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Series Editors: Mehmet Huseyin Bilgin · Hakan Danis

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Gökhan Karabulut
Giray Gözgor *Editors*

Eurasian Economic Perspectives

Proceedings of the 23rd Eurasia Business and Economics Society Conference

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Editors

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Editors
Mehmet Huseyin Bilgin
Faculty of Political Sciences
Istanbul Medeniyet University
Istanbul, Turkey

Hakan Danis
MUFG Union Bank
San Francisco, CA, USA

Gökhan Karabulut
Faculty of Economics
Istanbul University
Fatih, Istanbul, Turkey

Giray Gözgor
Faculty of Political Sciences
Istanbul Medeniyet University
Fatih, Istanbul, Turkey

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Preface

This is the Volume 1—Eurasian Economic Perspectives of the 13th issue of the Springer's series *Eurasian Studies in Business and Economics*, which is the official book series of the Eurasia Business and Economics Society (EBES, www.ebesweb.org). This issue includes selected papers presented at the 23th EBES Conference—Madrid that was held on September 27–29, 2017, at the *Faculty of Economics and Business, Universidad Complutense de Madrid* **in Madrid, Spain**.

Distinguished colleague *Giuseppe Ciccarone* from *Sapienza University of Rome*, Italy, joined the conference as keynote speaker. During the conference, participants had many productive discussions and exchanges that contributed to the success of the conference where 301 papers by 519 colleagues from 53 countries were presented. In addition to publication opportunities in EBES journals (*Eurasian Business Review* and *Eurasian Economic Review*, which are also published by Springer), conference participants were given the opportunity to submit their full papers for this issue.

Theoretical and empirical papers in the series cover diverse areas of business, economics, and finance from many different countries, providing a valuable opportunity to researchers, professionals, and students to catch up with the most recent studies in a diverse set of fields across many countries and regions.

The aim of the EBES conferences is to bring together scientists from business, finance, and economics fields, attract original research papers, and provide them with publication opportunities. Each issue of *the Eurasian Studies in Business and Economics* covers a wide variety of topics from business and economics and provides empirical results from many different countries and regions that are less investigated in the existing literature. All accepted papers for the issue went through a peer-review process and benefited from the comments made during the conference as well. The current issue covers fields such as public economics, regional studies, finance, economics of innovation, risk management, inequality, tourism, and international trade.

Although the papers in this issue may provide empirical results for a specific county or regions, we believe that the readers would have an opportunity to catch up

with the most recent studies in a diverse set of fields across many countries and regions and empirical support for the existing literature. In addition, the findings from these papers could be valid for similar economies or regions.

On behalf of the series editors, volume editors, and EBES officers, I would like to thank all presenters, participants, board members, and the keynote speaker, and we are looking forward to seeing you at the upcoming EBES conferences.

Istanbul, Turkey Gokhan Karabulut

Eurasia Business and Economics Society (EBES)

EBES is a scholarly association for scholars involved in the practice and study of economics, finance, and business worldwide. EBES was founded in 2008 with the purpose of not only promoting academic research in the field of business and economics but also encouraging the intellectual development of scholars. In spite of the term "Eurasia," the scope should be understood in its broadest terms as having a global emphasis.

EBES aims to bring worldwide researchers and professionals together through organizing conferences and publishing academic journals and increase economics, finance, and business knowledge through academic discussions. Any scholar or professional interested in economics, finance, and business is welcome to attend EBES conferences. Since our first conference in 2009, around *11,157* colleagues from *98* countries have joined our conferences and *6379* academic papers have been presented. ***EBES has reached 2050 members from 84 countries***.

Since 2011, EBES has been publishing two journals. One of those journals, *Eurasian Business Review—EABR*, is in the fields of industrial organization, innovation, and management science, and the other one, *Eurasian Economic Review—EAER*, is in the fields of applied macroeconomics and finance. Both journals are published quarterly by *Springer* and indexed in *Scopus*. In addition, EAER is indexed in the *Emerging Sources Citation Index* (*Clarivate Analytics*) and EABR is indexed in the *Social Science Citation Index (SSCI)*.

Furthermore, since 2014 Springer has started to publish a new conference proceedings series (**Eurasian Studies in Business and Economics**) which includes selected papers from the EBES conferences. The 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, and 20th (Vol. 2) EBES Conference Proceedings have already been accepted for inclusion in the *Conference Proceedings Citation Index – Social Science & Humanities* (*CPCI-SSH*). The 20th (Vol. 1), 21st, and subsequent conference proceedings are in progress.

We look forward to seeing you at our forthcoming conferences. We very much welcome your comments and suggestions in order to improve our future events. Our success is only possible with your valuable feedback and support!

With my very best wishes,

Klaus F. Zimmermann
President

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Contents

List of Contributors

Nidžara Osmanagić Bedenik Department of Managerial Econonomics, University of Zagreb, Zagreb, Croatia

Małgorzata Borkowska-Niszczota Department of Management Engineering, Bialystok University of Technology, Bialystok, Poland

Djula Borozan Department of National and International Economics, Faculty of Economics in Osijek, Josip Juraj Strossmayer University of Osijek, Osijek, Republic of Croatia

Elie Chrysostome Department of Business Administration, State University of New York Campus of Plattsburgh, Plattsburgh, NY, USA

Aidas Dilius Regional Development Institute, Siauliai University, Siauliai, Lithuania

Pawel Dobrzanski Department of Mathematical Economics, University of Economics in Wroclaw, Wroclaw, Poland

Julia Dubrovskaya Economics and Finances Department, Perm National Research Polytechnic University, Perm, Russia

Aleksandrs Fedotovs Department of Economics and Finance, RISEBA University, Riga, Latvia

Laura Girdžiūtė Faculty of Economics and Management, Aleksandras Stulginskis University, Kaunas, Lithuania

Jose M. Gómez-Gras Department of Business, Miguel Hernandez University of Elche, Elche, Spain

Liudmila A. Guzikova Graduate School of Public Administration and Financial Management, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation

Anastasia Ivanova Institute of Economics and Industrial Engineering SB RAS, Novosibirsk State University, Novosibirsk, Russia

Tomasz Jedynak Department of Risk Management and Insurance, Cracow University of Economics, Cracow, Poland

Jurgita Karaleviciene Economical Department, University of Siauliai, Šiauliai, Lithuania

Oksana Kashina Institute of Economics and Entrepreneurship, Department of Finance and Credit, Lobachevsky State University of Nizhny Novgorod, Nizhny Novgorod, Russian Federation

Nana Katsitadze Faculty of Economics and Business, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia

Halina Kiryluk Faculty of Engineering Management, Department of Marketing and Tourism, Bialystok University of Technology, Bialystok, Poland

Vedran Kojić Department of Mathematics, University of Zagreb, Zagreb, Croatia

Monika Kontrimaite Western Union Processing, Global Back Office Operations, Vilnius, Lithuania

Elena Kozonogova Economics and Finances Department, Perm National Research Polytechnic University, Perm, Russia

Nataliya Kravchenko Institute of Economics and Industrial Engineering SB RAS, Novosibirsk State University, Novosibirsk, Russia

Katarzyna Anna Kuzmicz Faculty of Engineering Management, Bialystok University of Technology, Bialystok, Poland

Svetlana Kuznetsova Institute of Economics and Industrial Engineering SB RAS, Novosibirsk State University, Novosibirsk, Russia

Meijuan Li School of Economics and Management, Yunnan Normal University, Kunming, China

Biying Ma School of Economics and Management, Yunnan Normal University, Kunming, China

Maria Alexandra Maassen Faculty of Business Administration in Foreign Languages, The Bucharest University of Economic Studies, Bucharest, Romania

Katarzyna Maj-Waśniowska Department of Public Finance, Cracow University of Economics, Cracow, Poland

Cristina Mora-Rodriguez Department of Business, Miguel Hernandez University of Elche, Elche, Spain

I. A. Natsvlishvili Faculty of Economics and Business, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia

Joanna Niżnik Finance Department/Faculty of Finance and Law, Cracow University of Economics, Cracow, Poland

Jarosław Odachowski Faculty of Law, Administration and Economics, Uniwersytet Wrocławski [Wroclaw University], Wrocław, Poland

Leon Olszewski Department of International Economic Relations, University of Wroclaw, Wroclaw, Poland
Department of Management, University of Business in Wroclaw, Wroclaw, Poland

Katarzyna Owsiak Local Finance Department/Faculty of Finance and Law, Cracow University of Economics, Cracow, Poland

Eugenia Panfiluk Bialystok University of Technology, Bialystok, Poland

Dubravka Pekanov Starcevic Department of Finance and Accounting, Faculty of Economics in Osijek, Josip Juraj Strossmayer University of Osijek, Osijek, Republic of Croatia

Sergey Petrov Institute of Economics and Entrepreneurship, Department of Finance and Credit, Lobachevsky State University of Nizhny Novgorod, Nizhny Novgorod, Russian Federation

Ekaterina V. Plotnikova Graduate School of Public Administration and Financial Management, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation

Darko Prebežac Department of Tourism, University of Zagreb, Zagreb, Croatia

Nataliya Pronchatova-Rubtsova Institute of Economics and Entrepreneurship, Department of Finance and Credit, Lobachevsky State University of Nizhny Novgorod, Nizhny Novgorod, Russian Federation

Mirjana Radman Funaric Polytechnic in Pozega, Požega, Republic of Croatia

Ewa Rollnik-Sadowska Faculty of Engineering Management, Bialystok University of Technology, Bialystok, Poland

Dalia Rudyte Economical Department, University of Siauliai, Šiauliai, Lithuania

Oksana Sakalosh College of Business Administration, Riga, Latvia

Janina Seputiene Institute of Regional Development, Siauliai University, Siauliai, Lithuania

Sevgi Sezer Burhaniye School of Applied Sciences, Bal?kesir University, Bal?kesir, Turkey

Arkady Shemyakin University of St. Thomas, St. Paul, MN, USA

Konrad Sobanski International Finance Department, Poznan University of Economics and Business, Poznan, Poland

Katarzyna Stabryła-Chudzio Department of Finance and Financial Policy, Cracow University of Economics, Cracow, Poland

Ivan Strugar Department of Informatics, University of Zagreb, Zagreb, Croatia

Grzegorz Strupczewski Department of Risk Management and Insurance, The Cracow University of Economics, Cracow, Poland

Elżbieta Szymańska Bialystok University of Technology, Białystok, Poland

Zita Tamasauskiene Regional Development Institute, Siauliai University, Siauliai, Lithuania

Antonio Jose Verdú-Jover Department of Business, Miguel Hernandez University of Elche, Elche, Spain

Agnieszka Wałęga Department of Statistics, Cracow University of Economics, Cracow, Poland

Nadezhda Yashina Institute of Economics and Entrepreneurship, Department of Finance and Credit, Lobachevsky State University of Nizhny Novgorod, Nizhny Novgorod, Russian Federation

Maria N. Zubareva Graduate School of Public Administration and Financial Management, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation

Part I
Public Economics

Cooperation Model of Public Employment Services and Private Stakeholders: Evidence from Poland

Ewa Rollnik-Sadowska

Abstract In the era of aging of European society, there is a need to rationalize public expenditures. As a result, it is crucial to increase the efficiency of public policy. It significantly refers to labor market policy, as on the one hand, it is responsible for activation of the unemployed, passive resources, increasing employability and optimal usage of labor supply. On the other hand, public entities conducting labor market policy (mainly public employment services—hereafter PES) are obliged to efficient management of public funds. The effectiveness of PES is strongly determined by the engagement of employers in realization of labor market instruments. Cooperation of PES with relevant stakeholders is needed to build up alliances for active policy. There are different models of such cooperation, with variant levels of partnership, communication channels, and mutual services. The main objective of the article is to determine the perspective cooperation model of PES and private companies in Poland. The quantitative study was realized among large companies in Podlaskie province. It is one of the Polish peripheral regions characterized by lower than average labor demand, lower purchasing power, and higher unemployment rate.

Keywords Labor economics · Labor market policy · Employers · Public employment services

1 Introduction

Labor market situation in the EU is not homogenous (Rollnik-Sadowska 2016a). It differs in terms of both unemployment levels as well as employment potential. However, currently there can be noticed some common trends of the EU labor market, which prove the gradual improvement of indicators and formation of the employee labor market. Unemployment rate of the EU-28 has been dropping as it

E. Rollnik-Sadowska (✉)
Faculty of Engineering Management, Bialystok University of Technology, Bialystok, Poland
e-mail: e.rollnik@pb.edu.pl

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was 9.2% in 2010 and in August 2017 the indicator reached 7.6%. At the same time, the employment rate has been increasing. In 2016, the EU-28 employment rate for persons aged 20–64 stood at 71.1%, the highest annual average ever recorded for the EU (Eurostat 2017a). The increase of labor demand can be also noted by the analysis of job vacancy rate, which measures the percentage of vacant posts compared with the total number of occupied and unoccupied posts. The job vacancy rate in the EU-28 was 2.0% in the second quarter of 2017, up from 1.9% recorded in the previous quarter and from 1.8% in the second quarter of 2016 (Eurostat 2017b).

While the unemployment rate is lowering, and employment is improving, serious problem is the inactivity of labor resources and scarcity of labor supply. It is severe issue in the area of aging society and, as a result, decreasing labor force. In 2016 the number of inactive persons as a percentage of the working age population (15–64) in the EU-28 reached the level of 27.1% (Eurostat 2017c). Even though the indicator has been continuing the downward trend, inactive population remains a heterogeneous group, e.g., as regards age, the level of attachment to the labor market and reasons for inactivity (Eurostat 2017c). Inactive population is mainly young people as more than 50% of men and women aged 15–24 are outside the labor force in the EU-28. The main reasons for youths' inactivity are education and training but the serious problem is also NEET phenomena when young people do not participate in any professional and educational activity (Rollnik-Sadowska 2016b). The likelihood of staying out of the labor market is also more than three times greater for the low educated than for highly educated people. Family responsibilities are still the main cause of inactivity and it mostly concerns women (Eurostat 2017c).

The creation of the employee labor market and the shortage of labor supply also redefine the tasks of public entities (like PES) implementing labor market policies. PES are not only responsible for coordination frictions on the labor market and reduction of unemployment (Petrongolo and Pissarides 2001; Weber 2016). The significant role of PES is also the support of employers in the field of reaching to a scarce workforce and complementing the labor force with professional qualifications that meet the needs of local labor demand.

In the paper, there was presented the example of Poland, one of the Central and Eastern European transition countries where the public structures are still under transformation process and adjustment to the market demands. The main objective of the article is to determine the perspective cooperation model of PES and private companies in Poland. The undertaken scientific method was desk research analysis to present the main assumptions of labor market policy in Poland. Moreover, the primary research was carried out among 38 large companies from one of the Polish provinces—Podlaskie region. The research results and secondary data analysis were the basis of construction of perspective cooperation model of PES and private stakeholders in Poland.

2 Public Employment Services: Its Role and Functions

PES role is related to human resource management as it is concentrated at improving social welfare through the following three channels: increasing labor market effectiveness; promoting equal access to labor market; mitigating the negative consequences of cyclical and structural changes in labor demand (Kalvāne 2015). Even though the PES main mission concerns labor supply, it cannot be realized without engagement of social partners. Participation of social partners in decision-making of PES can contribute to increasing efficiency of public entities. The implementation of labor market instruments may be less troublesome because these partners are able to create support among their respective stakeholders, namely employers and employee organizations (Leroy and Ludo 2014).

According to the study by Thuy et al. (2001), there can be determined four main functions associated with PES as job broking, providing labor market information, administering labor market adjustment programs, and administering unemployment benefits. The first function of PES is providing placement services. Job broking is the process through which the PES arrange for jobseekers to find jobs and for employers to fill vacancies. The rationale for job broking is that since neither employers nor jobseekers have full information about vacant jobs and candidates, there is a need for a service which can help with making the links between the two sides. The PES try to fill this lack of information and put employers and jobseekers in touch with each other (Thuy et al. 2001, p. 41). However, currently the counterparts to PES in terms of job broking are private employment agencies.

Through second function (labor market information) PES provide registered job seekers with information about job offers and registered vacancies with information about potential applicants. When operating efficiently, PES reduce search costs of both, job seekers and firms, thereby increase the labor market's matching efficiency and positively affect welfare (van Ours 1994; Yavas 1994; Fougère et al. 2009). The third of PES's functions (labor market adjustment programs) can be defined as comprising job-search assistance programs, training and education programs, and direct job creation programs. Job-search assistance programs are treated as orientation and career counseling as they include self-help provision, group activities (in the form of job clubs, job fairs, and workshops), and individual assistance (in the form of vocational guidance and intensive counseling programs) (Thuy et al. 2001, pp. 71–90). Additionally, PES administer benefit payments, monitor the job seekers' search efforts, and assign job seekers into training measures or jobs.

Increasing the efficiency of PES may have even larger effects on unemployment than reducing unemployment benefits (Launov and Wälde 2016). The European Commission (2010, 2015) therefore assigns PES a central role in its "Europe 2020 Integrated Guidelines." It recommends its member states to adopt policies that improve labor market matching and to implement performance measurement systems for their PES. The role of the PES in developed countries has shifted from that of traditional job broker or labor exchange to that of the executor of employment policy and labor market programs (Thuy et al. 2001). European Commission for

implementation of Europe 2020 strategy developed "PES 2020 Strategy." According to this strategy, PES services are divided into five groups, which are oriented to different PES clients. They include services for employers, services for alignment between labor market supply and labor market demand, services for improving workforce skills and competences, the unemployed sustainable activation services, and services for improvement of career of the unemployed.

3 Labor Market Policy in Poland: The Selected Issues

Labor market situation in Poland has been currently following the trend of creation of employee labor market and approaching to full employment. The unemployment rate in Poland reaches the lower level than the EU c (Eurostat). At the same time, employment rate notices gradual growth (from 58.3% in 2005 to 69.3% in 2016) (Eurostat).

The labor market situation in Poland is a component of many factors that affect demand and supply of labor. Significant determinants are demand factors like increasing competitiveness of Polish economy and development of SME sector or inflow of the EU structural funds. The supply factors are the relatively low price of labor as well as high level of education and skills of labor force (Kumpikaite-Valiūniene et al. 2016).

Labor market policy in Poland is based on the low provided by the Act on the promotion of employment and labor market institutions from April 20, 2004, (with later amendments). It determines, among others, the tasks of PES, the rules of financing of these entities. Moreover, the Act specifies the labor market instruments provided by the county labor offices. Those instruments are targeted at groups in a special situation on the labor market (like e.g., young people below 25, long-termed unemployed, the unemployed aged more than 50, the unemployed with low qualifications, and disabled unemployed).

Labor market instruments in Poland are divided into two main groups—active labor market policy tools and passive supports. Active labor market policy tools consist of supply and demand oriented (Wiśniewski and Zawadzki 2010). Instruments for labor supply support are primarily training, internship, employment counseling, and partly job broking (by providing the unemployed with information on vacancies). Demand-driven instruments include all forms of subsidized employment and partly job broking (in terms of providing employers with recruitment services).

PES in Poland play an important role in implementation of labor market policy. They include 338 county and 16 voivodeship labor offices, the Ministry of Family, Labor and Social Policy, and 16 voivodeship offices performing the tasks specified by the law. The entities, which are responsible for implementation of labor market policy, are mainly county labor offices. They are decentralized and they are managed on the level of local authorities. Those units fulfill all four functions mentioned

above but the increasing impact is put on the third function by realization of active labor market instruments—both supply and demand oriented.

The effective implementation of these instruments would not be possible without the involvement of employers. Supply oriented instruments require providing the place for realization of internships and trainings. Demand oriented instruments are directed to current and future employers. The representatives of public authorities who administer Polish PES notice the significance of development of cooperation with private stakeholders and it is the reason of organizational changes in those entities. In 2014, among others, it was implemented, by the amended Act on the promotion of employment and labor market institutions, the new position in county labor offices—the counselor of institutional clients. That specialist provides the services for employers by offering labor market instruments. Communication channels of PES and private companies depend on the solutions implemented in the separate county labor offices but they are based on both indirect contact—mainly telephone communication as well as direct meetings (Kobylińska et al. 2016).

4 Cooperation of PES and Private Stakeholders in Poland: Current Situation and Perspectives

Primary research was conducted in the second half of 2017 to deepen the analysis of the current model of cooperation between PES and private companies as well as to distinguish the prospective model. Quantitative research was carried out using the Pencil and Paper Interview (PAPI) technique. It was realized on the sample of 38 large enterprises of Podlaskie province (Poland). The size of enterprise was assessed according to the number of employees (250 and more) or turnover (30 million PLN or more).

The respondents represent quite balanced gender structure as 58% were male and 42% female. They are well educated, the majority (80%) have higher education and 17% of respondents hold an MBA diploma. They represent the top management of large companies (47% are senior managers, 26%—owners or co-owners, 19%—chairman of the board and 8% represented members of the board). The researched companies came mainly from the industry (63%), the minority represent construction sector (11%), transport (8%), trade (6%), and agriculture (3%). The enterprises represented by the respondents have a good situation with prospects of development. Forty percent of researched managers state that the company is intensively developing and 42% that it is developing. Only 13% of respondents indicate that their business is poorly developed and 5% identify it as stagnant. 82% of respondents have already cooperated with PES during the last 3 years (mainly with county labor offices). However the average rating of PES is below 4[1] and county labor offices are assessed even lower−3.35.

[1]The scale was from 1 (the lowest rank) up to 5 (the highest rank).

Employers use mainly instruments that provide them with a reduction in the cost of running the business. The most popular forms of cooperation with PES are subsidized training (used by 68% of respondents, rating 3.88) and subsidized internship (61%, rating 4.09). However, respondents also appreciated other services offered by PES, which provide for employers better access to new employees and improving skills in the workforce. Representatives of large enterprises from Podlaskie province positively assess dissemination by PES of the job advertisement issued by the employer (used by 61% of respondents, rating 3.14); trainings organized by PES (47%, rating 3.22), and recruitment services by PES (39%, rating 2.93). It is worth noting that subsidized forms are quite highly rated by employers but other services have an evaluation slightly above 3 or even below that level.

The representatives of large Polish companies also indicated the main barriers of cooperation with PES, which is lack of flexibility in terms of target groups and funding areas (71% of respondents supported the statement); bureaucracy and complicated procedures (58%); extended waiting time for getting support (53%), granting support only within a given calendar year (50%). The above inconveniences result mainly from systemic solutions, legal regulations which set out the scope and procedure of applying for support. The researched managers when analyzing the barriers, indicated the aspects of cooperation which make it difficult for entrepreneurs to choose for them the convenient area of support in a favorable period of time and additionally are complicated and time consuming.

The respondents were also asked to identify the perspectives of cooperation with PES which would be adjusted to the needs and capabilities of employers. Firstly the representatives of large Polish enterprises from Podlaskie province determined the expected forms of support—Fig. 1. The most desirable labor market instruments which in the opinion of employers are the most favorable in the future cooperation

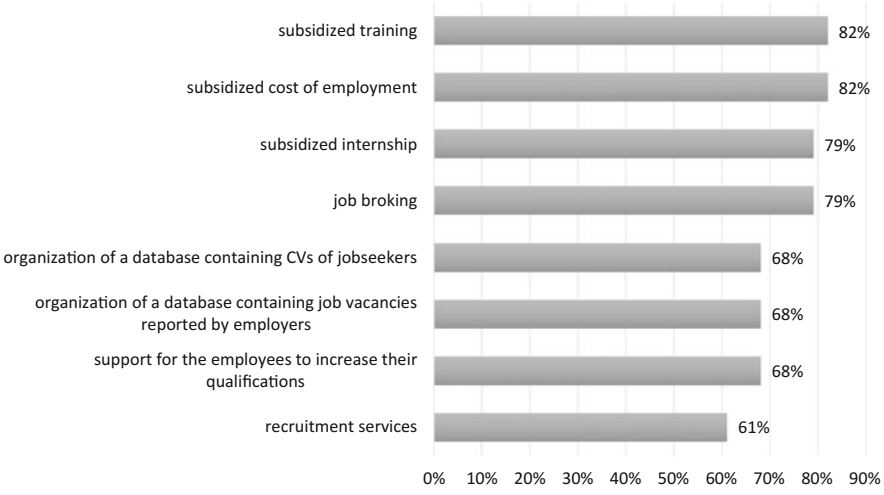

Fig. 1 Expected forms of support. Source: Own study

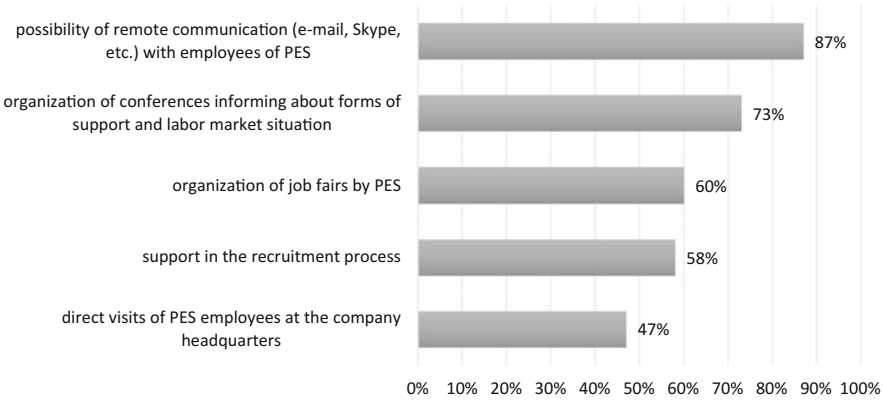

Fig. 2 Expected actions. Source: Own study

with PES are mainly subsidized forms (training—82% of respondents selected that instrument, employment—82%, internship—79%). Another instruments are also appreciated by respondents like job broking (79% of followers), organization of databases useful in recruitment process (68%), and support for employees to increase their qualifications (68%). Simultaneously, recruitment services are assessed as the ones relatively less appreciated by the large enterprises (61% of respondents regarded them as expected forms of support). Large companies often contain in their structure HR Departments responsible for recruitment process, which could be the reason that they do need external support. At the same time, as it was already mentioned, existing recruitment services provided by PES are poorly rated by researched large enterprises.

Moreover, respondents assessed the expected actions, which should be taken by PES in the future to improve the cooperation—Fig. 2. The most important for employers are changes of communication channels. Eighty-seven percent of representatives of large enterprises would appreciate the possibility of remote communication (via e-mail, Skype). On the contrary, direct visits of PES employees at the company headquarter are expected by only 47% of respondents. Other desirable activities are organization of conferences (73%), job fairs (60%), and support in the recruitment process (58%).

Summarizing the above research results, there can be identified three crucial areas of cooperation between PES and private stakeholders—Fig. 3. The first one is legal systemic solutions assuring long-term planning of expenses, lower bureaucracy, and higher flexibility of usage of labor market instruments. Longer (than 1 year) budgeting of funds by county labor offices would allow for planning long-term cooperation with employers. The individualization of support and the limitation of formal procedures would ensure a greater involvement of entrepreneurs in realization of labor market instruments.

The second area of cooperation between PES and private stakeholders is the variety of instruments offered by PES. Beside subsidized forms of training, internship, and employment, it is also expected to develop recruitment services and

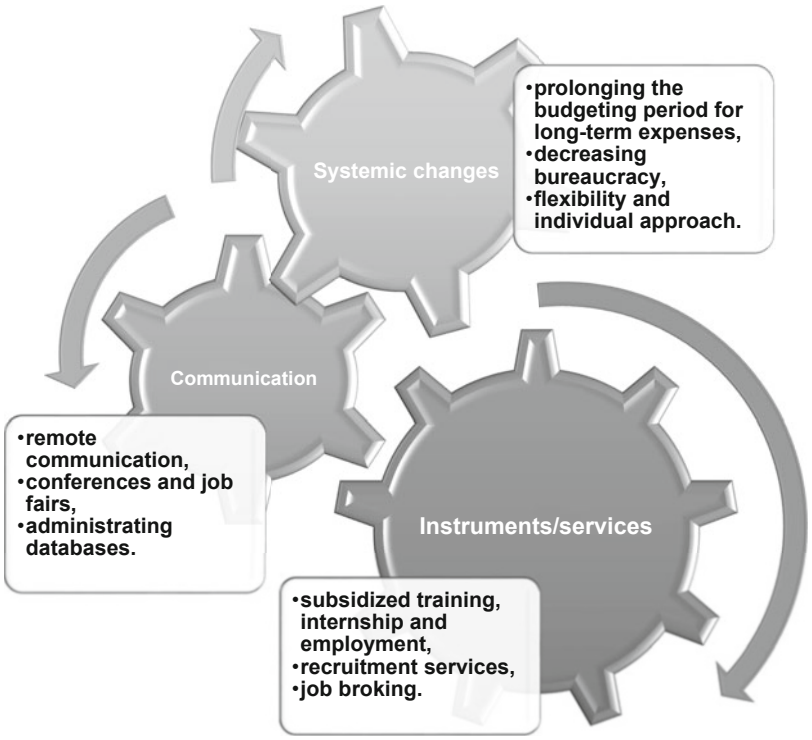

Fig. 3 Perspective model of cooperation of PES and private stakeholders in Poland. Source: Own study

maintain job broking. It is crucial to offer customer-oriented services, which on the one hand they are adjusted to the needs of the job seekers and simultaneously are tailored to employers' requirements. The research results prove that poorly developed aspect of support is offering recruitment services for entrepreneurs. The current PES offer in that area is poorly rated by the recipients of these services. The experience of Western European countries shows that recruitment services are an important aspect of cooperation with private stakeholders (Marklund and Rollnik-Sadowska 2016). The crucial issue of cooperation model is also expansion of communication channels. The desirable forms are remote communication, dissemination activities by organization conferences and fairs as well as providing databases for the exchange of recruitment information.

5 Conclusion

In the face of current labor market developments, which are approaching full employment, there is a need to redefine priorities of PES and as a result, adjust governance and business model of the PES. Such situation concerns also Poland.

There is a growing need to develop cooperation with employers to effective implementation of labor market instruments. The results of the research prove that Polish PES offer wide variety of labor market instruments for private companies. Although the subsidized instruments and job broking are well assessed by employers, the recruitment services need implementation of improvements as their rating is low.

Despite the variety of labor market instruments, employers are not respectively aware of PES offer because of limited communication channels, especially in terms of insufficient remote contacts. Moreover, due to bureaucracy, private stakeholders limit their application for support. In addition, there are some systemic restrictions, which reduce the flexibility of the cooperation and possibilities of long-term planning.

PES can anticipate and influence labor market changes proactively by information exchange with policy-making bodies, local authorities, and working with the private sector. However, as the labor market is a subject of continuous transition, PES should evolve to adjust their structure and offer to those changes.

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Public Expenditure on Social Protection in the Light of the Europe 2020 Poverty Objective

Katarzyna Maj-Waśniowska, Katarzyna Stabryła-Chudzio, and Agnieszka Wałęga

Abstract The problem of poverty and social inequality has become extremely important as a consequence of the 2008 financial and economic crisis. Taking into consideration, the Europe 2020 targets lifting at least 20 million people out of the risk of poverty and social exclusion compared with 2008 it seems necessary to check to what extent the member states of the European Union are capable of meeting their imposed requirements. The main aims of the paper include: the description of the EU strategy concerning fight with the poverty and social exclusion, its objectives and the methods used in their implementation in the Member States, analysis of European measures of poverty and social exclusion in Poland against the background of European Union countries and correlation between the level of public expenditure on social protection and indicators of poverty contained in the Europe 2020 strategy. Panel data models (longitudinal data) were used in the research. EU countries will also be subdivided into relatively homogeneous groups in terms of selected poverty rates. The study finds that the variation in the level of spending on social protection was reflected in the degree to which individual EU countries have achieved benchmarks. A higher level of GDP per capita results in a reduction in poverty while an increase in the unemployment rate raises the level of the analyzed poverty rates.

Keywords Europe 2020 strategy · Public expenditure · People at risk of poverty or social exclusion · Social protection

K. Maj-Waśniowska (✉)
Department of Public Finance, Cracow University of Economics, Cracow, Poland
e-mail: katarzyna.maj@uek.krakow.pl

K. Stabryła-Chudzio
Department of Finance and Financial Policy, Cracow University of Economics, Cracow, Poland

A. Wałęga
Department of Statistics, Cracow University of Economics, Cracow, Poland
e-mail: agnieszka.walega@uek.krakow.pl

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1 Introduction

According to Article 5, 151, and 153 of the Treaty on the Functioning of the European Union (European Union Treaty 2012), the Union may take initiatives to ensure coordination of Member States' social policies. The EU and the Member States, aware of the fundamental social rights expressed in the European Social Charter, signed in Turin on October 18,1961, and in the 1989 Community Charter of Fundamental Social Rights of Workers, aim to promote employment, improved living, and working conditions so as to enable them simultaneous progress, adequate social protection, dialog between the social partners, the development of human resources to increase and maintain employment and to prevent exclusion. To that end, the Union and the Member States shall put into effect measures which take into account the diversity of national practices, in particular in the area of contractual relations, and the need to maintain the competitiveness of the Union economy. The Union supports and complements Member States' efforts to combat social exclusion.

In the treaty of Rome (EEC Treaty 1957) (Treaty establishing the European Economic Community), internal actions were limited to a few issues related to social policy, given their importance for each Member State. Issues at Community level were to add value to national activities. First poverty programs in the European Communities occurred in mid-1970 and the concept of social exclusion popularized in France was adopted in the EU in 1990 as the integration of the least privileged (Mathieson et al. 2008).

The Single European Act (1987) and the prospect of the internal market have broadened the scope of Community action for research and technological development (Title VI), environmental protection (Title VII), and enriching the Community's social policy with respect to occupational safety and health. In the next treaties, introducing amendments to the Treaties of Rome, further social issues were extended to education, vocational training, and youth affairs. There are also new sections on culture, health, consumer protection, trans-European networks, and industry.

In the light of these considerations, we have formulated questions: What is the difference between the concept of poverty and social exclusion? What is the significance of the Europe 2020 strategy in the context of reducing poverty and social exclusion in the European Union as a whole and in every Member State? What are the aims and means of implementation of the policy in the scope of poverty reduction and social exclusion in Poland? How have the poverty and social exclusion indicators in the European Union changed in the years 2008–2015, with particular emphasis on Poland?

We have also hypothesized that the level of public expenditure on social protection is essential to level of poverty rates in EU as a whole and the Union's individual countries (Kiendrebeogo et al. 2017). The research problem and the hypothesis are the basis for establishing the main aims of the chapter, which include: the explanation of poverty and social exclusion meanings, the description of the EU strategy concerning fight with the poverty and social exclusion, its objectives and the

methods used in their implementation in the Member States and analysis of European measures of poverty and social exclusion in Poland against the background of European Union countries and analysis of correlation between the level of public expenditure on social protection and indicators of poverty contained in the Europe 2020 strategy. Also the similarity of EU countries was examined in relation to the level of poverty indicators. The chapter ends with the most important conclusions to be drawn from the research.

2 Literature Review

It exists an exhaustive literature concerning the concept of poverty and social exclusion. In these definitions, poverty is linked to the fact that certain needs are not satisfied at the desired level, but it is necessary to identify which needs can be considered as basic and what level of satisfaction they need to be considered desirable. In the 1960s, poverty was combined with basic needs such as food, clothing, and housing, which are the elements necessary to survive. However, over time, the definition was extended to include nonfinancial aspects (lack of or low educational attainment, exclusion from civic, social, and cultural life, etc.) (Panek and Zwierzchowski 2013).

According to the European Commission (2010b), poverty is defined as a lack of sufficient income and material resources to live in dignity; limited access to basic services, such as housing, education, and healthcare, exclusion from labor market and work of low quality. Although the Council of the European Union (2004, p. 8) expressed in a wider way that the concept of poverty by taking into consideration also exclusion or marginalization from participating in economic, social, and cultural activities that are the norm in a society, and restricted access to fundamental rights. As Panek and Zwierzchowski (2013) point out, poverty, according to Sen (2000), means not only the lack of sufficient financial resources (as current and cumulative resources) but also the inability to achieve the means of activities corresponding to person's lifestyle. This lack of ability to achieve the individual's desires for functioning may result from either insufficient financial resources or other constraints such as lack of appropriate qualifications, discrimination, or infrastructure barriers. Moreover, poverty is identified by Sen not only with the lack of access to goods and services but also with the lack of opportunities for participation in decision-making and in civic, social, and cultural life.

In consequence, poverty measurement and analysis are evolving rapidly (Lang and Lingnau 2015). A variety of approaches are required to do justice to the complex and multifaceted nature of poverty and social exclusion (Alkire and Foster 2011; Alkire et al. 2015; Alkire and Apablaza 2016; Dhongde and Haveman 2017; Mauro et al. 2018). Nowadays the nonmonetary deprivation indicators are playing an important role in capturing poverty (Watson et al. 2017; Nolan and Whelan 2018).

Additionally, the European Commission states that social exclusion (Eurostat 2016) of certain individuals occurs when they are pushed to the edge of society as a

result of their poverty, lack of basic competencies, and lifelong learning opportunities, or discrimination. Levitas et al. (2007, p. 9) underline that it exists different degrees of severity of social exclusion. In general social exclusion is defined in a more complex way than the European Commission emphasizing also that it affects not only the quality of life of individuals but simultaneously also the cohesion and equity of the whole society. In effect, the most important risk or factor of social exclusion is poverty. However, social exclusion is also possible without being poor (Lecerf 2016). As Duffy (1995) points out social exclusion is a broader notion than poverty with low material means and also distance from mainstream society.

Consequently poverty could be included in social exclusion and both concepts could be interpreted as a process and as a state (Silver 1994; Sen 2000; Estivill 2003). Barnes (2005) attempted to make distinction between deprivation and social exclusion linking the first notion with physical and material needs while the second also with societal participation. Although, it seems that both concepts should be treated as the same phenomenon, because individual could be deprived also of social needs (Bossert et al. 2007).

The European Commission distinguishes absolute and relative poverty (Eurostat 2016) and this approach is also developed in the study of poverty (Duclos and Grégoire 2002; Notten and De Neubourg 2011; Panek and Zwierzchowski 2013). The absolute category of poverty is based on the concept of the degree of satisfaction of needs defined in specific quantitative and qualitative categories. The problem of poverty according to the followers of the absolute approach is resolved when all the members of society are provided with the satisfaction of their basic needs. Poverty in the absolute sense can thus be completely eliminated through economic growth. The category of relative poverty is based on the comparison of the level of satisfaction of the needs of individuals (persons, families, and households) to the level of satisfaction of these needs by other members of society. Poverty in this sense cannot in practice be completely eliminated but only reduced by decreasing unevenness in the level of satisfying needs. Critics of the relativistic approach indicate that it does not allow for a fixed point of reference for comparisons of poverty in time and space and thus makes it difficult to assess the effectiveness of policies aimed at fighting poverty. In addition, obtaining a relative assessment that there has been an increase in the level of satisfying needs may not be the result of the actual increase in their satisfaction, but lessening the inequalities in the level of satisfaction of these needs in the population studied. On the other hand, the absolute approach creates problems of both conceptual and methodological nature related to the set of basic needs in the category of poverty, the minimum level of satisfaction, and the quantification. In addition, the definition of poverty always depends on the specific characteristics of the social and cultural community in question, the climate, and changes in time, even for the same community and its development.

Beck (1992) points out that research concerning poverty and social exclusion should bring into consideration the aspect of the poverty dynamic analyzed from the point of view of temporization and democratization (Tran et al. 2015). The first one is defined by duration of the process in question and the second one could be interpreted as social risk that not only belongs to the lower socioeconomic classes or some marginalized groups but also reaches wider population.

3 The Europe 2020 Strategy and Its Implications

In 2010 the Europe 2020 strategy (European Commission 2010a) has replaced the former Lisbon Strategy (European Council 2000) to reach targeted improvements. Despite the failure to achieve the objectives of the previous document, the European Commission, together with the Member States, has acknowledged that striving for earlier results should be strengthened and better coordinated. Thus, the open method of coordination on social protection and social inclusion of the Social Security Approach by Member States has been used (European Commission 2011), while at the same time providing support to the European Commission, which monitors progress in line with the agreed objectives by analyzing the Stability and Convergence Program as well as the National Reform Programs. The involvement of EU institutions within the European Semester does not refer only to ensuring the sustainability of public finances per se but also has a broader context in the analysis of other policies aimed at contributing to economic stability throughout the European Union.

In the Europe 2020 Strategy (European Commission 2010a), a social dimension is the guiding principle. Beginning with issues related to raising the level of education and training, by increasing employment, and ending with the fight against poverty and social exclusion (Rakipi 2018). Two other issues, i.e., environmental protection and innovation in the European Union, are also aimed at improving the standard of living of citizens. Among the seven flagship initiatives, that is, programs considered to be important for economic growth, attention should be paid to the "European Poverty Reduction Program," which aims to contribute to lifting at least 20 million people out of poverty and social exclusion by 2020. Consequently a European Platform against Poverty and Social Exclusion was created in 2010 to establish a framework for common actions of the EU institutions, Member States and other authorities, organizations, and institutions (i.e., social partners and NGOs). It is necessary that the EU poverty target should be enhanced by the national ones in a coordinated way with the use of not only national financial resources but also European Structural and Investment Funds and the European Fund for Strategic Investments (EFSI). The EU initiatives corresponding to the European Platform against Poverty and Social Exclusion are divided into six groups (European Commission 2013, 2014a, b).

The Europe 2020 strategy (European Commission 2010a) promotes social inclusion, in particular through the reduction of poverty, by aiming to lift at least 20 million people out of the risk of poverty and social exclusion (to reduce the number of people at risk of poverty or social exclusion) (European Commission 2010a). This indicator corresponds to the sum of persons who are at risk of poverty and/or severely materially deprived and/or living in households with very low work intensity (Table 1). A person who lives in a household experiencing at least one of the three above is therefore considered to be at risk of poverty or social exclusion. It should be noted that people are counted only once, also when they are at risk of more than one form of poverty or social exclusion (if they are present in several

Table 1 Three indicators defining Europe 2020 strategy target for the reduction of poverty and social exclusion

Name	Description
The at-risk-of-poverty rate (after social transfers)—the rate of relative monetary poverty	The at-risk-of-poverty rate also reflects the definition of poverty adopted by the European Council in 1975 who defined the "poor" as "those individuals or households whose resources are so low as to exclude them from the minimum acceptable way of life in the country where they live." The risk of poverty threshold is set at 60% of the national median equivalized disposable income (after social transfers). Equivalized income is defined as the total household income (including all sources of current income available to the household after social transfers and direct taxes) divided by its "equivalent size" to take account of the size and composition of the household. This is a relative approach to measuring poverty, according to which the poverty threshold is linked to the standard of living in each country. This measure determines the population group in each of the countries being in the relatively hardest income situation (without reference to the level of income in other countries).
The index of material deprivation (severe material deprivation rate)	People are considered "materially deprived" (the share of people unable to afford specific goods and services) if they experience at least 4 out of 9 deprivations: people cannot afford (1) to pay their rent or utility bills, (2) keep their home adequately warm, (3) face unexpected expenses, (4) eat meat, fish, or a protein equivalent every second day, (5) a week of holiday away from home once a year, (6) a car, (7) a washing machine, (8) a color TV, or (9) a telephone.
The percentage of people living in households with very low work intensity	People living in households with very low work intensity are people aged 0–59 living in households where the adults work less than 20% of their total work time potential during the past year (situations where, taken all together, adults in the household do not work enough to make a living for the whole household). It is treated as a measure of social exclusion. The intensity of household work constitutes the ratio of the total number of months through which the members of a given household being in a working age worked in the reference year, to the number of months which they could theoretically have worked if they had used their full potential.

Source: European Commission (2010b, 2011)

sub-indicators). Combating poverty and social exclusion takes three dimensions: reducing poverty and social exclusion, eradicating poverty, and finally counteracting these phenomena. While the reduction of poverty and social exclusion is possible and feasible, also by means of prevention, elimination seems to be extremely difficult to implement, if not impossible. This does not mean, however, the resignation from striving for such a status, which should contribute to significant progress in actions. It can be assumed that such is the case in the Europe 2020 strategy (European Commission 2010a), where the fight against poverty and social exclusion is monitored by three indicators. It should be stressed again that these indicators do not give a picture of three distinct groups in society. As a result, we can distinguish (European Commission 2011):

1. People at risk of poverty, not deprived, not unemployed
2. People not at risk of poverty, deprived, not unemployed
3. People not at risk of poverty, not deprived, unemployed
4. People at risk of poverty, deprived, not unemployed
5. People at risk of poverty, deprived, unemployed
6. People not at risk of poverty, deprived, unemployed
7. People at risk of poverty, not deprived, unemployed

Persons whose income is less than 60% of median for a given country are considered to be at risk of poverty. This is a relative measure of poverty, linked to the distribution of income and taking into account all sources of income. The indicator of serious material deprivation describes the situation of people who cannot afford the goods deemed necessary for a decent life in Europe. It reflects both the distribution of resources within the country and differences in living standards and GDP per capita across Europe. These two indicators are the effect of convention which means that a change of the benchmark or threshold could influence the results. The third ratio of people living in very low intensity households describes the situation of people living in households where no one works (or members of the household work to a very small extent) but who do not necessarily maintain a very low income. The European Commission has recognized that the objectives are necessary for the adoption by the Member States of their own sub-strategies, which will show in-house actions bringing the results closer. The ease with which indicators are monitored is a cornerstone of the Europe 2020 strategy (European Commission 2010a), as targeted analysis is an important tool for communication between the public, states, and the EU institutions. According to the definition adopted by the European Commission (2011), most vulnerable to poverty or exclusion are children, the elderly, women, young people, single parents, under-qualified, unemployed, inactive people of working age, including the disabled, people living in rural areas, families with only one earner, households with dependents, people with migrant background, certain ethnic minorities (such as Roma), people with disabilities and the low skilled.

However, as indicated by Panek and Zwierzchowski (2013), there is an important drawback of the EC methodology. The method of identifying monetary poverty (calculated independently for each EU country) does not treat the EU as a single

organism but considers the poverty in individual EU countries independently. This raises the extent of poverty in wealthy countries and regions (high income equivalent) and underestimates them in the less affluent countries and regions. As a result, the implementation of the Europe 2020 strategy (European Commission 2010a) in the area of poverty reduction will result in a reduction in the income spans within individual EU countries rather than reducing the poverty gap by focusing on helping the 20 million poorest in the EU treated as a whole. In addition, the relative way of measuring the poverty line is that the indicators of monetary poverty used by the EU become indicators of income inequality and not measures of poverty. Moreover, the adoption of different levels of poverty in Member States (60% of median income distribution in different countries) makes the poverty assessments, as already indicated, incomparable across countries.

4 Poverty Reduction in the EU Member States

Government policy reduces poverty through many channels. The social policies of EU Member States aiming at reducing poverty and social exclusion should use both incentive measures (via labor law, tax and insurance schemes, tax incentives and legislative enhancement to create own business, grants, job search support, courses and training as activation assistance) and social transfers reducing income inequalities (unemployment benefits, minimum income schemes, disability pensions, family and child allowances). Social expenditure should be countercyclical. The level of social benefits, eligibility criteria, and duration of transfers needs to be prepared in such a way to avoid the exit from or encourage active participation in the labor market. European Commission (2011) emphasizes that it exists a risk that many people moving onto long-term sickness and disability benefits or early retirement schemes are likely never to return or enter the labor market.

As the European Commission (2011) underlines, richer countries of the EU spend a larger share of their GDP on social protection policy. The general tendency is that the main group expenditure in this field is on the first place old-age pensions and on the second—sickness, healthcare, and disability benefits (Fig. 1).

Number of people exposed to poverty and social exclusion in the EU (including persons exposed to financial poverty, living in material deprivation, or in households affected by unemployment) increased from 115.9 million in 2008 (EU-27) to peak value—123.6 million in 2012 (EU-28). The main reason for the situation was the economic crisis and recession which occurred in most Member States afterward (Eurostat 2016). In 2015 it could be observed an important decrease to 119.1 million people, but still it is not close to the level from 2008. From 2008 cumulative difference in number of population at risk of poverty or social exclusion grew by 1.85 million people (in the euro area—to 5.47 million people). The EU has therefore moved away from its goal—which is 96.4 million people by 2020—and there is no sign of rapid progress in remedying this situation; By 2020 the number of people at risk of poverty may be close to 100 million. The crisis has revealed the need for

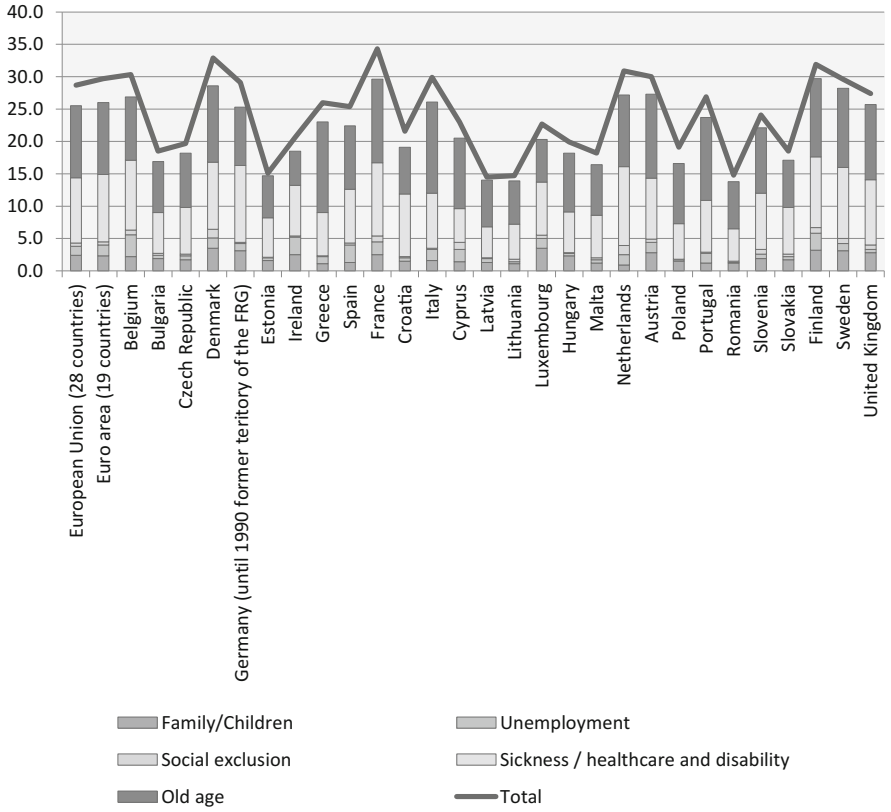

Fig. 1 Gross expenditure on social protection benefits, by function, in % of GDP—2014. Source: Eurostat (2017)

effective social protection systems (European Commission 2014b). In 2015 five countries have already obtained better results than their 2020 objectives—Romania, Poland, Bulgaria, the Czech Republic, and Latvia (Fig. 2). Of course, it does not mean that the situation will not change and the targets will be reached in 2020.

The at-risk-of-poverty-or-social-exclusion (AROPE) rate in the 28 Member States (EU-28) increased to 2012 (24.7%), followed by a slow fall in 2015 which corresponds to the level from 2008 (23.8%). The highest rate in 2015 was recorded in Bulgaria (41.3%), Romania (37.4%), and Greece (35.7%), the lowest in the Czech Republic (14%), Sweden, (16%) and the Netherlands (16.4%). It is important to emphasize that the overall decrease in the ratio in comparison with the previous year in most EU countries, with the exception of five countries—Bulgaria, Italy, Cyprus, Lithuania, and Slovakia, with the increase in the first four countries, while Slovakia remained at the same level.

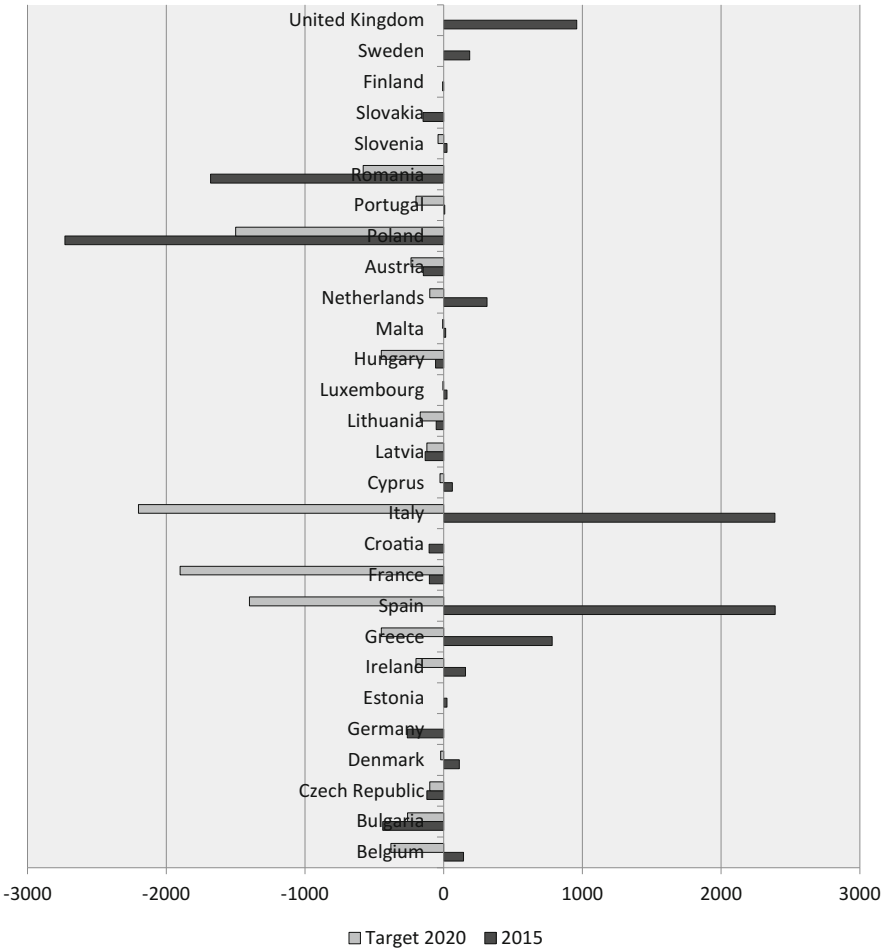

Fig. 2 People at risk of poverty or social exclusion. Cumulative difference from 2008, in thousands. Source: Authors' own calculations based on Eurostat (2017)

According to the European Commission (2010b) "in 2008, more than 80 million people across the Union lived below the poverty line,[1] that is, more than the population of our largest Member State, or 16.5% of our population." The rate could be much bigger if it takes into consideration kind of exclusion which is not related to income. Moreover it should be stressed not only national but also regional perspective of poverty. Territorial dimension of poverty means that "the very "poorest people" are often concentrated in particular regions or even smaller areas."

Progress on reducing poverty and social exclusion is still very limited. As the European Commission (2014a, b) points out in the period 2008–2012 vulnerability

[1]People at risk of poverty after social transfers (monetary poverty).

to poverty and social exclusion has increased in most EU countries, consequently after financial and economic crisis. National levels of poverty targets showed a growing gap between the best and least well-performing Member States and regions. The crisis has also highlighted growing inequalities in the distribution of wealth and income.

It should be underlined that the poverty rate used in Europe 2020 strategy (European Commission 2010a) does not bring information about the poverty dynamics in the European Union. In a consequence additional analysis made by Vaalavuo (2015) shows that the meaning of long-term poverty varies significantly between Member States. The probability of exit from poverty decreases with the years spent in this state. The threat of permanent social exclusion is strongly correlated with the duration of individual's poverty. Therefore, it is essential to use early intervention and preventive measures.

5 European Measures of Poverty and Social Exclusion in Poland Against the Background of European Union Countries

The starting point for an analysis of poverty and social exclusion is income level analysis. The level of average disposable income[2] in the European Union countries is very diverse, with Poland being one of the countries with the lowest incomes. In order to ensure the reliability of comparisons of the income situation in the countries of the European Union, the so-called PPS (Purchasing Power Standard) is used. PPS constitutes a common contractual currency, the unit of which is a purchasing power standard. The value of one PPS is equal to the number of units of the national currency corresponding to 1 euro on the domestic market, taking into account the relation of prices of consumer goods and services in a given country to those of other countries participating in the comparison (Eurostat 2014a).

The value of the average annual equivalent income[3] in Poland amounted to about 11.4 thousand PPS is 2015 (about 26.6 thousand PLN), and the median−9.6 thousand PPS (about 23.2 thousand PLN). Of all the EU Member States, Luxembourg had the highest average annual disposable income per equivalent entity (about 33 thousand PPS) as well as Austria and France (24.5 thousand PPS and about 23.2 thousand PPS, respectively). The lowest average annual disposable income was recorded in the new Member States of the European Union, with the least favorable

[2]Disposable income defined as the sum of net cash income (after deduction of income tax advances, property taxes, social security, and health contributions) of all household members less by: real estate taxes, money transfers transferred to other households and settlements with the Tax Office.

[3]Income calculated per equivalent unit is obtained by dividing the achieved household disposable income by the number of equivalent units corresponding to that household.

situation in 2015 in Romania (about 5 thousand PPS), Hungary (about 9 thousand PPS), and Bulgaria (about 8.5 thousand PPS). Similarly as in the case of the average, the highest median disposable income was recorded in Luxembourg (around 29.3 thousand PPS) and in Austria and Sweden (22 thousand PPS and about 21 thousand PPS, respectively), and the lowest median value of disposable income was observed in Romania (about 4.4 thousand PPS) and in Bulgaria and Latvia (approximately 6.9 thousand PPS and about 8.1 thousand PPS, respectively) (Eurostat 2017).

When analyzing the income situation, attention should also be paid to the scale of income disparities in individual countries. To assess these inequalities in the EU Member States, the Gini coefficient and the quintile income differentiation index are used (the so-called indicator of income inequality S80/S20).

The Gini coefficient is defined as the relationship of cumulative shares of the population arranged according to the level of equivalized disposable income, to the cumulative share of the equivalized total disposable income received by them (Eurostat 2014b). The higher the value of the indicator, the higher the degree of income concentration and the greater the differentiation in the country. The Gini coefficient for all 28 EU Member States in 2015 was 31. The highest concentration of income was recorded in Bulgaria, Romania, and Lithuania. In these countries, the value of the indicator was about 37. The lowest Gini coefficient was recorded in Slovakia, Slovenia, and the Czech Republic, where the index was around 23.5–25. In Poland, the discussed coefficient was similar to the EU average and reached a level of 30.6 in 2015. In regards to 2008, there was a decrease in the value of the indicator in Poland by 1.4 points, and in relation to 2010 by 0.5 points (Eurostat 2017).

If, however we take into account the Gini coefficient of equivalized disposable income before social transfers (pensions included in social transfers) the value of the coefficient increases in 2015, for the whole of the Community to 51.8. The highest values were observed in Portugal (64.1), Greece (60.7), and Germany (56.4), and thus these are different countries than those indicated in the above paragraph. This demonstrates the importance of social transfers that significantly reduce income inequalities. The lowest value was determined for Slovakia, Malta, and Czech Republic (below 45). In Poland, a much lower rate was recorded in 2015–47.9, which is 1.9 points lower than in 2008 (Eurostat 2017).

The value of the Inequality of income distribution S80/S20 (income quintile share ratio) (Eurostat 2014c) in the European Union was 5.2 in 2015, which means that the total income of 20% of households with the highest level of equalized income for disposal (V quintile group) was more than five times higher than the sum of income of 20% of the lowest income households (I quintile group). The countries where in 2015, the highest quintile differentiation of equivalent income was observed were Romania (8.3), Lithuania (7.5), and Bulgaria (7.1). This indicator obtained the lowest value in the Czech Republic and Slovenia (3.5), as well as Slovakia (3.6). In Poland, in the years 2008–2015 the value of the indicator was close to 5, however in 2013, it reached a level of 4.9, which remained unchanged until 2015 (Eurostat 2017).

Table 2 At-risk-of-poverty rate by poverty threshold (cutoff point: 60% of median equivalized income after social transfers)

Specification	2008	2009	2010	2011	2012	2013	2014	2015
	% of people in households							
European Union (28 countries)	16.5[a]	16.4[a]	16.5	16.8	16.8	16.7	17.2	17.3
Euro area (19 countries)	16.1	16.2	16.3	16.8	16.9	16.7	17.1	17.2
Poland	16.9	17.1	17.6	17.7	17.1	17.3	17.0	17.6

Source: Eurostat (2017)
[a]European Union (27 countries)

As previously noted, according to a methodology agreed by the Member States of the European Union and adopted by Eurostat, people living in households whose disposable income is less than the poverty line set on the level of 60% of the median income in a given country are considered at risk of poverty (Eurostat 2014d). The poverty threshold for a single-person household, taking into account price differences in the European Union countries, was about 6 thousand PPS in Poland in 2015, which means that people in households with annual incomes below 14 thousand PLN were considered poor. For comparison, in 2008, the relative poverty threshold in Poland was about 4 thousand PPS, which was equivalent to about 9.4 thousand PLN. It should also be noted that in 2015 the poverty threshold for a single-person household in the European Union was about 14 thousand. PPS. The highest poverty threshold was recorded in Luxembourg (about 17.6 thousand PPS) and the lowest (over seven times lower than in Luxembourg)—in Romania (2.6 thousand PPS) (Eurostat 2017). Between 2008 and 2015, the relative poverty rate in Poland remained at a similar level, reaching a value of about 17%. In 2015 the relative poverty rate in Poland amounted to 17.6%, which means that it was slightly higher than the EU average of 17.3% (Table 2). More than 6.6 million people lived in Poland below the poverty threshold and over 86.8 million people in the European Union (Eurostat 2017).

Both in Poland and in the European Union, unemployment is a factor that is adversely affecting the extent of poverty. In 2015, about 45.7% of the unemployed in Poland aged 18 and over lived in households experiencing poverty. The at-risk-of-poverty rate among the unemployed in Poland was slightly lower than the EU average (about 47.5%). Almost every second unemployed person lived below the relative poverty threshold. This does not mean, however, that poverty is linked only to unemployment. In 2015, among those working at the age of 18 and over, 11.2% of people in Poland lived in households below the assumed poverty threshold. Throughout the whole European Union, the scale of this problem was slightly lower, as in this case, the risk of poverty was almost one in ten (9.5%). It is worth noting that in the years 2008–2015, there was a noticeable increase in the at-risk-of-poverty rate among the unemployed in Poland. This indicator increased in the indicated period by 6.9% (from 38.8% in 2008 to 45.7% in 2015). At the time, the poverty rate among working persons slightly decreased (by 0.3%.) (Eurostat 2017).

Due to the fact that the poverty level is estimated based on the median income of a particular country in a specific year, we may be experiencing a decline in the poverty

Table 3 At-risk-of-poverty rate anchored at a fixed moment in time (2008) (cutoff point: 60% of median equivalized income after social transfers)

GEO/TIME	2008	2009	2010	2011	2012	2013	2014	2015
	% of people in households							
European Union (28 countries)	NA	NA	16.3	17.4	18.0	19.0	19.4	18.6
Euro area (19 countries)	16.1	15.7	15.7	17.8	18.7	20.0	20.7	20.0
Poland	16.9	13.7	13.0	11.9	11.8	12.0	11.3	10.2

NA not available
Source: Eurostat (2017)

rate with a decrease in household income or an increase in the poverty rate with an observed improvement in income. The impact of changes in the economic situation on the level of poverty risk shows the poverty rate according to the real poverty threshold value of a given year (At-risk-of-poverty rate anchored at a fixed moment in time) (Eurostat 2015). Year 2005 is adopted in estimations as a reference in these years, when all European Union countries experience implementation of the EU-SILC survey and 2008 constituting a reference year for the EU 2020 monitoring indicators (Eurostat 2017). This article analyzes the second of the mentioned indicators—the relative poverty rate according to the value of the at-risk-of-poverty rate anchored at a fixed moment in time in 2008 (Table 3).

In Poland, the poverty rate anchored in time in 2015 was 10.2%, (taking into account the realistic value of the limit from 2008), so significantly (by 8.4%) lower than the relative at-risk-of-poverty rate estimated by current income, and on the level of the whole EU—18.6% that is by 2.3% more than the relative risk of poverty in 2010.

Another element that is subject to assessment is the sustainability of poverty. It is based on a 4-year observation period for the same people with the help of a specially developed indicator called persistent poverty. In the Eurostat methodology, persons in households whose level of disposable equalized income in the year of the study and at least two out of the three previous years was lower than the relative poverty threshold adopted for the given year set at 60% of the median equivalent income are considered to be threatened by persistent poverty (Eurostat 2014d).

Both in Poland and in the European Union, the value of the persistent at-risk-poverty rate was more than 10% in 2015. With respect to 2008, a slight decrease in the population in Poland was observed (from 10.4% in 2008 to 10.1% in 2015). It should be noted, however, that in 2013 the rate in both the European Union and Poland was at the lowest level and amounted to 10 and 9%, respectively. Each year its level is higher (Table 4).

As already noted, the relative at-risk-of-poverty rate is estimated on the basis of household income. In some households, a significant part of them are social transfers received in the form of institutional support. These include old-age (retirement) and survivors' (widows' and widowers') pensions, unemployment benefits, family-related benefits, sickness and invalidity benefits, education-related benefits, housing allowances, social assistance, and other benefits. These transfers can significantly

Table 4 Persistent at-risk-of-poverty rate (cutoff point: 60% of median equivalized income after social transfers)

GEO/TIME	2008	2009	2010	2011	2012	2013	2014	2015
	% of people in households							
European Union (28 countries)	8.7[a]	9.2[a]	10.0	9.8	10.3	10.0	10.3	10.9
Euro area (19 countries)	9.0	9.7	10.3	10.0	10.4	10.4	10.6	11.5
Poland	10.4	10.2	10.5	10.1	10.7	9.0	10.7	10.1

Source: Eurostat (2017) (http://ec.europa.eu/eurostat/data/database)
[a]European Union (27 countries)

contribute to the reduction of poverty, so that—in order to assess their impact on relative poverty rates, hypothetical poverty risk indicators are calculated without taking into account social transfers (Eurostat 2014d).

The relative at-risk-of-poverty rate estimated on the basis of household income minus the value of social transfers received excluding age benefits (primarily pensions) is also used to assess the effectiveness of social policy in reducing the scale of poverty. If all social transfers except for pensions were excluded from household incomes, the range of the relative at-risk-of-poverty rate in Poland would increase by 5.3% in the year 2015, covering 22.9% of the population. A similar rate estimated for the European Union would increase by 8.8%, reaching a value of 26.1% (Table 5).

Another, and at the same time one of the basic indicators used to diagnose the living situation in the European Union, is the severe material deprivation rate. This indicator is based on respondents' declarations that determine if there are situations in their households where due to financial reasons, they are not able to meet certain basic needs (deprivation of needs) (Eurostat 2014e). The severe material deprivation rate takes into account the nine earlier-mentioned symptoms of material deprivation. The development of the severe material deprivation rate in the European Union is presented in Table 6.

In 2015, 8.1% of the Polish residents lived in households that experienced severe material deprivation. At the level of the whole European Union, this problem regarded about every tenth person (from 0.7% in Sweden to 34.2% in Bulgaria). Over the years of 2008–2015, there was a significant decline in the proportion of people living in households who were unable to meet their basic material needs. In 2008, the value of the severe material deprivation rate in Poland amounted to 17.9%. In the following years, a systematic decline in the indicator was observed, with the exception here being a slight increase in 2012 (Eurostat 2017). This rate for the European Union experienced a slight decrease from 8.4% in 2010 to 8.1 in 2015. However, in 2012–2013 it remained at a level of over 9% (Table 6).

The third element included in the construction of the composite poverty risk or social exclusion rate is the very low intensity rate of work in a household.

The value of the very low work intensity rate in Poland amounted to 6.9% in 2015. In 2008–2015, the percentage of people living in households with very low intensity of work remained at a similar level—7–7.5%. Poland looks more favorable

Table 5 The impact of social transfers on the relative poverty rate (excluding mainly pensions)

	2008		2015	
	At-risk-of-poverty rate (cutoff point: 60% of median equivalized income after social transfers)	At-risk-of-poverty rate before social transfers (pensions excluded from social transfers) by poverty threshold	At-risk-of-poverty rate (cutoff point: 60% of median equivalized income after social transfers)	At-risk-of-poverty rate before social transfers (pensions excluded from social transfers) by poverty threshold
GEO/TIME	% of people in households			
European Union (28 countries)	16.5[a]	25.3[a]	17.3	26.1
Euro area (19 countries)	16.1	24.2	17.2	25.7
Poland	16.9	25.1	17.6	22.9

Source: Eurostat (2017)
[a]European Union (27 countries)

Table 6 Severe material deprivation rate

	2008	2009	2010	2011	2012	2013	2014	2015
GEO/TIME	% of people in households							
European Union (28 countries)	NA	NA	8.4	8.8	9.9	9.6	8.9	8.1
Euro area (19 countries)	5.9	6.0	6.1	6.9	7.8	7.5	7.4	7.0
Poland	17.7	15.0	14.2	13.0	13.5	11.9	10.4	8.1

NA not available
Source: Eurostat (2017)

than most EU Member States. In 2015, more than one in ten European Union residents (on average 10.7%) lived in a household whose members worked less than one-fifth of their potential full working time. Every 20th child in Poland lived in a household with very low work intensity in 2015. Among people aged 18–59, the value of the rate reached 7.6% at the time (Table 7).

In summary, The Europe 2020 Strategy assumes that the basic indicator for monitoring progress in addressing measures to combat poverty or social exclusion will be a composite measure, taking into account the three subindices. Table 8 shows persons at-risk-of-poverty and social exclusion in the EU in 2008–2015.

An analysis of the value of the poverty risk or social exclusion rate by age group indicates that young people under the age of 18 years old are the most vulnerable. There was about 30% of people in the group who was at risk of poverty or social exclusion in the early years of analysis. The drop in the value of this indicator was only seen in 2013. Among elderly people aged 65 and over, this problem affected about every fifth person, while among people aged 18–64 years, 26% were experiencing poverty or social exclusion. In the years 2008–2015, the greatest

Table 7 People living in households with very low work intensity

	Year							
	2008	2009	2010	2011	2012	2013	2014	2015
	% of people in households							
Age	European Union (28 countries)							
Total (0–59)	NA	NA	10.3	10.5	10.5	10.9	11.2	10.7
Less than 18 years	NA	NA	9.3	9.2	9.1	9.6	9.8	9.4
18–59	NA	NA	10.6	10.9	11.0	11.4	11.7	11.1
	Euro area (19 countries)							
Total (0–59)	9.3	9.1	10.4	10.9	10.7	11.2	11.9	11.2
Less than 18 years	7.0	7.1	8.6	9.0	8.3	8.7	9.4	8.7
18–59	10.0	9.7	11.0	11.6	11.5	12.0	12.7	12.0
	Poland							
Total (0–59)	8.0	6.9	7.3	6.9	6.9	7.2	7.3	6.9
Less than 18 years	5.0	4.7	4.8	4.1	4.6	5.0	5.1	5.0
18–59	8.9	7.6	8.1	7.8	7.6	7.8	8.0	7.6

NA not available
Source: Eurostat (2017)

Table 8 People at risk of poverty or social exclusion by age

	Year							
	2008	2009	2010	2011	2012	2013	2014	2015
	% of people in households							
Age	European Union (28 countries)							
Total	NA	NA	23.7	24.3	24.7	24.6	24.4	23.8
Less than 18 years	NA	NA	27.5	27.2	28.0	27.8	27.7	27.1
18–64	NA	NA	23.6	24.4	25.3	25.4	25.4	24.7
65 or over	NA	NA	20.1	20.5	19.2	18.3	17.8	17.4
	Euro area (19 countries)							
Total	21.7	21.6	22.0	22.9	23.3	23.1	23.5	23.1
Less than 18 years	23.7	24.3	25.4	25.5	25.6	25.2	25.7	25.4
18–64	21.5	21.5	22.3	23.5	24.3	24.5	25.1	24.6
65 or over	20.4	19.5	17.6	18.2	17.6	16.5	16.2	15.9
	Poland							
Total	30.5	27.8	27.8	27.2	26.7	25.8	24.7	23.4
Less than 18 years	32.9	31.0	30.8	29.8	29.3	29.8	28.2	26.6
18–64	30.6	27.3	27.6	27.0	26.7	26.1	25.2	24.1
65 or over	26.9	25.8	24.4	24.7	23.4	19.7	18.2	17.0

NA not available
Source: Eurostat (2017)

decline in the value of the rate was observed in the oldest of the mentioned age groups. This rate fell by nearly 10% among people aged 65 and over in that period. A decrease in the value of the rate was noted in the other analyzed age groups in the

years 2008–2015, but it was not as significant as in the elderly and amounted, respectively: 6.3% among people aged 0–17 years and 6.5% among people aged 18–64.

6 Research Results

In order to check how public expenditure on social protection influences poverty rates, econometric modeling was applied. In view of the fact that available data on social transfers reach only the year 2014, the year 2007 was also taken into account in the research in order to obtain the longest time series for the EU-27 countries. Due to the nature of analyzed data (panel data with a balanced panel—data for 28 countries for a period of 8 years 2007–2014), models relevant to panel data were used. General notation of the panel model (Maddala 2006; Osińska 2007):

$$y_{it} = \beta_0 + \mathbf{\beta X_{it}} + \alpha_i + v_t + u_{it}, \quad i = 1, \ldots, N, t = 1, \ldots, T, \tag{1}$$

where: β_0—absolute term; $\mathbf{\beta}$—vector of structural parameters of the model; $\mathbf{X_{it}}$—matrix of values observed on explanatory variables; α_i—individual effects, part of the variability of y variable, typical of ith unit (N effects); v_t—periodic effects, part of the variability of y variable, typical of t period (T effects); u_{it}—purely random distortion component.

In the estimated models, explanatory variables were public expenditure on social protection as a percentage of gross domestic product (GDP) ($\beta_1\beta_1$), GDP per capita ($\beta_2\beta_2$), and unemployment rate (β_3). Dependent variables were rates taken into account in the Europe 2020 strategy: severe material deprivation rate (model 1), people at-risk-of-poverty rate after social transfers (model 2), share of people aged 0–59 living in households with very low work intensity (model 3), and the people at-risk-of-poverty or social exclusion rate (model 4).

First, parameters of a pooled model were estimated. The model assumes that all units in the model are similar; therefore, they can be described with a simple total regression model. Next, diagnostic testing was performed to determine whether there were any significant effects that would suggest the choice of a fixed effects model (FE) or a random effects model (RE).

In the case of all the models considered, residual variance test results as regards the significance of individual effects provided the basis for rejecting a null hypothesis that assumes the correctness of the OLS panel model in favor of an alternative hypothesis that recommends the use of a fixed effects model. Verification of the assumption about the constancy in variation of the random component of objects by the Breusch–Pagan test allowed the researcher to reject the null hypothesis in accordance with which the OLS panel model is correct in favor of the alternative hypothesis which takes that the random effects model is more appropriate. In the end, in the case of each of the models (variant 1), the Hausman test confirmed the

Table 9 Estimation results of model parameters for panel data (variant 1)

Specification	Model 1	Model 2	Model 3	Model 4
Constant	27.1304***	19.5727***	2.4521*	29.5314***
Public expenditure on social protection as a percentage of GDP ($\beta_1\beta_1$)	−0.5392***	−0.0861	0.2272***	0.1280
GDP per capita (β_2)	−0.0004***	−8.793e-05**	−5.7466e-06	−0.0004***
$\beta_3$unemployment rate (β_3)	0.4549***	0.0495	0.2739***	0.0315
Hausman test	RE	RE	RE	RE
AIC	1322.66	1007.42	1008.69	1289.77
HIQ	1327.94	1012.70	1013.99	1295.07

Source: The authors
Note: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$, *RE* random effects

correctness of the choice of the random effects model. Estimation results of model parameters are presented in Table 9.

When analyzing the results in Table 9, it can be noticed that not all the explanatory variables considered turned out to have statistically significant influence on poverty rates. Generally, with the ceteris paribus assumption, a higher level of GDP per capita results in a reduction in poverty. On the other hand, an increase in the unemployment rate raises the level of the analyzed poverty rates. When the impact of social transfers on the poverty level is considered, in turn, this impact turned out to be ambiguous. In the case of models 2 and 4, there was no significant impact of social transfers on the people at-risk-of-poverty rate after social transfers and the people at-risk-of-poverty or social exclusion rate. When it came to an increase in the share of social transfers in GDP, it led to a considerable decrease in the severe material deprivation rate. Taking into account the rate of people living in households with very low work intensity as a percentage of total population aged less than 60, an increase in the share of social transfers in GDP results in an increase in the level of this rate.

In order to verify the impact of social transfers on the level of the analyzed rates, there were estimated parameters of models in which public expenditure on social protection as a percentage of GDP was an explanatory variable. In addition, the square of the explanatory variable was entered in the models to verify nonlinear impact of this variable on the poverty rates (variant 2).

The explanatory variable coefficient turned out to be significantly different from zero in models 2 and 3, which means that public expenditure on social protection considerably affects the people at-risk-of-poverty rate after social transfers and the rate of people living in households with very low work intensity as a percentage of total population aged less than 60 (Table 10). In the first case, an increase in expenditure on social protection leads to a decrease in the people at-risk-of-poverty rate after social transfers. The positive sign of the parameter at the square of the explanatory variable informs us that an increase in expenditure on social protection causes a decrease in the poverty rate to a certain point, and then, despite the increase in expenditure on social protection, the poverty level increases.

Table 10 Estimation results of model parameters for panel data (variant 2)

Specification	Model 2	Model 3
Constant	19.4491***	−6.8632**
Public expenditure on social protection as a percentage of GDP ($\beta_1\beta_1$)	−0.3373*	0.8774***
Squared public expenditure on social protection as a percentage of GDP ($\beta_1{}^2$)	0.0080*	−0.0061
Hausman test	FE	FE
LSDV-R^2 (%)	93.16	89.19
Within-R^2 (%)	2.05	40.34
LSDV F p-value	1.30e-95	2.50e-72
Breusch–Pagan test p-value	1.01e-129	1.33e-093
Test for constant p-value	1.92e-088	2.89e-070
AIC	678.69	731.89
HIQ	719.85	772.54

Source: The authors
Note: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$

On the other hand, in the case of the share of people aged 0–59 living in households with very low work intensity, an increase in expenditure on social protection results, as in the model in variant 1, in an increase in the level of the analyzed rate.

In order to group countries similar in terms of the risk of poverty or social exclusion (thus countries with similar results as regards severe material deprivation, very low work intensity and relative poverty risk, in accordance with rates used in the assessment of social cohesion for the needs of the Europe 2020 strategy), the method of hierarchical cluster analysis (Ward's method with Euclidean distance) was used.

Twenty-eight EU Member States were analyzed; data used for the analysis (values of the three sub-rates mentioned above accepted in the analysis as independent variables after having checked their correlation strength (condition of no collinearity) refer to the years 2008 and 2015. Results of the hierarchical cluster analysis are shown in Figs. 3 and 4.

An analysis of the dendrogram (with the use of the agglomeration curve) allows the researcher to conclude about the emergence of four clusters in both compared years. In 2008, there is a clear distance between the new EU members (Bulgaria and Romania) and the rest of the EU in terms of the considered poverty rates. In 2015, these countries were in a group together with Greece, Lithuania, and Latvia. Therefore, the cluster analysis, which makes it possible to isolate relatively homogeneous groups of objects, leads to the conclusion about the dissimilarity of the European Union countries in terms of results they achieve in counteracting poverty and social exclusion. By analyzing the similarity of the obtained groupings (Salamaga 2010), a similarity index at the level of 0.45 was obtained, which indicates that the obtained grouping results differ. It confirms the fact that in the analyzed years, changes as regards the poverty rate occurred in the examined countries.

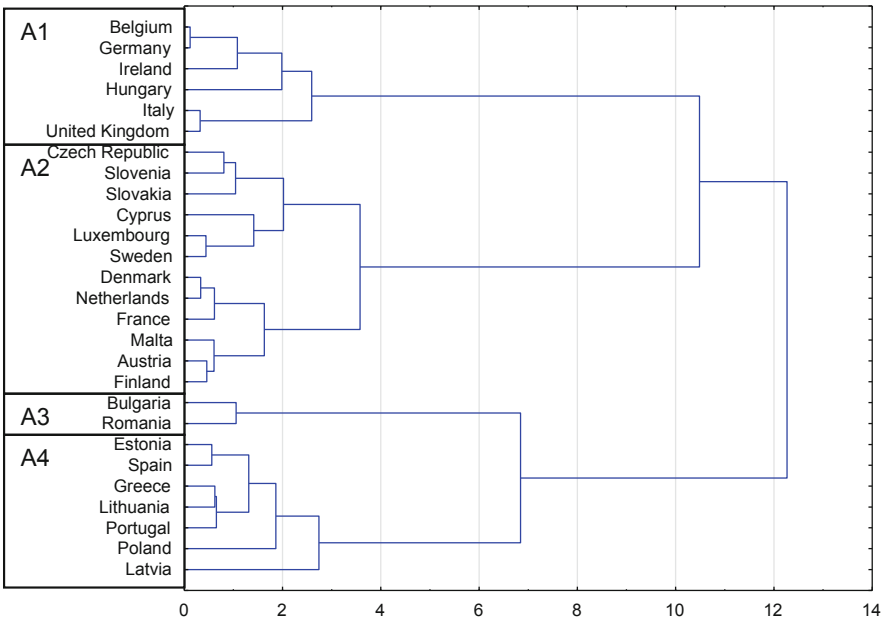

Fig. 3 Hierarchical cluster analysis—dendrogram (EU-28)—2008. Source: The authors

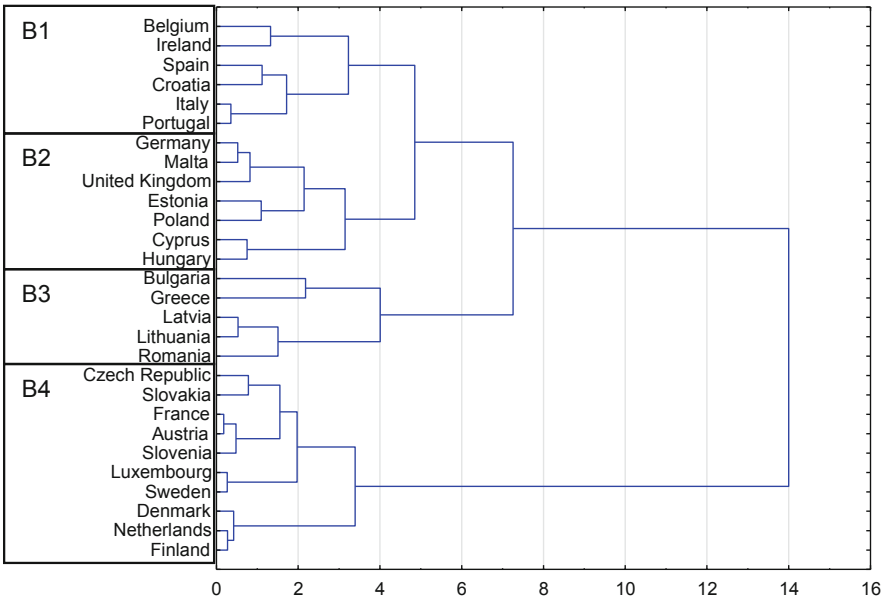

Fig. 4 Hierarchical cluster analysis—dendrogram (EU-28)—2015. Source: The authors

Table 11 Characteristics of isolated clusters in 2008 and 2015

	Groups[a]							
	A1	A2	A3	A4	B1	B2	B3	B4
Specification	2008				2015			
Severe material deprivation rate								
Average	7.75	4.93	36.95	11.27	9.08	9.43	21.88	3.97
CV	65.39	68.59	16.27	52.39	34.08	61.12	35.86	60.19
Min	4.50	0.70	32.70	3.60	5.80	4.40	13.90	0.70
Max	17.90	11.80	41.20	19.30	13.70	19.40	34.20	9.00
Median	5.55	4.85	36.95	11.20	8.55	8.10	22.20	3.65
People at risk of poverty after social transfers								
Average	15.90	12.72	22.50	20.23	18.78	17.14	22.70	12.98
CV	15.71	16.35	6.91	13.90	14.18	12.40	6.88	12.77
Min	12.40	9.00	21.40	16.90	14.90	14.90	21.40	9.70
Max	18.90	15.90	23.60	25.90	22.10	21.60	25.40	15.30
Median	15.35	12.40	22.50	19.80	19.70	16.70	22.20	13.00
Share of people aged 0–59 living in households with very low work intensity								
Average	11.65	6.90	8.30	6.46	14.42	9.24	10.66	8.22
CV	10.48	22.68	3.41	15.61	20.54	21.01	35.26	25.09
Min	10.40	4.50	8.10	5.30	10.90	6.60	7.80	5.70
Max	13.70	8.80	8.50	8.00	19.20	11.90	16.80	11.60
Median	11.70	7.30	8.30	6.30	14.65	9.40	9.20	7.80
Total expenditure on social protection as a percentage of GDP								
Average	24.95	23.15	14.40	18.51	25.78	21.69	17.70	27.46
CV	12.44	22.18	2.95	23.51	15.81	23.42	27.85	20.79
Min	19.90	15.70	14.10	12.10	20.60	15.10	14.50	18.50
Max	27.70	30.40	14.70	23.40	30.30	29.10	26.00	34.30
Median	26.30	23.15	14.40	19.30	26.15	19.90	14.80	29.80

Source: The authors

[a]Components of groups as in Figs. 3 and 4, *CV* coefficient of variation

When analyzing values of poverty rates in the isolated groups of countries (Table 11), it can be noticed that Bulgaria and Romania (A3 group) were in the worst situation in 2008, and A2 group (Czech Republic, Slovenia, Slovakia, Cyprus, Luxembourg, Sweden, Denmark, Netherlands, France, Malta, Austria, and Finland) was in the best situation. In this group, the lowest values of poverty rates and the high level of expenditure on social protection as a percentage of GDP could be observed on average. In 2015, these countries were included in B4 group (except for Cyprus and Malta), and an improvement in the situation in terms of the analyzed rates was also noticeable.

In 2008, Poland was in the same group with Estonia, Spain, Greece, Lithuania, Portugal, and Latvia (A4 group), and in 2015—with such countries as Germany, Malta, the UK, Estonia, Cyprus, and Hungary (B2 group). In both analyzed years, the situation of these countries in terms of poverty can be deemed average—situated between the groups in the worst and the best situations.

7 Conclusions

This chapter has been structured around the hypothesis: public expenditure on social protection contributes to reducing poverty and social stratification; other factors such as GDP, unemployment rate, tax burden, or shadow economy are only a direct result of the state's spending policy. In the article, it was examined that the development of poverty in the EU Member States according to selected indicators characterizing the economic situation of these countries. Research used models for panel data. EU countries were also subdivided into relatively homogeneous groups in terms of selected poverty rates.

The analysis presented verifies the hypothesis. It turns out that expenditure on social protection benefits reduced the poverty rate in the EU members. The impact of social protection varies greatly across the EU so providing the right kind and level of support remains challenging for many Member States. In addition to social transfers, the role of social policy is also important but the results of these measures are only visible in the long run.

In the period considered (2008–2015), there are differences between the countries analyzed in terms of poverty rates. In the context of the Europe 2020 strategy targets, it can be assumed that countries with the best poverty rates will achieve their targets. On the other hand, in the case of countries belonging to the B3 group, it may be difficult or even impossible to achieve the target.

The success of the Europe 2020 strategy (European Commission 2010a) depends on achieving all its objectives reinforcing each other on the EU level but mainly in every Member State. In effect, for reducing poverty and social exclusion is essential coordinated actions in the area of such government policies as: social, budgetary, employment, and education policy. However, the results of our research are positively correlated with the European Commission findings (2011) and showed that "despite the clear redistributive effect of social protection, inequalities have often increased and poverty and social exclusion remain a major issue in most EU countries, although with substantial differences across Europe."

It should be noticed that the fight against poverty and social exclusion is a long-term task. Therefore a long-term approach in fighting poverty is fundamentally important and should be a priority of sustainable social, health, education, and employment policy (Vaalavuo 2015). It is therefore necessary to continue research in this area, e.g., on the determinants of poverty.

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Evaluation of Finances Impact to Business Competiveness in EU Countries

Dalia Rudyte and Jurgita Karaleviciene

Abstract Public expenditure in different countries may have different economic effects as business competitiveness capabilities are more likely to be expressed by more than one factor. The aim of this article is to investigate the link of public expenditure within different field businesses with reference to statistical data. This chapter analyzes the effectiveness of allocation of public expenditure regarding the value of such costs, as well, the impact on the businesses competitiveness incensement. It can be concluded that public expenditure for economy is assigned to productive public expenditure, and however it is not directly reflecting the need for the increasing expenditure for businesses competitiveness. The premise, as well as, a conclusion can be made that the increase of economic expenditure does not always have the impact on specific countries companies' competitive advantage in the increase.

Keywords Public expenditure for economy · Productive public expenditure · Business competiveness · EU countries

1 Introduction

In the most general sense, business competitiveness is reflected in the achievements of economic indicators that can be compared between different countries. The goal of each state is to ensure a good economic situation in the country, which reflects high economic indicators and the provision of public goods or services. The provision of public services is seen through government spending, which can be both productive and nonproductive. Economic theory argues that productive spending on investment boosts economic growth and therefore has a long-term impact, complements private-sector production, and has a positive external impact on the business sector, positively affects marginal capital and productivity. Unproductive costs are

D. Rudyte (✉) · J. Karaleviciene
Economical Department, University of Siauliai, Šiauliai, Lithuania

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allocated for consumption and for one-time benefits, and therefore they do not have persistent values and inhibit economic growth, they are more likely direct benefits to households through running expenditure, education, culture, recreation, and sports expenditures. Studies (Rudyte and Skuncikiene 2015; Liesionis and Rackauskas 2012; and other) usually agree that costs to the economy are attributed to productive costs that increase the country's economic growth. The share of public resources allocated to the country's economy depends on many factors, including the cost structure itself, the distribution of productive and unproductive costs. Balancing public expenditure, with a larger share of resources allocated to the national economy, reflects the ability to more effectively generate economic benefits through increasing the competitiveness of business enterprises. However, scientists do not have a unanimous view on the proportion of public finances that is appropriate to be distributed in the country's economy in order to increase the competitiveness of business enterprises. There are a lot of scientific debates about the structure of productive and nonproductive expenditures. It has been accepted that public money is spent on public sector services alone, but public funds are often used to subsidize private-sector's output, such as agriculture, and the production of different industries. In addition, public funds are not the only source of financing for public sector services, as the private sector is inextricably involved in the public and private sectors.

The problem of this article arises from the fact that the size of expenditure on the economy in the general public expenditure portfolio does not always encourage the growth of the competitiveness of domestic business. This may be due to factors that, from the first sight, seem insignificant, although their impact on business competitiveness may vary in different economic environments.

The aim of the article is to systematize studies on the relationship between public expenditure and business competitiveness in order to determine how the change in the state's expenditure on the economy determines the indicators characterizing business competitiveness. In the article to define the existing relations between the state expenditure on the economy and business competitiveness, revealing the factors of the significance of the impact. The used methods clusterization and correlation—regression analysis identifies significant links and assesses the impact on the EU share of public expenditure on the economy on business competitiveness.

2 Theoretical Assumptions About the Link Between Public Expenditure and Business Competitiveness

In EU countries, fiscal policy is shaped in line with the established rules of the Maastricht Treaty and the Stability Growth Pact, based on three basic principles: the implementation of a credible and sustainable fiscal policy; reduction of the state budget deficit and the size of the state debt; reduction of public expenditure and taxes (Ferreiro et al. 2013). These theoretical foundations have led to a fiscal policy set by

the rules and norms set in the Maastricht Treaty and the Stability and Growth Pact. In this sense, the working of national fiscal policies in the EU is based on the following principles: The implementation of sound and sustainable fiscal policies; The reduction of the size of public deficits and the stocks of public debt; The reduction of the size of public expenditure and taxation.

Many studies (European Commission 2017; Garuckas et al. 2007; Ferreiro et al. 2013) suggest that competitiveness of business enterprises equates to the characteristic of a competitive economy of the country. Economic stabilization is usually one of the main functions of fiscal policy, which is often analyzed in economic literature. Stabilization of the economy is usually one of the key functions of fiscal policy and it has been often investigated in the economic literature. Fiscal policy is used as a tool for economic stabilization, but in general, the response of discretionary fiscal policy to changes in production volume gaps is usually weak or pro-cyclical. During the recessionary periods, governments are more likely to focus on businesses, although such pro-cyclicality yields a fairly small result (European Commission 2017). Under certain circumstances, lower public spending in the gross domestic product may be more favorable and result in faster economic growth, although in other circumstances, a higher share of public expenditure in gross domestic product may be desirable (Mitchell 2005).

Analyzing research on the competitiveness of domestic business entities in empirical work reveals such key factors as: clustering, technology platforms, and entrepreneurial potential. The level of entrepreneurship of the country's economic entities can be measured by the number of individual types of enterprises per thousand inhabitants of the country. It also reveals the impact of the public sector on business infrastructure, the promotion of networks and supply chains, and innovation. The state does this through the establishment of specialized state or municipal institutions, information centers, business incubators, science and technology parks, innovation and technology centers, agencies engaged in economic development, business promotion, and technological development and innovation (Garuckas et al. 2007).

Zadorskaja (2009) analyses technologies and capital as business competitiveness and production-level factors, along with human capital, country exports and imports. The quality of human capital is measured by the quality of education, which is inseparable from the use of innovative technologies. The more competitive a business is in the country, the higher the level of competitiveness is in the country itself. Therefore, constant business support in the country inevitably increases the country's overall competitiveness. Among the competitive countries are England, Denmark, Finland, and the Baltic States are referred to as countries where reforms at the state level are needed (Zadorskaja 2009). According to Liubimova and Zigiene (2010), it is impossible to formulate general conclusions that are appropriate for each country about the impact of the public expenditure on the economy on the share of the product (GDP) and on economic growth, as the author of the article agrees with the classical economic theory that economic growth depends on the state expenditure in the economy. Under certain circumstances, a lower proportion of public spending on the economy may be more favorable and lead to faster economic growth, and this

may be directly related to labor productivity in that country. Maciulyte-Sniukiene and Paliulis (2011) distinguished the following key factors of labor productivity in the country: labor force employment rate, education, inflation, expenditure on information and telecommunication technologies, capital structure and degree of economic openness, foreign direct investment and urbanization, sectors of agriculture, and industry and services in the economy. Strength of influence depends on the analysis of the period and the level of development of the country. The analysis of labor productivity is necessary in order to identify the opportunities for increasing competitiveness of the country jointly opportunities for business competitiveness.

Separate elements of government spending have an exceptional impact on the national economy based on the endogenous growth theory, the structure of public spending needs to be changed, with a higher percentage being allocated to productive costs. Public spending on education and health has a positive impact on the formation of human capital, which also has a positive impact on the country's economic performance. There is no broad debate between the researchers in assessing the cost of the economy among the researchers—there is a shared view that the latter costs have a positive impact on the economy of the country, taking into account their size and distribution efficiency (Garsvienė 2015).

3 Factors Influencing the State Expenditure on the Economy for Business Competitiveness

In most empirical studies, the effect of possible factors is analyzed and the relationships that may exist with the object being analyses are shown. It is unequivocally accepted that GDP is the main macroeconomic indicator on which the country's economy is valued, the higher the volume of state expenditure, the higher the GDP of the country as costs are one of the components of this indicator (Garsvienė 2015; Liesionis and Rackauskas 2012; Mitchell 2005). Researchers analyzing the link between public spending on the economy and the unemployment rate in the country (Liesionis and Rackauskas 2012; Holden and Sparrman 2011) state that there is a strong negative connection. With the rising unemployment rate in the economy, the amount in the entire public spending portfolio is decreasing, which indicates that public expenditure is increasing for the social sector. This is easily explained by the scarcity of public resources available to the public, as if expenditure is growing in one sector then declining in another. The negative link between public spending on the economy and the aging population is increasing, old-age benefits are rising, and therefore the state's interest must remain at the creation of new jobs, the promotion of entrepreneurship, and the birth rate of the population. This would help to reduce unemployment rate and compensate for nonproductive social benefits through income taxes.

When assessing national productivity, the gross domestic product (GDP) or value added indicators are commonly used, and productivity is usually treated as an

indicator of economic activity. Investigated the impact of spending on research and development (R&D), wages, foreign direct investment, and tangible and intangible capital on labor productivity. It is concluded that one of the ways to increase the productivity of the country's work, and, moreover, competitiveness, is to increase investment in the R&D business sector (Maciulyte-Sniukiene and Paliulis 2011). According to Rudyte and Skuncikiene (2015), the competitiveness of depends on the size and number of competitive companies in the country, the uniqueness of culture and geography, the development of transport, communications, electricity, and water supply infrastructure and the government's research, technology, and innovation policy. One of the most important and most frequently mentioned aspects in defining the country's competitiveness is the productivity of the country, which can be regarded as a prerequisite for increasing living standards. Measuring productivity is often one of the key indicators for assessing the quality of life. In order to ensure national competitiveness, production generated in the national economy must be competitive both in domestic and foreign markets.

Inflation is explored as a factor in the link between productive costs, inflation, and government revenue. By allocating more expenditure to productive sectors, the state receives more income and stimulates economic growth, as the rising inflation shows (Liesionis and Rackauskas 2012; Mitchell 2005). Bruneckiene (2010) show that one economic indicator cannot fully reflect competitiveness and competitiveness assessment is required. A multidimensional level is revealed using several indicators or the developed index of evaluation. A more accurate assessment of competitiveness creates preconditions for the formation of priorities and goals, more efficiently utilizing all available potential (Rudyte and Skuncikiene 2015). In research, competitiveness is often identified with productivity, which can be expressed in terms of per capita GDP at national level. Consequently, productivity analysis can help to uncover the impact of public spending on the economy through business competitiveness enhancements.

4 Methodology

The chapter presents a model for assessing the impact of public expenditure on business competitiveness. After analyzing the scientific literature, the factors determining the impact of public expenditure on business competitiveness were selected. Data to be taken from the Eurostat databases. According to the need for research, the stages of assessment of the impact of three public expenditures on business competitiveness have been identified (see Fig. 1).

The presented stages of the assessment of the business competitiveness of public expenditure allows to assess the impact of public expenditure on business competitiveness. The purpose of the first stage is to evaluate statistics and to distinguish EU countries by clusters. The second stage aims to measure the impact of the impact of public expenditure on business competitiveness. The objective of the third stage is to determine the effect of public expenditure on the business competitiveness.

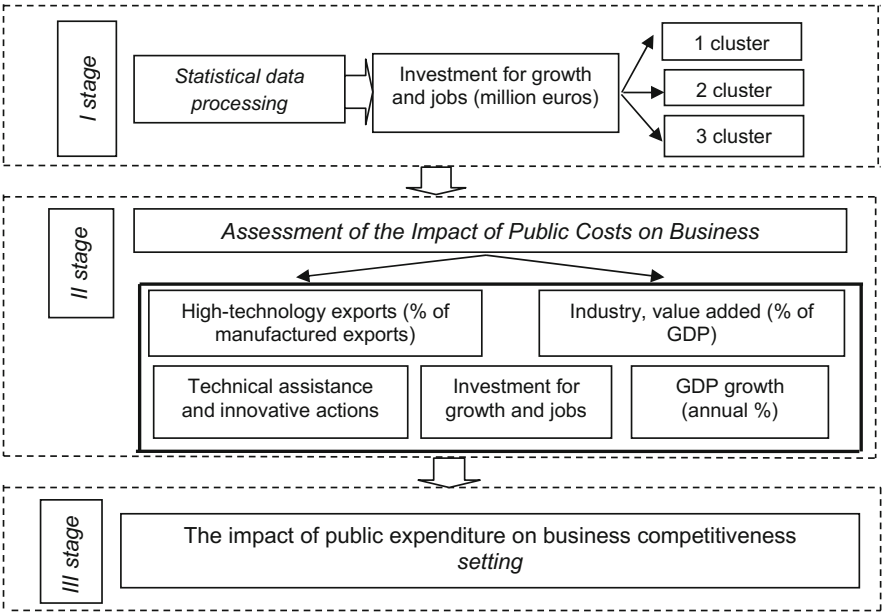

Fig. 1 Stages of assessment of the business competitiveness of public expenditure. Source: Authors

In the first stage, the clustering of 28 European Union countries using "investment for growth and jobs" (million euros) indicator is carried out in order to identify the impact of the public sector expenditure on the economy on business competitiveness. Such grouping allows you to measure the distribution of the countries according to the flows of the state-investing economy, and it is possible to further elaborate the factors related to labor productivity in a particular group of countries. The research uses a hierarchical clustering method, which consists of dividing the analyses elements so that the differences in clusters are minimal and the differences between clusters are the largest (Berzinskienė and Stoskus 2006).

Phase II assessed the impact of public expenditure on business competitiveness. The indicators used are high-tech exports (% of manufactured exports), industry, value added (% of GDP), technical assistance and innovative actions, investment for growth and jobs, and GDP growth (annual %). Models are selected for each cluster by choosing different test indicators.

Stage III evaluated the impact of public expenditure on the economy on the state and examined the relationship between these costs and indicators characterizing business competitiveness. The impact of public spending on business competitiveness is also foreseen. Correlation-regression analysis was used to evaluate the impact and its strength. The time period used for the analysis, without considering cyclicality.

5 Results of Research

Data from the databases for 2010–2015 (WDI 2017) are used for clustering groups of countries. The study used data from 28 European Union countries. In order to keep pace with possible short-term structural deviations, the data were averaged. The cluster analysis element (object) is selected—Investment for growth and jobs (million euros in 2015) indicator. Before the cluster analysis, it was checked that the selected data would not be isolated or correlated. The cluster-based cluster-forming method is "Between-groups linkage."

At the beginning stage, 5 clusters were obtained: cluster 1: Germany, Italy, Greece, Czech Republic, Portugal, Hungary; Cluster 2: the United Kingdom, France, Romania, Slovakia; Cluster 3: Spain, cluster 4: Poland; Cluster 5: The Netherlands, Belgium, Sweden, Austria, Bulgaria, Denmark, Finland, Ireland, Croatia, Lithuania, Slovenia, Latvia, Estonia, Cyprus, Luxembourg, Malta. However, in the next step, with the help of SPSS 17.0, the first and second clusters, and the third and fourth, were joined together and joined with the third cluster. Surveillance of the EU-28 in the "Investment for growth and jobs (2015)" (investing in growth and jobs, million euros) revealed 3 different cluster sizes (see Table 1).

The 1 cluster is the countries investing more in growth and jobs (Investment for growth and jobs, million euros). In year of 2007 for the 1 cluster, Poland allocated 6101.35 million euros, and Spain allocated 5443.85 million euros for "Investment for growth and jobs". In the period of 2007–2015 for the highest investments in growth and jobs were allocated in Poland, to a lesser extent in Spain. In cluster 1 during 2007–2015, Costs have increased more in Poland (47.19%) in Spain—0.52%. During the research period, investments for "Investment for growth and jobs" in cluster 1 were 4.65 times higher in Poland and 3.18 times in Spain, while in Spain they were higher than the EU-28 average, but this difference decreased over the period.

Cluster 2—Germany, Italy, Greece, Czech Republic, Portugal, Hungary; The United Kingdom, France, Romania, Slovakia (which allocates "Investment for growth and jobs" (2015) on average. In 2007 to 2015, investment for growth and jobs was the highest in Italy, France, and the United Kingdom. Estimated change in expenditure over the period analyses shows that in 2nd cluster the largest increase occurred in Slovakia (79.42%) and Hungary (64.69%), while the largest decrease was observed in Portugal (102.02%), Romania (87.58%), and the Czech Republic (84.19%). During the research period, investments in "Investment for growth and jobs" in 2nd cluster were higher than the average of EU-28. But not as big a difference as in cluster 1. The Czech Republic (3.4 times), Italy (3.04 times), and Hungary (2.15 times) were the most distant from the average. In other countries in this cluster, spending on "Investment for growth and jobs" was higher than the EU-28 average of only 0.7 times (in Portugal) to 1.97 times (in Romania). Expenditure in other Member States was lower than the average cost of the EU-28.

The third cluster is the Netherlands, Belgium, Sweden, Austria, Bulgaria, Denmark, Finland, Ireland, Croatia, Lithuania, Slovenia, Latvia, Estonia, Cyprus, Luxembourg, and Malta, which consists of EU members, least distinct from Investment

Table 1 Distribution of EU countries by clusters by the indicator investment for growth and jobs 2007–2015 y. (million euros)

Country	2007 y. (million euros)	2015 y. (million euros)	Change (million euros)	Average per 2007–2015 y.	Change, Proc.
1 Cluster					
PL	4217.10	7985.60	3768.50	6101.35	47.19
ES	5429.60	5458.10	28.50	5443.85	0.52
2 Cluster					
DE	4311.80	2704.20	−1607.60	3508.00	−59.45
IT	4452.50	5219.80	767.30	4836.15	14.70
EL	4591.00	3067.60	−1523.40	3829.30	−49.66
CZ	918.10	5808.50	4890.40	3363.30	−84.19
PT	2456.00	1215.70	−1240.30	1835.85	−102.02
HU	1304.20	3693.22	2389.00	2498.70	64.69
FR	2449.30	2670.80	221.50	2560.05	8.29
RO	421.40	3392.50	2971.10	1906.95	−87.80
SK	635.20	3086.30	2451.10	1860.75	79.42
U.K.	2357.00	1782.70	−574.30	2069.85	−32.22
3 Cluster					
BE	346.80	412.00	65.20	379.40	15.82
NL	251.40	196.40	−55.00	221.75	−28.00
SE	303.50	140.00	−163.50	223.90	−116.78
AT	264.70	262.70	−2.00	263.70	−0.76
BG	144.90	1421.20	1276.30	783.05	−89.80
DK	129.30	102.80	−26.50	116.05	−25.77
FI	322.00	104.80	−217.20	213.4	−207.25
IE	263.70	129.10	−134.60	196.4	−104.26
HR	0.00	2670.80	2670.80	1335.4	100
LT	465.50	197.90	−267.60	331.7	−135.22
SI	158.90	624.50	465.60	391.7	74.56
LV	437.20	663.00	225.80	550.1	34.06
EE	216.80	154.80	−62.00	185.8	−40.05
CY	34.40	62.30	27.90	48.35	44.78
LU	13.50	14.90	1.40	14.2	9.40
MT	49.10	76.80	27.70	62.95	36.07

Source: World Development Indicators (2017)

for growth and jobs (2015 investment in growth and jobs, million euros). In this cluster between the period of 2007 and 2015 for the highest investment in growth and jobs were in Bucharest and Hungary. During the evaluation of the change of costs over the analyses period, it was found that in 2nd cluster during the years 2007–2015 costs have increased mostly in Hungary (100%) and Slovenia (74.56%), with the largest decrease in Finland (207.25%), Lithuania (135.22%), and Sweden

(116.78%). It should be noted that investment in the cluster 3 for Investment for growth and jobs in the majority of cluster countries of the 3 clusters were below the EU-28 average, with the exception of Hungary, whose costs for investment for growth and jobs were higher than the EU-28 average 1.55 times.

After the evaluation of the dependence of statistical data, the twinning relationships between high-tech exports (% of manufactured exports) and the state budget spending on the economy were determined. It has been established that the connection between the state budget expenditures on economy and business competitiveness of the components in different clusters are uneven. The strongest direct correlation is between high-tech exports (% of produced exports) and government spending in cluster 1 (correction factor 0.89—direct strong link). To a lesser extent, the direct (correction coefficient 0.6) is set in the second cluster, and only cluster 3 has an average correlation (correction coefficient 0.5).

In summary, it is possible to state the higher the cost of the state budget for the economy, the higher exports are in the field of high technologies. Thus, public expenditure on the economy is productive and determines business competitiveness, therefore, the higher the correlation coefficient, the higher exports in high technology (% of produced exports) depend on the productive expenditure of the state budget.

Stage II. In order to assess the components, which impact the public expenditure on business competitiveness, a correlation-regression analysis was applied. There are two models for individual clusters. Calculation of average cluster values for the period of 2007–2015.

For the first model, are developed 3 regression equations for different clusters. We will provide them:

$$y = 2.28 + 0.35 \times 1 + 0.09 \times 2 - 0.12 \times 3 \quad 1.1\ (1\ \text{cluster})$$

$$y = 5.58 + 2.08 \times 1 + 0.01 \times 2 - 0.35 \times 3 \quad 1.2\ (2\ \text{cluster})$$

$$y = 17.77 - 0.20 \times 1 - 0.11 \times 2 - 0.57 \times 3 \quad 1.3\ (3\ \text{cluster})$$

Exceptions were excluded from the models, the assumptions of the least square method were verified: multicollining (VIF statistics and tolerance measure), autocorrelation (Durbin Watson test), and Homodesk (White test). Data are suitable for research. The results of the calculations (first model) are presented in Table 2.

For the second model, are developed three regression equations for different clusters. We will provide them:

$$y = 28.41 + 0.66 \times 1 + 0.13 \times 2 \quad 1.4\ (1\ \text{cluster})$$

$$y = 2.34 + 0.15 \times 1 + 0.07 \times 2 + 0.09 \times 3 \quad 1.5\ (2\ \text{cluster})$$

$$y = 28.42 - 0.14 \times 2 + 0.12 \times 3 \quad 1.6\ (3\ \text{cluster})$$

Exceptions were excluded from the models, the assumptions of the least square method were verified: multicollining (VIF statistics and tolerance measure),

Table 2 First model regression results

Dependent variable: High-technology exports (% of manufactured exports)	1 Cluster	2 Cluster	3 Cluster
*X*1—technical assistance and innovative actions;	0.35	2.08	−0.020
*X*2—investment for growth;	0.09	0.01	−0.11
*X*3—GDP growth (annual %);	−0.12	0.35	0.57
Constant	2.28	5.58	17.77
Time dummies	Yes	Yes	Yes
Sector dummies	No	No	No
R-squared	0.81	0.63	0.83
Adjusted *R*-squared	0.79	0.6	0.81
Multicollinearity (VIF statistics and tolerance measure)	2.5	1.86	2.6
Autocorrelations Durbin Watson test	Not set	Not set	Not set
Heteroscedasticity (White test)	Not set	Not set	Not set
Fisher's criterion (*F*) (95%)	Model is adequate		
Statistical significance	5%	5%	5%,

Source: Own calculations

autocorrelation (Durbin Watson test), and Homodesk (White test). Data are suitable for research. The results of the calculations (first model) are presented in Table 3.

Stage II assessed the impact of the state's public expenditure on business competitiveness on the basis of two compiled models. Two models for each cluster were made. Technical assistance and innovative actions, investments for growth and jobs, GDP growth (annual %), i.e., the impact of public spending on business competitiveness is not likely to occur immediately. When calculating dual data were used: primary and adjusted by shifting the dependent variable. More precise results were shown by the results of using the shift-dependent variable, and therefore they were used for further calculations. The same test benchmarks were used for the assessment: technical assistance and innovative actions, investment for growth and jobs, GDP growth (annual %), but in the first model, the impact of public expenditure on the economy was measured through high-tech exports (% of manufactured exports), and in the second through—Industry, value added (% of GDP) (y). Such impact indicators are chosen because of the largest financial flows to the economy. It has been determined that state expenditures on economies in different clusters of countries have different economic effects, and the country's competitive opportunities are usually determined by a number of factors. The same test indicators: technical assistance and innovative actions, investment for growth and jobs, and GDP growth (annual %) result in different results in different clusters.

It was found that in the first model in all clusters High-technology exports (% of manufactured exports) are determined by Technical assistance and innovative actions, Investment for growth and jobs and GDP growth (annual%). The second model in cluster 1 Industry, value added (% of GDP) is determined by Technical assistance and innovative actions and GDP growth (annual %); in cluster 2—Technical assistance and innovative actions, Investment for growth and jobs and

Table 3 Second model regression results

Dependent variable: Industry, value added (% of GDP)	1 Cluster	2 Cluster	3 Cluster
*X*1—technical assistance and innovative actions	0.66	0.15	–
*X*2—investment for growth;	0.13	0.07	0.14
*X*3—GDP growth (annual %);	–	0.09	0.12
Constant	28.41	2.34	28.42
Time dummies	Yes	Yes	Yes
Sector dummies	No	No	No
R-squared	0.50	0.53	0.6
Adjusted *R*-squared	0.46	0.50	0.56
Multicollinearity (VIF statistics and tolerance measure)	2.3	1.93	1.2
Autocorrelations Durbin Watson test	Not set	Not set	Not set
Heteroscedasticity (White test)	Not set	Not set	Not set
Fisher's criterion (*F*) (95%)	Model is adequate		
Statistical significance	5%	5%	5%,

Source: Own calculations

GDP growth (annual %); in cluster 3—Investment for growth and jobs and GDP growth (annual %).

The purpose of stage III was to assess the impact of public expenditure on the economy on the state and examine the relationship between these costs and the indicators characterizing business competitiveness. To determinate the impact of public expenditure on business competitiveness correlation-regression analysis was used to assess the impact and its strength. According to the High-technology exports (% of manufactured exports) and Industry, value added (% of GDP), it was found that in cluster 3 the impact of state public expenditure on business competitiveness was highest, with the smallest impact being set in cluster 1. This means that with the changing economy of public spending, the level of competitiveness varies unevenly. The analysis showed that the rate of technical assistance and innovative actions, investment for growth and jobs, GDP growth (annual %) is determined by High-technology exports (% of manufactured exports) and Industry, value added (% of GDP). It has been established that the growth of the state's productive costs leads to a higher level of competitiveness in countries with the lowest state-owned expenditures. Thus, the most sensitive to even the minimal changes in government expenditure is the response of cluster countries 3, with the smallest impact on cluster 1. Thus, in cluster 3, even the poorly rising state's public spending on the economy has a major impact on business competitiveness.

6 Conclusions

Empirical studies substantiate the economic theory that public expenditures are devoted to the national economy are attributed to productive expenditures that stimulate economic growth in the country. However, in the general sense of the state, a situation can arise where a lower part of the state spending on the economy can be more favorable and lead to faster economic growth. This is determined by factors related to labor productivity in a specific country. Such factors as labor force employment rates, education, inflation, expenditure on information and telecommunication technologies, production capital structure, degree of economic openness, foreign direct investment, urbanization, the share of agriculture, industry, and services in the economy can be attributed to labor and productivity in the country.

The impact of public expenditure on business competitiveness differs from one country to another. The same factors in different groups of countries have different effects on the competitiveness of business entities. The strongest direct (due to rising costs, dramatically increasing impact), the impact of government spending on high-tech exports has been set in Poland and Spain (The substitution variable has remained direct but its strength has decreased). Weaker direct exposure has been observed in Germany, Italy, Greece, the Czech Republic, Portugal, Hungary, France, Romania, Slovakia, and the United Kingdom (The influence of the time factor on the impact is poor). The results of the research showed that in order to increase the competitiveness of business, it is expedient to increase the share of public expenditure in the economy in countries where the high impact of state expenditure on business competitiveness has been determined, the impact of the dependent variable decreases the impact. This would be the Netherlands, Belgium, Sweden, Austria, Bulgaria, Denmark, Finland, Ireland, Croatia, Lithuania, Slovenia, Latvia, Estonia, Cyprus, Luxembourg, and Malta. On the contrary, in Poland and Spain, the impact on business competitiveness will not change, even if the cost to the economy is reduced. In Germany, Italy, Greece, Czech Republic, Portugal, Hungary, France, Romania, Slovakia, the United Kingdom, the average impact between public spending and high-tech exports is set. Hence, in this group of countries, as the share of public expenditure increases, the share of public expenditure on business competitiveness increases, while the share of public expenditure in the economy declines—the impact of public expenditure on business competitiveness is decreasing.

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Is it Still Possible to Receive an Adequate Income from Pensions in the Era of Ageing Societies?—The Great Pension Gap Challenge in Europe

Tomasz Jedynak

Abstract With societies aging and pension gaps deepening, supplementary pension schemes are treated as the most suitable way of ensuring adequate benefits for pensioners. However, a significant question underlying this research has arisen: how much should one save over the course of his or her professional career to ensure the future pension gap is covered? The following study has two main objectives: to identify the size of the pension gap in five countries (France, Germany, Italy, Spain, and Poland) and to estimate the level of additional savings required to cover it. The study shows that the size of the future pension gap for the average worker in these five countries is between 19% (Italy) and 40% (Poland). Due to different socioeconomic and demographic conditions, the amount of monthly savings needed to cover this gap will vary significantly. In relative terms, fully financing the pension gap for the average worker in a base scenario requires savings from 12% (Italy) to 20% (Poland) of their gross salary. Apart from offering a base scenario, the chapter also includes a sensitivity analysis which considers different values of the applied model's parameters.

Keywords Pension gap · Pension system adequacy · Replacement rate · Retirement income

1 Introduction

One of the greatest long-term economic challenges for European countries is to meet the needs of elderly people in the era of ageing populations. Ongoing demographic changes have led to an imbalance in traditional public pension systems introduced under different socioeconomic conditions in the twentieth century. This imbalance manifests itself both in the systems' financial instability and their inability to ensure

T. Jedynak (✉)
Department of Risk Management and Insurance, Cracow University of Economics, Cracow, Poland
e-mail: Tomasz.jedynak@uek.krakow.pl

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adequate pension benefits. Leaving aside the issue of financial sustainability, this chapter focuses mainly on pension income adequacy.

The commonly used means of determining the adequacy of pensions are the replacement rate and the pension gap. The former is the percentage of previously earned salary received as pension, and the latter is the difference between an optimal (target) replacement rate and the actual replacement rate. The analysis described later in this study shows that the widely accepted value for the optimal replacement rate is around 70%, while the actual replacement rates from public pension systems in the countries under consideration remain below this level. This means that a pension gap in these countries already exists. It seems, however, that the true challenges will lie in the years ahead.

According to forecasts, the replacement rates from public pension schemes in most European Union countries will drop by more than 20 pp by 2050s (European Commission 2015; OECD 2015; Aviva 2016). The pension gap is therefore expected to increase substantially. The need to develop private supplementary pension schemes in order to effectively encourage people to voluntarily save for retirement is often discussed in response to this situation. Now, with societies aging and pension gaps deepening, supplementary pension schemes are rightly treated as the most effective way of ensuring adequate benefits for pensioners. However, a significant question underlying the research conducted in this study arises: *how much should one save during his or her professional career to ensure the future pension gap is covered*? This question was the basis for creating the two main objectives of the research: first, to identify the size of the pension gap in the five countries (France, Germany, Italy, Spain, and Poland) and, second, to estimate the level of additional savings required to cover it. The research sample in this study consists of the five largest European Union countries: France, Germany, Italy, Spain, and Poland. Due to the ongoing Brexit process, the United Kingdom has been excluded from the study. The population and pension data were taken from OECD elaborations, European Commission reports, and national statistics bureaus. The economic parameters were drawn mostly from the subject literature.

The chapter is organized as follows. The next section describes the issue of pension system income adequacy and attempts to estimate the size of the pension gaps in selected European Countries. The third section focuses on developing a model for calculating the proper monthly savings to cover one's individual pension gap. The fourth section presents the results of applying the model and an analysis of the model's sensitivity to changes in its parameters. Conclusions and final remarks close out the paper.

2 Measuring Pension Adequacy

According to the open method of coordination (OMC) designed by the European Commission, developing pension system income adequacy is, alongside financial stability and modernization, one of the key goals of modern pension systems

(European Commission 2006). Sounders and Wong (2011) maintain that payment adequacy is one of the criteria used to assess the degree to which social security is achieving its objectives. Whitehouse (2012, p. 1) goes even further in contending that "adequacy of retirement incomes is a central goal of all types of pension systems."

The importance of retirement income adequacy in modern pension systems makes it necessary to precisely explain what this term means at the outset. Retirement income adequacy is commonly associated with the generosity of pension systems. However, as Chybalski and Marcinkiewicz (2016) notice, the term adequacy should not be used only to describe the level of benefits. This is because, in the most general sense, pension adequacy is about providing retirement income that allows an appropriate level of consumption after exiting the labour market. Professional analyses of pension system adequacy should therefore focus on income adequacy as well as consumption adequacy.

The definition of pension adequacy provided by the OECD (2013, p. 61) is consistent with these remarks. It states that an adequate pension system is one that "replaces a worker's earnings at a level which enables him or her to maintain a standard of living in retirement comparable to that enjoyed during his or her working life—even though retirement income does not just replace earnings." Important features of pension adequacy directly expressed in this definition are: (1) adequate retirement benefits should allow pensioners to maintain their previous standard of living; (2) even if income is lower in one's retirement than during the period of professional activity, it does not mean that consumption is not properly smoothed.[1]

The World Bank adds a second dimension of pension adequacy to the OECD's consumption-smoothing approach—eliminating the risk of poverty. The World Bank definition, formulated by Hinz and Holzman (2005, p. 6), holds that in an adequate pension system, all citizens have access to benefits "that are sufficient to prevent old-age poverty on a country specific absolute level in addition to providing a reliable means of smoothing lifetime consumption for the vast majority of the population." Two questions arise here: What level of pension benefits prevent old-age poverty? How is the country specific level established? Another issue concerns how old-age poverty is measured.

The concept of pension adequacy used by the European Commission (2006) includes cross-generational solidarity alongside consumption-smoothing and preventing the risk of poverty. It says that an adequate pension system should: (1) prevent poverty among the elderly, (2) allow people to maintain their living standard after retirement, and (3) promote solidarity within and between generations. Without questioning this conception, it can be stated that inter and intra-generational solidarity could be treated both as a separate dimension of pension adequacy and as a

[1]This is due to the fact that the measure of consumption is not just pure income, but income reduced by savings. The demand for savings is usually lower during retirement (Chybalski and Marcinkiewicz 2016).

necessary tool for constructing an adequate pension system (Chybalski and Marcinkiewicz 2016, p. 103).

Like the European Commission's, the International Labour Organization's (ILO) concept of pension adequacy also involves a multidimensional approach. Besides guaranteeing a decent standard of living for the rest of the pensioner's life, the ILO notion of adequacy also contains a pension scheme extension to all members of society and eliminates any gender inequalities (International Labour Office 2001; Grech 2013). In the light of some recent studies on the gender pension gap, which prove that significant differences exist in men's and women's pension benefits (Bettio et al. 2012; Foster 2014; Burkevica et al. 2015), it seems that the last element of the ILO's concept of adequacy is particularly significant.

A major conclusion which may be drawn from the synthesis of different pension adequacy definitions is that pension adequacy has more than one dimension. These dimensions especially include: (1) consumption smoothing; (2) protecting against poverty; (3) gender equality; (4) and cross-generational solidarity. Generally, the first and the second dimensions are the most important in evaluating adequacy. This is because the third and the fourth dimensions are derived from them: Assessing differences between men's and women's pension benefits and the scope of solidarity between generations is based on measures of consumption smoothing and poverty. This may explain why the European Commission's definition of adequacy does not include gender equality and why the OECD and the World Bank do not consider both gender equality and cross-generational solidarity in their definitions. These institutions simply treat some dimensions of pension adequacy as secondary and focus mainly on measuring and analyzing primary ones, assuming that they can be easily adopted to examine the other aspects of adequacy mentioned above. The concept that pension adequacy is determined by the degree of poverty alleviation and consumption smoothing is also widely accepted in the literature (Barr and Diamond 2010). A similar approach is applied in this study.

While the literature does not chronicle much controversy surrounding the definition of pension adequacy apart from the issue of its dimensions, there is a good deal surrounding how pension system adequacy ought to be measured (Grech 2013). Two basic approaches to measuring pension adequacy are distinguished: the income approach and the consumption approach. The first is based on measuring retirement income and its relation to earnings during one's career. In the latter, adequacy is measured relative to household expenses before and after retirement. Because of its relative simplicity and intuitiveness, as well as the availability of data, the income approach is widely used in international comparisons. However, the consumption approach measures adequacy more accurately.

The replacement rate is undoubtedly the most commonly used adequacy measure. In the most general sense, the replacement rate is defined as the relation of pension benefits to pre-retirement income. The simplest definition just assumes that the replacement rate is the ratio of the first pension benefit to the last salary. In more complex replacement rate measures different definitions of the numerator and denominator are used. For the purposes of pension forecasts and international or intergenerational comparisons the theoretical replacement rates are also computed.

These measurements are based on the scenario approach, in which average workers and their standard career paths are considered.

For example, the European Commission's hypothetical worker is a male who receives an average wage spanning his whole career which lasts 40 years and ends at the age of 65 (European Commission 2015). The OECD's average worker enters a labour market at the age of 20 and remains active until statutory retirement age (OECD 2015), in the base scenario, he is a man who earns the average wage which increases by the specified rate over his professional activity.

Using the replacement rate to measure pension adequacy, has many advantages, mainly thanks to its simplicity. Most of all it is easy to apply and compute as it uses widely available data. A significant advantage of using the replacement rate is the fact that interpreting it is relatively straightforward. It also allows the results obtained in different studies for different populations (countries, economic areas, generations, genders, etc.) to be compared.

However, the replacement rate approach also has many limitations (Grech 2013). First, for individuals, the replacement rate is a historical measure—to assess its precise value, one has to wait until retirement. Second, the replacement rate is an abstract measure of a pension system's generosity and it is hard to assess the meaning of adequate retirement income as no universal benchmark exists. Third, the replacement rate is a point-in-time measure which neglects the impact of benefit indexation rules and is insensitive to changes in pension age and life expectancy after retirement. Fourth, the replacement rate is useless in estimating the risk of poverty among the elderly (even with a replacement rate equal to 100%, poor workers simply become poor pensioners). Fifth, the hypothetical (theoretical) replacement rate calculated for the average worker is unrepresentative of real labour market conditions, so the results obtained may be misleading. In addition, as Blöndal and Scarpetta (1999) claim, it is impossible to calculate the one and only replacement rate for all pension scheme participants. This is because replacement rates for individuals will always differ due to the differences in their career paths and previous earnings.

To move beyond the limitations of replacement rates in assessing pension adequacy, numerous measures based on the replacement rate concept are proposed. For example, Biggs and Springstead (2008), in their analysis of pension adequacy based on replacement rates, use four different measures of pre-retirement income. They are, respectively: (1) the average of real earnings in the 5 years prior to claiming pension benefits; (2) a constant real payment spanning working years derived from the present value of lifetime earnings; (3) a wage-indexed average of all earnings prior to claiming pension benefits; (4) the inflation adjusted average of all earnings prior to claiming pension benefits.

Holzman and Gueven (2009, pp. 37–38) describe two variants of the replacement rate: gross and net. The former is computed as the ratio of gross benefits paid to pre-tax pre-retirement earnings. The latter is calculated as the ratio of benefits received to post-tax pre-retirement earnings. This distinction is also applied in most reports by international organizations such as The World Bank, OECD, and European Commission. Forester and Mira D'Ercole (2005) propose a quasi

replacement rate, which they define as the mean disposable income of a person aged 66–75, relative to the mean disposable income of persons aged 51–65.

A similar measure is computed by the European Commission (2015); its aggregate replacement ratio is a ratio of the median individual pension income of retires aged 65–74 and median earnings of employees aged 50–59 excluding social benefits other than pensions. Another measure employed by The European Commission (2015) is the benefit ratio, which is calculated as the share of average pension benefits in the economy-wide average wage. In turn, the gross average replacement rate is defined as the relationship between the average first pension to the economy-wide average wage at retirement. The European Commission proposes another measure of pension adequacy in the Open Method of Coordination—the median relative income ratio, which is computed by comparing the median income of persons aged 65 and above, and the median income of persons aged 65 and below.

Borella and Fornero (2009) suggest using the comprehensive replacement rate, or the ratio between net disposable income after retirement and net disposable income during one's professional activity. Hurd and Rohwedder (2008 cited in Grech 2013) compiled the wealth replacement rate, which is based on a simulation of consumption paths over one's life in retirement and an assessment of whether the available resources could support this consumption path. In search of a better measure of pension adequacy, MacDonald, Osberg and Moore (2016) developed a living standard replacement rate that compares how much money a worker has available to support his personal consumption of goods and services before and after retirement.

To address the issues with replacement rates, some authors also suggest utilizing totally different measures of pension adequacy. Pension wealth is defined as the present discounted value of future pension rights, in which the prospect of mortality is also taken into account. The concept of pension wealth was first proposed by Feldstein (1974) and is promoted in Grech (2013), among others. Another method of measuring pension system adequacy is built on the theory of relative deprivation (Townsend 1979). This framework considers a pensioner's ability to afford items widely regarded as essential (Saunders and Wong 2011, p. 12). Similar assumptions underlie the budgeting approach, which has its roots in the concept of the family budget (Bernstein et al. 2000 cited in Mutchler et al. 2015). In this approach, the economic well-being of pensioners is measured on the basis of future expenses of needs they will have in retirement (Mutchler et al. 2015). Additionally, Chybalski and Marcinkiewicz (2016) treat pension adequacy as a multidimensional phenomenon that cannot be measured with only one simple indicator. To evaluate pension adequacy, they propose the synthetic pension adequacy indicator (SPAI), which is based on several simple measures of adequacy.

3 The Pension Gap

Despite its limitations and drawbacks, the replacement rate remains the most important and most frequently applied indicator of pension system adequacy (Biggs and Springstead 2008; Grech 2013, p. 5; Chybalski and Marcinkiewicz 2016, p. 100).

Table 1 The target replacement rate

Source	Target replacement rate (%)
Mercer (2016)	65–80
OECD (2015)	70
Munnel et al. (2014)	67–80
Whitehouse (2014)	50–60
MacDonald and Moore (2011)	70–80
Reno and Lavery (2007)	70–80
Schiebier (2004)	70
Greninger et al. (2000)	70–89
World Bank (1994)	60
Myers (1993 cited in Biggs and Springstead 2008)	70–75
International Labour Office (1952)	>40

Source: The author

Furthermore, replacement rates are commonly used in most of the international comparisons presented, e.g., in European Commission reports, OECD reports, and World Bank documents. Also in this chapter, replacement rates are the starting point for further analyses mainly due to data availability and international comparability. The possible limitations of this approach are discussed in the conclusion.

Accepting the replacement rate as a measure of pension system adequacy, however, requires discussion of its optimal amount. In light of Modigliani and Brumberg's (1954) life cycle income hypothesis and Friedman's (1957) permanent income hypothesis, it may be stated that the optimal target replacement rate level is the one at which retirement incomes enable one to maintain a standard of living at a level similar to that achieved while working professionally (Jedynak 2017). However, in practice it is rather difficult to determine exactly what the target replacement rate should be. The main obstacle is to determine what the future needs of retirees will be. Generally those needs are determined by considering the wealth of the society in which they live, but there are also many other factors involved (Mercer 2016; Aviva 2016).

The results of theoretical analyses and empirical studies show that for the majority of pensioners, the optimal target replacement rate is between 60% and 80% (see Table 1). It is generally believed that a replacement rate below 60% does not allow the pensioner to maintain the standard of living achieved during their career. At the same time, a replacement rate above 80% means that the savings rate was too high and consumption is not equalized over the course of the life cycle (Jedynak 2017).

The expected future replacement rates in the five European Countries have been the subject of comprehensive analysis in numerous studies. Aside from the single country-level research, which due to incomparability, cannot be considered in cross-country analysis, replacement rates are also computed in reports made jointly for many countries. The values presented in these reports are useful for the purpose of comparison as they are computed based on similar assumptions and methodology.

Table 2 The forecasted replacement rates

Country	European Commission (2015)[a]		OECD (2015)		Aviva (2016)[b]	
	2020 (%)	2055 (%)	Gross (2054–2059) (%)	Net (2054–2059) (%)	2017 (%)	2047 (%)
Germany	41.9	35.4	37.5	50.0	42.0	42.0
Spain	73.6	49.9	82.1	89.5	48.0	29.0
France	50.3	40.6	55.4	67.7	53.0	28.0
Italy	61.2	50.9	69.5	79.7	49.0	44.0
Poland	53.8	29.8	43.1	52.8	54.0	37.0

Source: European Commission (2015), Aviva (2016), OECD (2015)
[a]Gross replacement rates
[b]Net replacement rates

Certainly, the most widespread reports on pension adequacy in European countries are those drawn up by the European Commission and the OECD. Some financial sector institutions also compare the forecasted replacement rates of European countries (Aviva 2016). The forecasted replacement rates from public (base) pension schemes for the five countries considered in this study are presented in Table 2.

Even a rough comparison of target replacement rates with the forecasted replacement rates from the public pension system in the countries reveals significant discrepancies between these two values. Formally, the difference between the target (expected) and the actual replacement rate is called the pension gap (OECD 2011; Aviva 2016).

$$\mathrm{PGAP} = \mathrm{RR}_T - \mathrm{RR}_B \tag{1}$$

The initial target replacement rate is set at 70% and the forecasted replacement rates are taken from the European Commission report (2015) in order to estimate the pension gaps in the countries and taking the earlier considerations into account. The results of this assessment for the years 2020 and 2055 are presented in Table 3. Apart from the significant differences between particular countries, a considerable increase in the pension gap is observed in each of the countries.

The pension gap is usually presented as a percentage. Although for an individual, it could also be presented in terms of an actual amount of money. This amount is equal to the discounted (as of the day of one's retirement) value of future payments which cover the difference between the desired level of retirement income and the actual level obtained from the public pension scheme. To distinguish between these two ways of understanding the pension gap in this study, the terms pension gap and individual pension gap will be henceforth used, respectively. An attempt to estimate the individual pension gap for the average worker in the selected countries and the amount of monthly savings necessary to cover it under different assumptions is made in the next section.

Table 3 The pension gap in selected counties in the years 2020 and 2055

Country	2020 (%)	2055 (%)	Difference (2055–2020) (%)
Germany	28.1	34.6	6.5
Spain	−3.6	20.1	23.7
France	19.7	29.4	9.7
Italy	8.8	19.1	10.3
Poland	16.2	40.2	24.0

Source: The author

4 Methodology

The first step in calculating the future size of the individual pension gap in selected countries was to adopt baseline scenario assumptions and to estimate the gap in terms of percentage as in the previous section (see Table 3). The next step was to calculate the value of the monthly individual pension gap in the first month of retirement ($PGAP_1$) and multiply it by the last remuneration received from professional employment (R_L) (see Eq. 2). However, to make these calculations some further assumptions had to be made.[2]

First, it was decided that the average worker's professional career would begin in 2015 when he was 25 years of age. It was also determined that he would retire after 40 years of employment in 2055 at the age of 65. For simplicity, it was also assumed that the retirement age, the end of the period of accumulating savings and the age at which the consumption of savings begins are the same. Secondly, it was assumed that the initial salary is equal to the economy-wide average, country gross wage provided by Eurostat.[3] Third, the salary growth rate (g) during the subject's career was established at 2.3% per year after Berk et al. (2013). This value seems to be consistent with other studies concerning long-term wage growth. For example, the World Bank model assumes the average real earnings growth at 2.0% (Whitehouse 2012). The European Commission (2015) uses an average level of 3.0% for the earnings' growth rate in the model of theoretical replacement rate calculation. In turn, according to the OECD (2015) model, nominal wage growth is 3.275%.

$$\mathrm{PGAP}_1 = (\mathrm{RR}_T - \mathrm{RR}_B) \times R_L \tag{2}$$

The values of consecutive monthly pension gaps were calculated similarly, but with the additional assumption that pension benefits in subsequent months should grow at the same rate as the average wage does. The Eurostat projections for 2015 in which life expectancy is computed jointly for women and men was adopted in order

[2]Similar methodology, although with a different dataset, was also applied by the author in a study on Poland only (Jedynak 2017). The main findings of that study are consistent with the results of this research.

[3]Data for a single person without children who earns 100% of the average country wage as of 2015.

to estimate the average life expectancy from retirement for the average worker in base scenario (m). Although these projections are fully valid only for today's pensioners, no other reliable forecast of life expectancy for the base scenario average worker was identified.

In the next phase of the research, the consecutive monthly pension gap values for the average saver were discounted for the day when he retires and are totaled (see Eq. 3). Thus the value of PGAP_T represents the amount of money that should be saved before retirement in order to fully cover the individual pension gap.

$$\mathrm{PGAP}_T = \mathrm{PGAP}_1 \times R_0 \times \left(1 + q\frac{1-q^m}{1-q}\right) \tag{3}$$

where

$$q = \frac{1+r_d}{1+g} \tag{4}$$

Bearing in mind the need to minimize the investment risk during the saver's retirement, the discount rate (r_d)[4] was established at 1.0% per annum. This is lower than the standard OECD (2015, p. 136) and World Bank (Whitehouse 2012) assumptions of a discount rate equal to 2%. However, in light of recent experiences with the low-rate economic environment, this level seems to be more achievable in the long term. Interestingly, an even more rigorous assumption was made by Berk et al. (2013), who applied a discount rate of 0.5%.

In the next stage, the previously computed total individual pension gap was spread over a series of monthly payments which savers should make before retiring. To do so, it was assumed that the amount of monthly savings will grow proportionally to wage growth at the rate of g and the accumulated savings will be invested at a constant rate during the whole period at a rate of r. The value of r was set at 2.5% per annum in the base scenario, based on the assumption that investment of one's retirement savings should be secure and stable. Furthermore, it was assumed that the total number of monthly savings is equal to the length of the saver's career in months. Hence, the amount of the savings on the first month was calculated with the following formula:

$$S_{m_1} = \frac{\mathrm{PGAP}_T \times (r-g)}{(1+r)^n - (1+g)^n} \tag{5}$$

The methodology used here is based on a set of assumptions about the value of the parameters in Eqs. (3) and (4) discussed above. A necessary complement to the analyses in this study is, therefore, to examine how changes in the values of

[4]Please note that this rate should correspond to the technical interest rate used in the actuarial calculations in annuities.

particular parameters influence the amount of monthly savings needed to cover the individual pension gap (S_{m_1}). Based on Eq. (4), it can be said that S_{m_1} is a function of four variables: PGAP_T, n, r, and g. From Eqs. (2) and (3) it can be inferred that PGAP_T is a function of PGAP, W_1, m, r_d, and g. Finally, it can be concluded that:

$$S_{m_1} = f(\text{PGAP}_1, R_1, m, n, r, r_d, g) \tag{6}$$

The values of m and n are mutually correlated: the longer the saving period (n), the shorter the period of consumption savings (m) will be. Detailed results of the analyses in which different values of PGAP, m, n, r, r_d, and g were considered are presented in the next section. A similar analysis could also be carried out for different values of R_0. It seems, however, that taking into account the different levels of R_0 makes little sense, since in the model both PGAP_T and S_{m_1} depend linearly on that parameter.

5 Results

The values of the monthly individual pension gap in the first month of retirement (PGAP_1), the total value of the pension gap (PGAP_T) and its present value ($\text{PV}_r\ \text{PGAP}_T$) obtained under the base scenario assumption are presented in Table 4. The table also includes the calculated values of the first monthly savings necessary to cover the pension gap (S_{m_1}) and the share of these savings in the average country's gross wage (S_{m_1}/E). In the example of Poland, the particular values may be interpreted as follows. The average (in terms of base scenario assumptions) worker in Poland will face a monthly pension gap of 981 EUR immediately after retirement. Taking into account the entire period of retirement, the total sum of monthly pension gaps as of the day of retirement will be 242,697 EUR, which is 90,388 EUR at today's value. To fully cover this pension gap, an average worker who starts saving for retirement at the beginning of his career has to initially save 194 EUR per month or 19.8% of his current gross monthly wage.

The methodology and parameters the model uses to calculate the individual pension gap in selected counties and the monthly savings needed to cover it are

Table 4 Pension gap and monthly savings necessary to cover it under base scenario assumptions

Country	PGAP_1 [EUR]	PGAP_T [EUR]	$\text{PV}_r\ \text{PGAP}_T$ [EUR]	S_{m_1} [EUR]	S_{m_1}/E [%]
Germany	3423	915,450	340,942	732	18.4
Spain	1111	324,895	121,001	260	11.7
France	2315	695,298	258,950	556	17.5
Italy	1211	344,643	128,356	276	10.8
Poland	981	242,697	90,388	194	19.8

Source: the author

based on a number of assumptions. The following section examines the influence of particular parameters on the final results. Before proceeding to the detailed analysis, one important remark has to be made: the formula used to determine the size of the pension gap leaves it dependent on the value of one's final salary, which, in accordance with the previous assumption, grows at a constant rate of g. Hence the size of the pension gap presented for different retirement age values does not represent the same level of needs satisfaction, but the same rate of replacement of the final salary. As a reference point for calculating the pension gap for different retirement ages, the constant remuneration determined for the retirement age of 65 was used.

Generally, the amount of savings needed to cover the pension gap depends on the age of one's retirement: the later it is, the lower the amount will be. Similarly, a longer period of saving will, of course, also drive down the amount needed. However, the extent of the differences in the values of savings caused by changes during one's period of professional activity and the saving period are certainly worth emphasizing (see Table 5). Note the relatively high values in the table. In the base scenario (retirement at 65), the amount of monthly savings needed to cover the pension gap varies between 194 EUR in Poland and 732 EUR in Germany. Considering the S_{m_1}/E indicator, the initial monthly savings needed to cover the pension gap in the base scenario is between 11% (Italy) and 20% (Poland).

Given the difficulties in estimating the target replacement rate for an individual and the discrepancies in the forecasted size of the future replacement rate in the countries, it is uncertain whether the assumptions based on these model parameters have a significant influence on the final results. However, according to Eqs. (2) and (3), the size of the pension gap expressed in monetary units is directly proportional to the size of the pension gap expressed in percentage points. Hence, the amount of money needed to finance a pension gap of a certain size is always directly proportional to the amount calculated for a one-percentage point pension gap (see Fig. 1). Thus, if necessary, any previously made assumptions about target and forecasted replacement rates can easily be changed without recalculating the whole model.

The last stage of the research analyses the impact of the changes in the growth rate of salary values (g), the discount rate (r_d), and return on investment rate (r) (see Fig. 2). Considering the salary growth rate (g), which affects both the size of the pension gap ($PGAP_T$) and the amount of monthly savings needed to cover it, (S_{m_1}) the final outcome of this parameter demonstrates that the higher the salary growth rate, the higher the amount of monthly savings necessary to finance the pension gap. Such analysis may, however, lead to misleading conclusions. That is because the higher salary growth rate increases the remuneration used to compute the replacement rate and the pension gap (Eq. 2). Hence, as the monthly savings needed to cover the pension gap increases, so too does the level of needs satisfaction in retirement.

The changes in values of the market rate of return (r) do not affect the size of the pension gap but do have an influence on S_{m_1}. As a rule, the higher the rate r, the lower the amount of single monthly savings that are required (see Fig. 2). The

Table 5 Initial monthly savings needed to cover the pension gap and the different retirement age

	Germany		Spain		France		Italy		Poland	
	S_{m_1}	S_{m_1}/E	S_{m_1}	S_{m_1}/E	S_{m_1}	S_{m_1}/E	S_{m_1}	S_{m_1}/E	S_{m_1}	S_{m_1}/E
Age of retirement	[EUR]	[%]	[EUR]	[%]	[EUR]	[%]	[EUR]	[%]	[EUR]	[%]
60	1167	*29*	413	*19*	876	*28*	442	*17*	307	*31*
61	1065	*27*	377	*17*	798	*25*	402	*16*	279	*28*
62	971	*24*	343	*15*	729	*23*	367	*14*	255	*26*
63	884	*22*	314	*14*	667	*21*	333	*13*	233	*24*
64	805	*20*	285	*13*	609	*19*	304	*12*	213	*22*
65	732	*18*	260	*12*	556	*18*	276	*11*	194	*20*
66	665	*17*	237	*11*	507	*16*	251	*10*	177	*18*
67	608	*15*	216	*10*	463	*15*	228	*9*	161	*16*
68	551	*14*	196	*9*	421	*13*	208	*8*	147	*15*
69	502	*13*	178	*8*	385	*12*	188	*7*	133	*14*
70	454	*11*	162	*7*	350	*11*	171	*7*	122	*12*

Source: The author

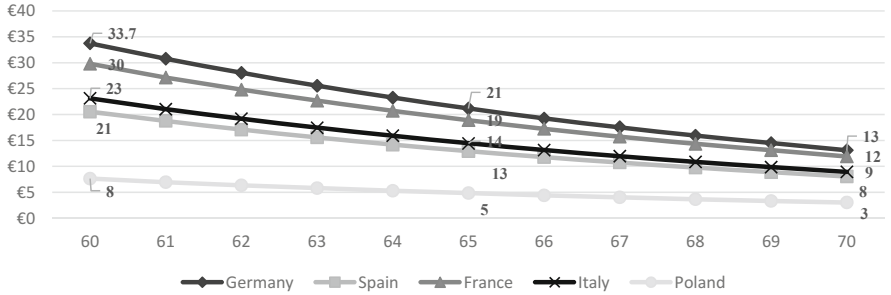

Fig. 1 Amount of savings needed to cover a one-percentage pension gap and different retirement ages. Source: The author

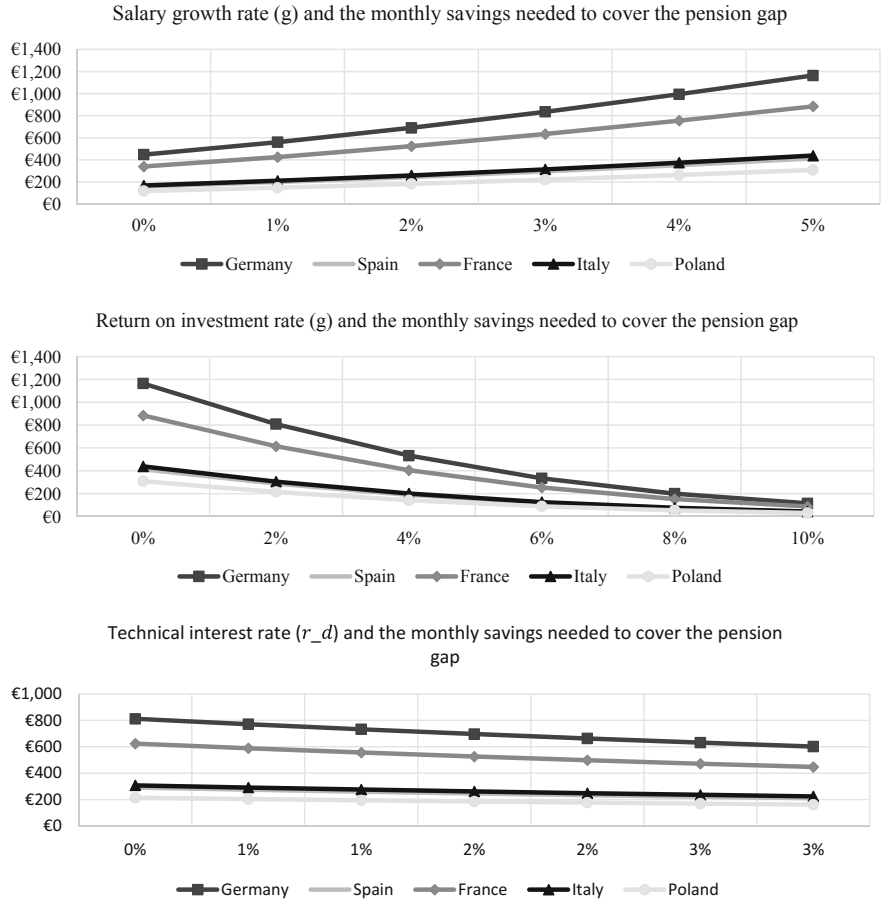

Fig. 2 The impact of selected model parameters on the monthly savings needed to cover the pension gap. Source: the author. Note: The calculations are based on assumptions from the base scenario

technical interest rate (r_d) directly influences the size of the pension gap ($PGAP_t$), and therefore also the final magnitude of S_{m_1}. Note that this relationship is inversely proportional. Generally, the saver should want to maximize both r and $r_{d,}$ as these parameters represent the return of investment on accumulated capital in each phase of financing the pension gap. However, one should also remember that the higher rate of return is always accompanied by a higher risk of failure in achieving it. Thus, in long-term retirement savings, portfolios with a moderate rate of return are usually preferred.

6 Conclusions

Undeniably, guaranteeing pension adequacy is one of the greatest challenges contemporary pension schemes face. This places the issue at the center of the modern pension economy. Despite the limitations pointed out in this study, the most widely used measures for determining a pension system's income adequacy is the replacement rate and the pension gap. According to many previously cited studies (i.e., European Commission 2015; OECD 2015; Aviva 2016), the future replacement rates will be substantially below expected values and the pension gap will grow substantially in most European countries in the next few decades. As was shown in the third section, in the five largest European countries, the pension gap will grow to between 19.1% (Italy) and 40.2% (Poland) around the year 2050. In the face of intense demographic changes, it is commonly agreed that any further reforms of base (public, national) pension schemes will not be sufficient to fully cover the pension gap and to do so, it will be necessary to accumulate supplementary (voluntary) pension savings. This is why, apart from identifying the size of the pension gap in the five countries, the second main aim of this study was to estimate the level of additional savings required to cover it.

The calculations presented in the study allow only a rough estimate of how much one should additionally save over the course of a career to ensure the future pension gap is covered. This is mainly due to the doubts surrounding the level of target replacement rate and the accuracy of actual replacement rate forecasts; the heterogeneity of future pensioners' life and career paths; and the great number of assumptions concerning the different parameters of the possible needs. The methodology applied in this chapter assumes that calculations for the hypothetical base scenario are made first, followed by the sensitivity analysis of how changes in particular parameters influence the final results. Thus, the most valuable conclusion of the study concerns the approximate value of savings necessary to cover the pension gap in terms of percentage of one's earnings under different scenarios of: retirement age, saving period, and the parameters of other models. The general impact of changes on the amount of monthly savings within the particular parameters necessary to cover the pension gap remains valid in each case. Here, the length of the savings' accumulation period and the age at which one retires is especially important and has a crucial impact on the amount of savings needed to cover the pension gap.

In view of the research, some practical conclusions for the pension policy in selected countries can be drawn. First, as achieving a target replacement rate at a recommended level of 70% seems to be impossible, it is necessary to build a comprehensive supplementary pension scheme which would effectively encourage voluntary saving for retirement (Jedynak 2016). Second, given that the saving (i.e., professional activity) period and the retirement age are crucial factors in determining the size of the pension gap, it is inevitable that the retirement age will be raised further. Third, there is a profound need to educate society about the pension system. The rules governing participation in the base pension scheme, the expected individual pension gap, and the need to fund it are crucial issues. Moreover, the influence of both the length of one's career and the age at which one retires on future benefits should be emphasized.

Although this study was prepared with particular attention placed on methodology and data, it still has some limitations and shortcomings. First of all, as stated above, the analyses prove that precisely determining the exact value of the savings needed to cover the pension gap is an extremely complex undertaking and providing a specific value appears impossible. In addition, the model adopted in the research has some constraints, including: not taking gaps in employment into account, the consideration that one's career will grow and become more lucrative over the years and constant consumption throughout all of one's retirement, assuming particular levels of the market's rate of return and the technical interest rate—both of which are appropriate to current market conditions, but are hard to maintain in the long run. Moreover, the majority of the parameters analyzed in the model are based on forecasts formulated on the basis of current market conditions and may be biased.

This research may contribute to further in-depth analyses. First of all, the issue of defining an alternative to replacement rate measures of pension system adequacy can be explored. Working out methods of determining the correct values of the adopted model's parameters, especially the size of the target replacement rate, is another interesting issue, as is the question of whether voluntary saving for retirement (the supplementary pension system) is the only way to increase future replacement rates. Finally, whether citizens of particular countries can afford additional retirement savings is a question worth exploring.

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Occupational Pension Scheme in Poland

Joanna Niżnik and Katarzyna Owsiak

Abstract This chapter describes and analyses the structure and performance of the occupational pension system in Poland, highlighting its strengths and weaknesses. The chapter examines the demographic implications for supplementary schemes and such factors as a sharp increase in the number of people over 65, permanent changes in dependency ratio and low savings rates. The study assesses the recent development of the occupational pension schemes and discusses the key elements of the proposals of the mandatory occupational capital plans in Poland. The voluntary occupational plans in Poland are still in an initial phase of development and have good developmental prospects (only 3% of insured people are covered). The political processes that shaped the country-specific pension arrangements in 1999 had important implications for subsequent reform possibilities, but the presented reform proposals need further detailed elaborations.

Keywords Occupational pension system in Poland · Dependency ratio · Indexation of benefits · Savings rate · Mandatory occupational capital plans in Poland

1 Introduction

The issue of social protection, including pension protection (a pension system), is a significant component of social policies as well as the subject of a broad scientific debate. This problem became an issue of key significance in Central and East European countries in the process of economic transformation as a result of a "shock therapy" after 1989. In a centrally planned economy, the state assumed

J. Niżnik
Finance Department/Faculty of Finance and Law, Cracow University of Economics, Cracow, Poland
e-mail: niznikj@uek.krakow.pl

K. Owsiak (✉)
Local Finance Department/Faculty of Finance and Law, Cracow University of Economics, Cracow, Poland
e-mail: owsiakk@uek.krakow.pl

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responsibility for all spheres of social life. A shift towards a free market economy changed the state's role in the area of traditional social functions, including the protection of incomes of the old age population. Such a transformation process requires greater prudence in making decisions related to social protection schemes, especially in the context of the state's increased social insurance spending as of 1990.

The current concerns about the future stability of social protection systems relate to changes in the labour market and demographic processes. With regard to the labour market, the key factors that deserve special attention include employment rates, professional activity rates, and mobility in Europe (Konkolewsky 2015). The factors related to demographic changes which affect the stability of a pension system include such phenomena as the ageing of societies and longer life expectancy. The adverse effects of these factors become visible in the context of, among others, available funds managed by pension systems. Considering the above, and assuming that most countries rely on the structure of their pension funds on intragenerational agreements and mutual obligations of present and future generations, such systems certainly need to be revised. Therefore, contemporary states are engaged in implementing legislative solutions in which part of pension schemes could be supported by supplementary insurance funds collected in the period of professional activity, for example, within the framework of occupational schemes. The pension reform enacted in Poland in 1999 facilitated the establishment of Occupational Pension Schemes (OPSs), which did not attract much attention at the initial stage of their operations. The chapter indicates various aspects of OPSs functioning, because as a result of the subsequent changes to the pension system, they may be treated not only as an alternative but also a significant form of savings for future pensions. The chapter primarily includes the following sections: introduction, materials and methods (theoretical background, data analysis), results, discussion, and conclusion.

2 The Functioning of Occupational Pension Schemes

The operations of contemporary occupational schemes depend on a number of factors. In the first place, such schemes can be mandatory or voluntary, and the key role is played by the nature of basic systems and their guaranteed benefits (Jędrasik-Jankowska 2001). Moreover, occupational pension schemes can be divided into various types depending on plans based on defined benefit or defined contribution. Considering the above remarks, it should be noted that the theoretical aspects of the functioning of occupational pension schemes should not be referred to Bismarck's and *Beveridge's models*.

The development of the market of additional pension protection is influenced by a number of factors and processes. They include the following: the level of public pension protection, the wealth of society (savings rate), financial knowledge (pension education), the development of financial markets and confidence in these

Table 1 Types of fiscal incentives in additional retirement savings

Moment of using an incentive	Type of incentive
Payout of savings	• Tax subsidy • Deducting premiums from tax base; • Taxation of part of premium; • Deducting part of premium from tax
Generating income from investing pension savings	• Exemption from capital gains tax • Preferential tax rate
Payout of benefits	• Tax exemption for benefits • Preferential tax rate for benefits, tax-free income

Source: Society of Polish Economists (2014, p. 50)

markets, as well as demographic processes. An equally significant role is played by the engagement of both employers and the state in the process of establishing occupational pension schemes. Therefore, it is necessary for the market of additional pensions to be competitive, but it should be regulated by the state. It implies the need for creating a system of fiscal incentives, encouraging people to save for their old age pensions (Society of Polish Economists 2014) (Table 1).

A review of literatures leads to the conclusion that a number of countries offer fiscal incentives to stimulate the development of the market of additional pension schemes, including occupational pension schemes. Additional funds (pension savings) are taxed when they are contributed, and when capital gains are realized (if the capital gains tax exists). There are two types of fiscal preferences: capital gains are not taxed, or taxation is deferred until a benefit is paid out, with the simultaneous tax exemptions for premiums and capital gains. The latter option is believed to be more effective (Society of Polish Economists 2014). The diversified character of pension systems in selected EU countries and, consequently, the different forms of occupational pension schemes are confirmed by data presented in Tables 2 and 3.

Apart from the lack of data concerning the number of occupational pension scheme participants in some EU member states, it should be noted that this form of pension plans is a common practice. A comparative analysis of data is also difficult due to the fact that participation in such pension schemes is not mandatory in all countries (see Table 3).

Taking into accounts the aforementioned remarks the development of occupational pension schemes deserves a positive assessment. The sector of occupational pension schemes is most advanced in the Netherlands, Finland, United Kingdom, Denmark, and Ireland. In these countries, the assets of occupational pension schemes exceeded the level of 40% of GDP (2012), reaching the level of 140% of GDP in the Netherlands. In most EU member states (Austria, Belgium, Spain, France, Germany, Hungary, Italy, Luxembourg, Latvia, Sweden, Slovenia, Slovakia, and Poland), the level of occupational pension scheme assets ranges from 3 to 8% of GDP, or is of slight significance (European Central Bank 2014).

Occupational pensions are regulated by the EU's legislation—European Parliament and Council Directive 2003/41/WE of 03 June 2003 on institutions for

Table 2 Members of occupational pension schemes in selected EU countries in 2015

	Members (in thousands)	
Country	Occupational DB plans	Occupational DC plans
Austria	n/a	n/a
Belgium	568	909
Czech Republic	n/ap	n/ap
Denmark	15	4783
Estonia	n/ap	n/ap
Finland	n/a	n/a
France	884	10,689
Germany	9318	n/ap
Greece	n/ap	112
Hungary	n/ap	n/a
Ireland	126	282
Italy	160	3448
Latvia	n/ap	13
Luxembourg	11	4
Netherlands	5110	355
Poland	n/ap	393
Portugal	187	149
Slovak Republic	n/ap	n/ap
Slovenia	n/ap	n/a
Spain	8440	1662
Sweden	n/a	n/a
United Kingdom	10,973	6931

DB—defined benefit; DC—defined contribution
n/a—not available; n/ap—not applicable
Source: OECD Pension Outlook (2016, p. 24)

Table 3 Type of participation in occupational pension schemes in selected EU countries in 2014

Country	Type	Country	Type
Austria	–	Italy	Voluntary
Belgium	Voluntary	Latvia	–
Czech Republic	–	Luxembourg	Voluntary
Denmark	Quasi M	Netherlands	M—Voluntary
Estonia	–	Poland	Voluntary
Finland	Voluntary	Portugal	M—Voluntary
France	Voluntary	Slovak Republic	–
Germany	Voluntary	Slovenia	M—Voluntary
Greece	–	Spain	M—Voluntary
Hungary	–	Sweden	Quasi M
Ireland	M—Voluntary	United Kingdom	M

M—mandatory
Source: Pension Scheme (2014, p. 71)

occupational retirement provision and supervision over such institutions (IORP). In accordance with EU concepts, occupational pension schemes benefit from the principles of the free movement of capital and the free provision of services. It implies that pension funds in one EU country can manage pension schemes for companies based in another EU member state. Moreover, pan-European companies can manage a single pension fund for all their subsidiaries in the entire territory of the EU (European Commission 2017). Another change to regulations was introduced in December 2016—European Parliament and Council Directive 2016/2341 of 14 December 2016 on institutions for occupational retirement provision and supervision over such institutions (IORP). EU decisions in this area facilitate the development of such schemes. The directive aims to achieve the following objectives (European Council 2016):

1. Develop overseas schemes through the removal of all possible barriers.
2. Ensure effective management including risk management.
3. Ensure that members and beneficiaries are better informed about their rights.
4. Provide supervisory bodies with necessary tools for effective control over institutions for occupational retirement provision (protection of members and beneficiaries).

EU member states are obliged to integrate new regulations into their national legislation by 13 January 2019.

3 The Establishment and Operating Principles of Occupational Pensions in Poland

3.1 Reasons for Establishing Schemes

Generally, modern pension systems employ an insurance method in managing old age risk, based on two stages:

1. The stage of savings, which starts upon joining an insurance scheme through contributing a premium in a specific amount.
2. The stage of consumption, which starts upon reaching the retirement age, entitling scheme members to lifelong pensions, calculated on the basis of collected funds (Sułkowska 2014).

The most significant element affecting contemporary pension schemes is the choice of financing future pensions. Currently, two systems are adopted: the PAYG (*pay-as-you-go*) system and the capital system. In Poland, after several reforms of the pension system, which aimed to shift from the PAYG system to a system combining PAYG with the capital system, and the trend to return to the PAYG system, it can be stated that the final solution has not been developed, and the system is in the process of modification.

Without a detailed description of the particular changes to the Polish pension system, let us just refer to several facts. In Poland, a breakthrough pension reform, based on the diversified sources of funds, i.e. a pillar system, was carried out in 1999 in response to the recommendations of international financial institutions (insurance companies and banks), supported by the World Bank and the International Monetary Fund (Oręziak 2014). The introduced changes led to creating a mixed system (PAYG and capital), based on three pillars. The first pillar was mandatory, based on the PAYG system and a social agreement, with pensions being paid out by the Social Insurance Institution (ZUS) from current premiums contributed by the entire working population (Owsiak 2017). The second private pillar is based on the capital system and the collection of funds for future pensions in the form of Open Pension Funds (Barr and Diamond 2009). Participation in the second pillar was mandatory for those who were under the age of 30 years when the reform was carried out, while it was voluntary for those at the age of 30–50 years. The existing third pillar is also based on the capital system, and it is managed by the private institutions of the financial market. The third pillar is based on voluntary participation and limited premiums, and its main objective is to supplement basic pillars as well as to collect additional funds contributed by employers under the Occupational Pension Scheme, which are to be paid out after reaching the retirement age or in the case of entitlement to disability benefits. As early as in 2004, however, it turned out that some of the proposed solutions were not effective, especially with regard to the third pillar. Little interest is shown by both future pensioners and employers (so-called additional pension) led to changes to the functioning of the Occupational Pension Scheme as well as the extension of the offer of promoting voluntary savings for future pensions. On 1 September 2004, additional insurance was introduced in the form of Individual Pension Accounts, and on 1 January 2012—Individual Pension Protection Accounts.

In 2011–2012, several other modifications were introduced, aimed to reduce the amounts of premiums transferred from Open Pension Funds to the Social Insurance Institution (ZUS), and the retirement age was extended to 67 years both for males and females. In 2014, subsequent changes were introduced due to the deteriorating condition of public finance and the disclosure of irregularities in the pension system and its implementation, as well as the unsatisfactory functioning of Open Pension Funds. The further transformation of the pension system resulted from forming a new government after the 2015 elections and the lowering of the retirement age in 2016 to 60 years for females and 65 years for males. Currently, further work is being continued to introduce changes announced in 2016. Trends in changes to third pillar Occupational Pension Schemes are discussed in the further parts of the chapter.

3.2 The Principles of the Functioning of Occupational Pension Schemes

As already mentioned, Occupational Pension Schemes were established in 1999, pursuant to the Act of 22 August 1997 on occupational pension schemes (Journal of

Laws No. 139 point 932), becoming effective on 1 April 1999. In 2004, as a result of subsequent changes, Occupational Pension Schemes were regulated by the Act of 20 April 2004 on occupational pension schemes (Journal of Laws 2004 No. 116 point 1207 with later amendments), which is still a binding law. According to legal regulations in force, an Occupational Pension Scheme is a form of a collective and voluntary accumulation of funds under the third pillar for the purpose of a supplementary pension, and these funds are raised by employers on behalf of their staff. The legislator accepts two forms of setting up such schemes—in one or several companies. The setting up of an Occupational Pension Scheme is initiated by an employer, who—together with employee representatives or trade unions—chooses a given scheme in accordance with the Act, and sets forth detailed guidelines for its functioning. When a scheme is set up in compliance with regulations, it is referred to as a statutory or qualified scheme. It should be noted that there are nonqualified and non-statutory schemes that are not registered by the Commission for Financial Supervision (the Financial Supervision Authority)—investment and insurance schemes. They differ from other schemes in that they cannot benefit from tax concessions, but, on the other hand, employers have greater freedom in choosing the forms of financing and joining a scheme—for example they can diversify the amount of contributed premiums depending on employees' positions and their significance in a company's hierarchy. With regard to statutory schemes, contributions cannot be diversified—basic premiums are set at the same level for all employees (Society of Polish Economists 2014).

There are four ways of managing Occupational Pension Schemes (Table 4).

Occupational Pension Schemes are based on two agreements. The first one is concluded by an employer, and it is a company agreement. It should be stressed that a company agreement specifies the basic conditions of a scheme's functioning, i.e. the choice of a financing institution, the provider of financial services or the amount of basic contributions. The amount of contributions transferred to a scheme cannot exceed 7% of the participant's compensation. The basic contribution can be determined on the basis of three variants: a percentage of compensation, equal amounts for all participants, or a percentage of compensation with a specific maximum amount of contributions. Unless otherwise provided by a scheme, its participants are authorized to make additional contributions from their compensation. The amount of such annual contributions cannot exceed 450% of the average projected monthly wage in the national economy. The other agreement is concluded with a financial institution that manages collected funds until they are paid out. Such institutions include investment funds, insurance companies, or pension funds set up for the needs of a scheme. Within the framework of the single European market of financial services, funds collected in a given country under occupational pensions can be entrusted to a specialised foreign institution based in one of the EU member states.

The setting up of a scheme is conditioned by the participation of at least half of a company's employees or one-third of employees in the case of more than 500 staff members. A participant of a scheme should be employed for a period of at least 3 months and be under the age of 70 years. Employers are entitled to specify the

Table 4 The forms of occupational pension schemes

Forms of occupational pensions	A body managing occupational pension funds	A type of product offered under occupational pensions
Pension fund	Employee pension society	Investment
Agreement on contributions to a pension fund	Investment fund society	Investment
Agreement on collective life insurance based on capital insurance fund	Life insurance company	Insurance and investment
	A life insurance company whose members are employees	
Foreign management	Any entity based in EU country and subject to supervision of mother country, whose core business is accumulation and depositing of funds for the purpose of payouts for the benefit of pension scheme participants after reaching retirement age	Depending on the core business of a managing entity

Source: Finansowy (2016)

detailed conditions for joining a scheme, including a minimum period of employment or an employee's age. They can also disapprove an employee's participation by refusing to accept his/her application and by a written justification of such a decision. From the perspective of employers, it is significant that it is they who have an impact on the final agreement, adjusting its form and provisions to the company's current situation (employment structure, age, and number of staff, or a given industry). There are a number of institutions that offer assistance in setting up pension schemes, enabling employers to rely on their experience in the process of making relevant choices.

The advantage of Occupational Pension Schemes is that they represent products for groups of customers and as such generate lower costs than products for individuals. It results from the lack of administration costs and related charges; costs can relate to insurance protection if a scheme is managed in the form of life insurance (Pawlak 2016).

3.3 The Role of the Financial Supervision Authority

Supervision over pension risk in Poland is performed by the Financial Supervision Authority. With regard to Occupational Pension Schemes, supervision activities focus on compliance of the functioning of schemes with legal regulations. Moreover, prior to the launching of schemes, they should be registered by the supervision authority. On behalf of employers, an application for registration can be submitted by a financial institution that manages a scheme, and the first transfer of contributions can be effected 1 month after the date of registration. One of an employer's

administration obligations after the launch of a scheme is to submit annual reports to the supervisory authority with the use of special forms provided by the supervisor, as well as information on changes to the scheme (e.g. the change of a financial institution which manages a scheme).

If employers initiate the establishment of a scheme, they are also authorised to waive their obligation to manage it. The closing of a scheme requires submission of a relevant application to the authority. When a scheme is closed, all its participants should receive a notification. Then, they are requested to identify an account into which funds will be transferred. The transfer of funds into this account (a pension account, or an account in a different pension scheme) is performed by an institution that manages the scheme until its liquidation.

3.4 Fiscal Preferences

The development of the market of Occupational Pension Schemes is affected by the legislator's fiscal solutions, which are significant both for employers and employees. When an employer makes contributions to a scheme (which are treated as a specific form of remuneration), employees only incur tax-related costs, and their salaries are not charged with additional social and health insurance premiums (social insurance). From an employee's perspective, the basic premium (a component of remuneration) represents a source of income generated from a labour contract, which is subject to general regulations on income taxes paid by natural persons. On the other hand, additional contributions made by employees are not liable for tax concessions or reductions in social insurance payments.

Simultaneously, an employer's costs resulting from the establishment and operations of Occupational Pension Schemes are tax deductible. Such costs include basic contributions made by an employer as well as other scheme-related charges—costs resulting from company agreements, employee participation statements, legal disputes, etc. This solution applies to entrepreneurs who pay their income tax in accordance with the Act on taxation of legal persons (the Act of 15 February 1992 on taxation of legal persons, Journal of Laws 1992 No. 21 point 86 with later amendments), as well as to natural persons (the Act of 26 July 1991 on taxation of natural persons, Journal of Laws 1991 No. 80 point 350 with later amendments).

The funds accumulated in Occupational Pension Schemes in the entire period of savings constitute an employee's additional source of income on reaching the retirement age. Tax exemptions apply exclusively to funds collected by Occupational Pension Schemes and paid out to scheme participants or entitled persons after participants' death. The acquisition of occupational scheme funds by entitled persons is not liable for inheritance and donation tax.

4 The Factors Affecting the Market of Occupational Pension Schemes

The ageing of population poses a major threat to pension systems, especially in the context of lowered pensions based on public funds. This matter is given much attention by theoreticians and practitioners, which increases the social awareness of these issues. Longer life expectancy results in women's and men's longer employment contracts. According to European Commission estimates, life expectancy by 2060 will increase by 7.9 years for males and 6.5 years for females as compared with the year 2010. Another phenomenon is the "shrinking" of the European population, reflected in an increase in the population at the age of 60 years by 2 million per annum. This increase is twice as high as in the late 1990s and at the beginning of 2000 (European Commission 2012). In this context, an increasing dependency ratio is of key significance (Table 5), indicating the number of post-productive people per 100 people of productive age.

The dependency ratio is steadily increasing in Poland. If the retirement age were 67 years for both genders, and according to the adopted forecast which says that in 2010 there are four working people per one retired person, then, in 2050, there would be two working people for one retired person. Because of lowering the retirement age to 60 years for females and 65 years for males as of 2017, the demographic burden rates are likely to increase, reaching the level of 75 in 2050. This implies four working people per three pensioners.

European Commission forecasts are confirmed by figures presented in Table 6. An analysis of Poland's population and its structure based on the economic criterion confirms the advanced demographic ageing of labour resources (a decrease in the number of people at the age of 18–44 years by 6 million in the analysed period) and an increase in the number of post-productive population (by approx. 3 million people in the projected period). This situation is mainly caused by previous baby booms and baby busts.

Difficulties faced by future pensioners are also confirmed by the level of the replacement rate. In 2008–2016, it is decreased by 13.8% points and this trend is expected to continue (Table 7).

In the context of such demographic forecasts and unfavourable trends recorded by the pension system with regard to the replacement rates, it is justified to state that pensions paid out from public funds should be supplemented by additional pensions—for example those from Occupational Pension Schemes. However, decisions

Table 5 Dependency ratio in Poland in selected years

Year	2010	2015	2020	2025	2030	2035	2040	2045	2050
I.	26	31	38	43	45	49	56	65	75
II.	29	32	35	37	37	38	38	44	52

I. According to the Act on retirement by 31 December 2012
II. According to the Act on retirement of 1 January 2013
Source: Own research based on Central Statistical Office of Poland, Warsaw (2014, p. 150)

Table 6 Predictions of the number of population (in thousands) by economic age groups in Poland

Description	2013	2020	2035	2050
Pre-productive 0–17	6995	6733	5568	4963
Productive mobile 18–44	15,338	14,219	10,725	9331
Productive nonmobile 45–59/64 (I) Productive nonmobile (II)	9084 9210	8568 9601	9990 11,844	7252 9717
Post-productive 60+/65+ (I) Post-productive (II)	7078 6952	8617 7585	10,193 8340	12,404 9939

I. According to the Act on retirement by 31 December 2012
II. According to the Act on retirement of 1 January 2013
Source: Central Statistical Office of Poland, Warsaw (2014, p. 148)

Table 7 Gross replacement rate in Poland—selected years

Year	2004	2006	2008	2010	2012	2014
Replacement rate	56.9	62.1	62.1	59.0	48.8	43.1

Source: OECD (2007, 2009, 2011, 2013, 2015a, b)

related to retirement savings are affected not only by the awareness of these issues but also by the savings rate.

5 The Market of Occupational Pension Schemes in 1999–2015

Occupational Pension Schemes started functioning when the regulating Act came into force in 1999. As Fig. 1 indicates, a small number of schemes were launched at the beginning of the analysed period. The situation changed dramatically in 2005, when the Act on occupational pensions was amended, encouraging employers to transform the existing group insurance schemes into Occupational Pension Schemes. The major incentive for employers to adopt new solutions was the loss of insurance payment exemptions for funds transferred to employees. According to the new legislation, group insurance schemes transformed into occupational schemes by 31 December 2005 could benefit from these exemptions. Moreover, new regulations contained fiscal incentives—tax exemptions and liberalised regulations related to establishing and liquidating schemes, as well as lowered fines for the failure to meet deadlines for notifying the supervisory authority of the activities carried out by occupational schemes.

An in-depth analysis of Fig. 1 indicates that the number of schemes rose from 3 in 1999 to 1054 in 2015. The most significant changes occurred between 2004 and 2005, when the number of schemes increased by 564 (more than 2.5 times). The number of schemes rose each year up to 2011, when 1116 schemes were recorded. In the subsequent period of 4 years, 62 of them were liquidated or joined occupational schemes. In the entire analysed period of 1999–2015, the highest average increase,

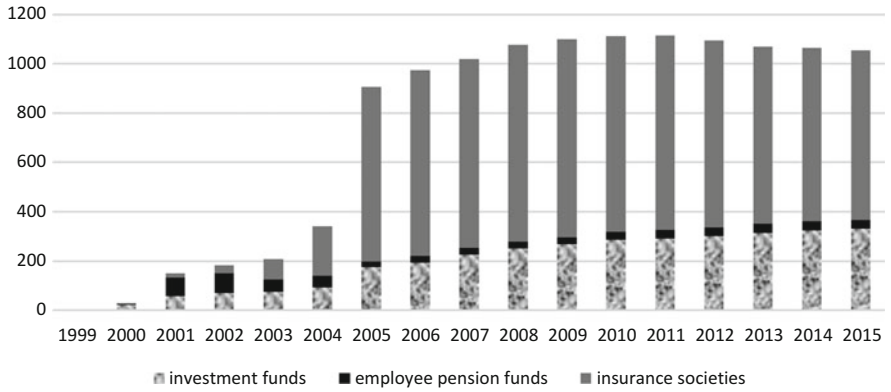

Fig. 1 The number of Occupational Pension Schemes in 1999–2015. Source: Own research based on Financial Supervision Authority, data obtained from entities managing schemes

as high as 54.7%, was recorded for group life insurance schemes combined with capital insurance funds (insurance companies), approx. 31.5% operated as investment funds, while merely 10.2% of schemes operated as Occupational Pension Schemes.

The situation on the market of occupational pensions in 1999–2004 differed considerably from market conditions in later periods. Therefore, some of the analyses refer to the 2005–2015 period. In the last 11 years, the dominant position has been held by employee pension funds, accounting for 71.6% (a larger share than before), investment funds accounted for approx. 25.4%, while Occupational Pension Schemes represented approx. 3%.

A comparison of 2005 and 2015 figures points to an increased role of schemes with the participation of investment funds and a decreasing significance of those with the participation of insurance companies. In 2005, insurance companies managed approx. 78% of all Occupational Pension Schemes, with employee pension funds accounting for merely 2.8% of all schemes, and the remaining 19.2% operated on the basis of agreements with investment funds. In 2015, approx. 65.4% of occupational pensions were managed by insurance companies, approx. 3.1% operated as employee pension funds, and 31.5% of employers concluded agreements with investment fund societies.

The market for Occupational Pension Schemes was dominated by small entities. Most schemes are established for less than 50 employees, i.e. in the SME sector. In 2006–2015, they represented approx. 50% of the market,[1] followed by Occupational Pension Schemes with 51–200 participants (29%). The least interested employers are those with more than 1000 employees, accounting for 6% of the occupational pension market (Fig. 2).

[1]Due to incomplete or lack of data further analyses refer to a shorter time horizon.

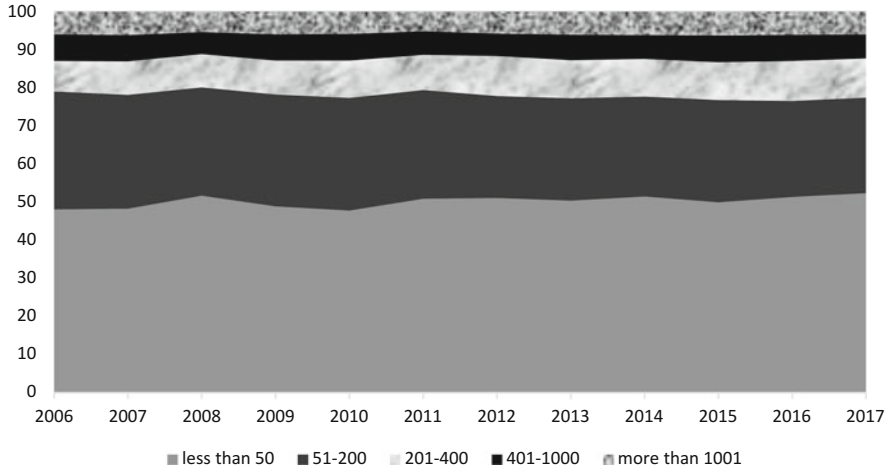

Fig. 2 The structure of the occupational pension market by scheme size. Source: Own research based on Financial Supervision Authority, 2007–2016

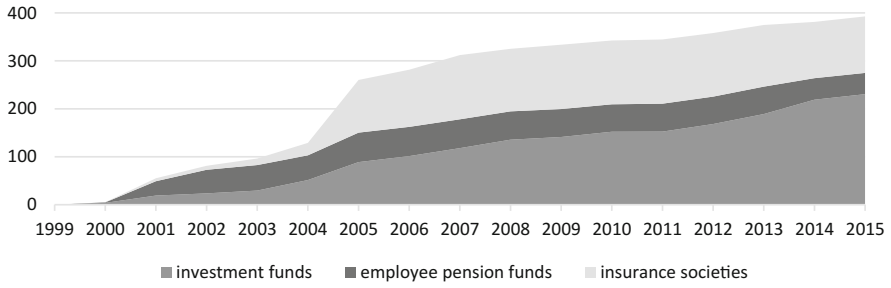

Fig. 3 The number of occupational pension participants (in PLN thousands). Source: Own research based on FSA (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016)

In the course of time, the number of pension schemes rose, coupled with an increasing number of target employees. Figure 3 indicates that in 2003–2015 the number of occupational pensions increased from 96.5 thousand to 392.6 thousand (almost fourfold). The largest number of employees were covered by pension schemes in 2005 (an many as 131.2 thousand), which, obviously, related to an increase in the number of schemes, with merely 2.3 thousand in 2011. This phenomenon can be attributed to an economic slowdown.

In the period of the first 2 years, the largest number of participants were recorded in investment funds because in 1999 they were the recipients of all contributions, while in 2000—approx. 75% of employee contributions. In the period of the subsequent 3 years, the largest number of participants were recorded in employee pension funds—in 2001, 2002 and 2003—54%, approx. 60%, and approx. 55%, respectively. In 2004, the number of participants of occupational pensions and employee pension funds are equal (approx. 40%). In 2005–2007, insurance

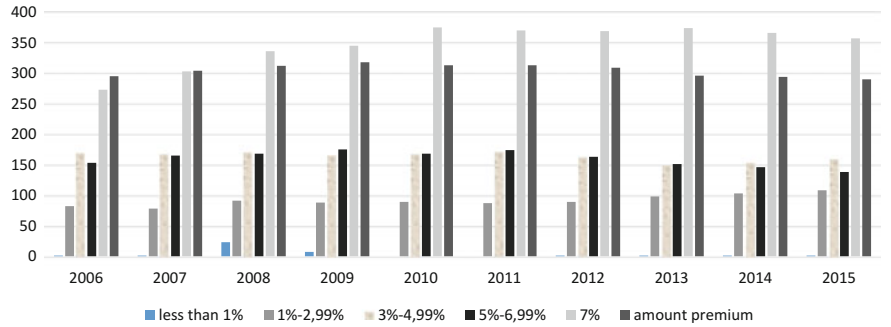

Fig. 4 The amount of basic contribution specified in a company agreement. Source: Own research based on data from the Financial Supervision Authority (2006–2016)

companies take the lead, accounting for 42% of all occupational pension participants. Since 2008, the dominant position has been held by investment funds, in which the number of participants has risen from 41 to 50% of all pension scheme participants.

Legislation allows employers to adopt a wide range of basic contributions. As already mentioned, the amount of contributions should not exceed 7% of an employee's gross compensation. According to figures presented in Fig. 4, in 2006–2015 contributions were determined percentagewise in approx. 72% of all operating schemes. In the remaining 28% of schemes, contributions were in the same amount for all employees.

The employers who decided to pay contributions as a percentage of gross compensation usually chose a maximum level of 7%. In the analysed period such a decision was made by approx. 32% of schemes. Contributions in the amount of 3–4.99%, and 5–6.99% were adopted by approx. 15% of Occupational Pension Schemes. With the exception of 2008 and 2009, employers did not make contributions below 1% of employees' gross compensation.

Basic contributions constitute a major source of funds for employee pension schemes. However, legislation allows for increasing these funds by additional contributions made by scheme beneficiaries—employees.

An average basic premium in 2004–2015 amounted to PLN 3190, exceeding the additional premium of PLN 1066 by PLN 2123 (3-fold). Figures presented in Fig. 5 also point to increased basic premiums (with the exception of 2005 and 2015), with additional premiums remaining at similar levels. In 2004–2015, additional premiums accounted for approx. one-third of total contributions to Occupational Pension Schemes. At the beginning of the analysed period, additional premiums paid by employees were higher, accounting for approx. 40%, while their share in 2013 was the lowest (28%).

The annual contributions increased their accumulated value from PLN 30 thousand in 1999 to approx. PLN 1.2 billion in 2015. The fastest increase in premium revenue was recorded between 2001 and 2002, 2004 and 2005, and 2005 and 2006, amounting to PLN 131.7 million, PLN 146 million, and PLN 279.4 million,

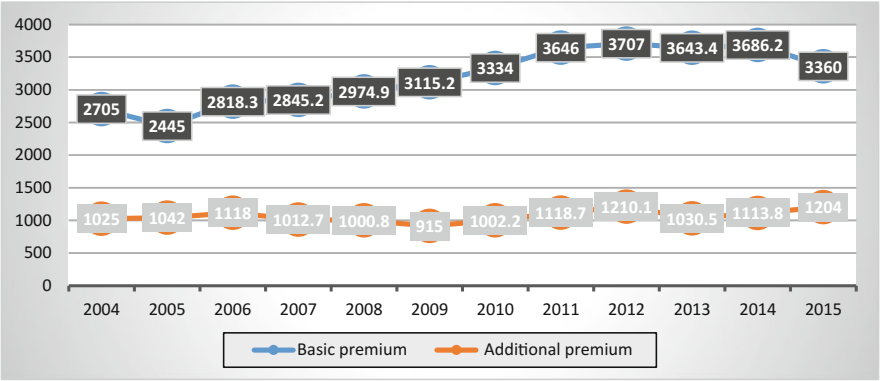

Fig. 5 Average annual basic and additional contributions per participant (PLN). Source: Own research based on data from the Financial Supervision Authority (2006–2016)

respectively. Basic premium revenue considerably exceeded that from additional premiums, accounting for 97% of total revenue in the analysed period.

The accumulated assets of Occupational Pension Schemes, resulting from premiums and premium placements, amounted to PLN 527 million in 2003. By the end of 2015, they increased by PLN 10,096.5 million, reaching the level of PLN 10,623.5 million, which represents a 20-fold increase in this period (Fig. 6).

The greatest share in the assets was represented by funds paid into the investment fund account, which accounted for approx. 46% of total assets; 29% of all savings belonged to employee pension funds, and the capital funds of insurance societies represented approx. 25%. An in-depth analysis points to considerable differences between average values in the analysed period and the actual changes to the structure of assets. In the period of the first 5 years, except for the year 2004, investment fund assets accounted for approx. 40% of the total occupational pension assets. As of 2005, their share increased by one percentage point from 43 to 55% in 2015. A reverse trend was recorded for employee pension funds. In the period of the first 2 years they dominated the structure of assets at the level of 52 and 46%. In 2005 and 2006, employee pension funds accounted for 36 and 31% of total assets, respectively. From that period on, their share decreased annually by 1–2% points, reaching the level of 17% of total occupational scheme assets in 2015. The assets of insurance societies represented 8% of the total assets in the period of the first 2 years, and their share rose to approx. 25%, and in 2006 it stabilised at the level of 29%, decreasing to 26% in recent years.

As the above considerations indicate, the market of Occupational Pension Schemes underwent a number of changes in the analysed period. The number of schemes, the value of their assets, and the number of participants increased. Unfortunately, the number of the participants of occupational pensions is not considerable, which is confirmed by figures presented in Fig. 7.

In 1999–2015, the average number of occupational pension participants accounted for approx. 1.7% of ZUS participants. In the period of the first 6 years, their number

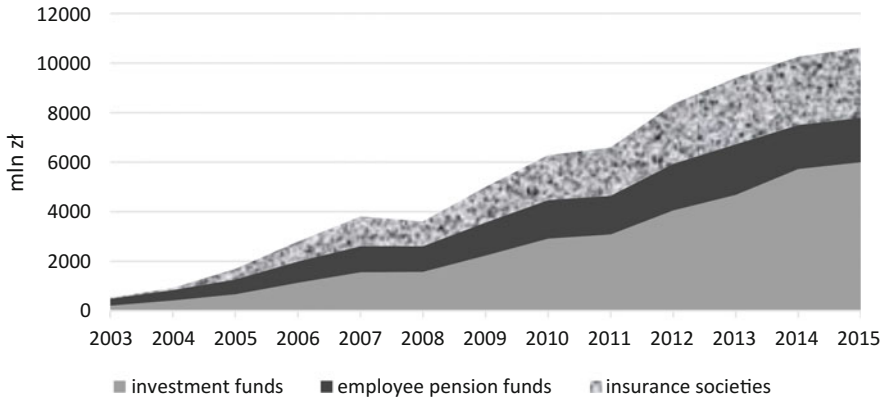

Fig. 6 Occupational Pension Funds' Assets in 2003–2015 (PLN millions). Source: Own research based on data from the Financial Supervision Authority (2006–2016)

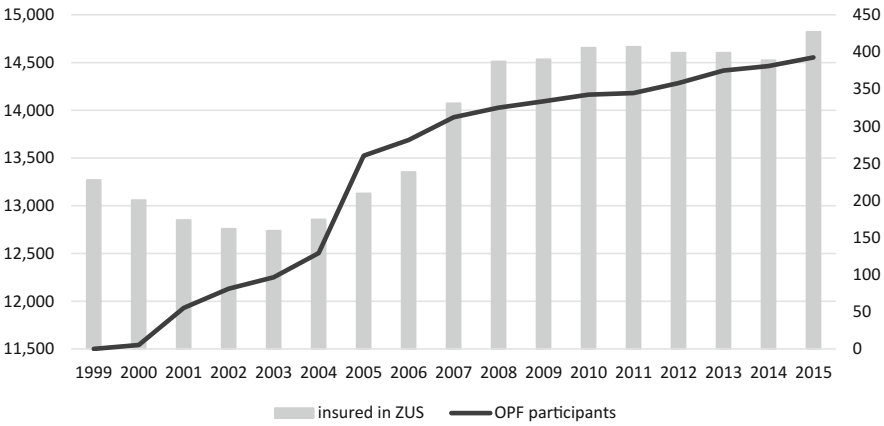

Fig. 7 The number of ZUS (Social Insurance Institution) and Occupational Pension participants (in millions). Source: Own research based on data from the Financial Supervision Authority (2006–2016)

did not exceed 1%. A breakthrough change occurred in 2005 when the number of participants of pension plans doubled as compared with the previous year, accounting for approx. 2% of the holders of public insurance policies. From this year on, the number of participants rises steadily. In 2005, their share amounts to approx. 2.7%.

6 Trends in Changes: Employee Capital Plans

Currently, further work is being continued to introduce changes announced in 2016 under the Responsible Development Strategy and the Capital Accumulation Plan. The objectives of the programmes are as follows:

1. To prevent possible decreases in pension benefits (replacement rates) in the first pillar of the pension system; under the first programme: Poles' financial security.
2. To reduce the bureaucratic burden of pension schemes and to ensure easy access to information on programmes for participants, to develop a stable, long-term, universal, and voluntary capital pension plan based on third pillar savings schemes; under objective four: effective voluntary capital pension scheme (Ministry of Development 2016).

In order to increase pensions, the government adopted the Capital Accumulation Plan (February 2017). One of the significant elements of the Plan is Employee Capital Plans. They are to be established by entrepreneurs who employ more than 19 people, and employees at the age of 19–55 years will be obliged to join the Plans. Employees will be entitled to resign from participation within 3 months after the date of launching the programme. It is very likely that companies which already operate Occupational Pension Schemes will not be obliged to establish capital plans.

In the period of the first 2 years funds from Employee Capital Plans will be transferred to the Polish Development Fund TFI SA, which will establish investment funds adjusted to the age of saving participants. After this period, savers will be entitled to join another investment fund. If employers offer Occupational Pension Schemes, they are not obliged to establish Employee Capital Plans.

Employee Capital Plans will be financed by premiums. Employees will pay a basic premium in the amount of 2% of their compensation (deducted from it). The premium can be increased to 4%. Employers, just like employees, pay a premium at the level of 1.5%, which can be raised to 4%. Contributions made by employers to employee capital plans are not subject to social insurance, they are tax deductible and subject to income taxes paid by employees. Employers will benefit from subsidies in the amount of 0.5% of premiums, contributed by the Labour Fund, which consists in lowering the financial obligation to a maximum amount of 30-fold average monthly compensation in the economy. All participants who join a scheme financed by public funds are offered a welcome reward discount in the amount of PLN 250.

Benefits offered by employee capital plans are available to those who reach the statutory retirement age. However, only 25% of funds can be made available as a one-time payment—the remaining 75% will be used to buy a pension with a lifetime annuity (a minimum of 10 years). Small companies (with up to 18 employees) should offer participation in employee capital plans or Individual Capital Plans established by financial institutions. Provisions related to participation, the payout of benefits and fiscal incentives will be the same as in the case of Occupational Pension Schemes. Employee Capital Plans are scheduled to come into force on 1 January 2018.

7 Conclusions

Currently, Occupational Pension Schemes do not play a major role in Poland's system of social insurance—their participants account for merely 2.6% of the total number of public insurance participants, and the share of their net assets in GDP does

not exceed the level of 2.2%. Additional pension protection is affected by a number of factors including the level of financing pensions by public funds, the material wealth of a society, and financial knowledge. In Poland, the impact of these factors is not satisfactory. The replacement rate in the public system records dramatic decreases, household savings are at a low level, and the knowledge of pension products is superficial and insufficient.

Other significant determinants include the employer's and state's engagement in organising pension schemes, and their financial support in the form of subsidies and tax concessions. OECD research studies on the impact of fiscal incentives on retirement savings do not lead to any explicit conclusions (OECD 2015a, b). On the other hand, Britain's experience in automatic enrolment into pension schemes confirms the effectiveness of this solution—only a few participants decide to resign from participation (Department for Work & Pensions 2014). Therefore, the integration of this mechanism into new solutions related to employee capital plans in Poland may increase the number of insured participants.

However, the absence of legal regulations on Employee Capital Plans raises doubts as to the amount of contributions, operating costs, or protection against the loss of accumulated funds. Therefore, it is difficult to predict the impact of mandatory Occupational Pension Schemes on the amount of benefits, retirement expenditure, or replacement rates. However, the presented analyses indicate that this impact can be considerable.

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Comprehensive Assessment of Financial Safety of the States Taking into Account Social, Economic, and Shadow Indicators

Nadezhda Yashina, Sergey Petrov, Nataliya Pronchatova-Rubtsova, and Oksana Kashina

Abstract In the knowledge-based economy, the issue of assessing the financial policy effectiveness and its impact on the level of socioeconomic development of the country and the population's welfare is acute. Maximizing the effectiveness of financial policy is possible while ensuring financial safety of the country. Market management conditions create the existence of a shadow economy, which adversely affects the development and functioning of the global financial system in general and of each state. The purpose of the chapter is to conduct a comprehensive assessment of the financial safety of states on the basis of determining the socioeconomic position of the country considering the shadow economy and revealing its impact on the level of the population's welfare. To determine the financial safety of states, a methodology has been developed for calculating the total standardized indicator for assessing the socioeconomic position of countries considering the shadow economy by means of specially created system of indicators. Approbation of a technique is carried out on a selection of 45 countries in 2015. Based on the developed technique, a rating of countries was built. It was revealed that the higher the country's financial safety, the higher the population's welfare.

Keywords Financial safety · Socioeconomic position · Shadow economy · Population's welfare · The total standardized indicator · Rating

1 Introduction

Current situation of the countries in a globalized world is characterized by a high degree of integration of national financial systems into the global economy. It entails an increase in threats to the financial sector of states, which is conditioned by their interdependence; this fact has been repeatedly noted in many studies (Andruseac

N. Yashina (✉) · S. Petrov · N. Pronchatova-Rubtsova · O. Kashina
Institute of Economics and Entrepreneurship, Department of Finance and Credit, Lobachevsky State University of Nizhny Novgorod, Nizhny Novgorod, Russian Federation

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2015; Ripsman and Paul 2010). In this regard, ensuring financial safety of a country is one of the most pressing challenges in the modern world. Financial safety of a state is the basic condition for its ability to carry out an independent financial and economic policy that would correspond to its national interests.

Many studies focus on a comprehensive assessment of the world countries' economic and financial safety (Grigoreva and Garifova 2015; Hacker et al. 2012; Popkova et al. 2015; Semjonova 2016; Epstein 1939). For instance, Semjonova (2016) developed and applied a consolidated indicator of financial safety situation, which allowed to assess the situation in the Baltic States and several countries of the European Union. The developed indicator was determined by summing up a number of economic and financial parameters related to the financial safety of a country. The study results have shown that the received values of the comprehensive indicator moderately correlate with a Fitch agency rating both for the Baltic States and for the analyzed states of the European Union.

Hacker et al. (2012) developed an Economic Security Index (ESI) based on the following three key groups of factors: population's and state's income level, expenses for healthcare, and the amount of reserve financial resources. The source information used to calculate the comprehensive economic safety indicator was the data of surveys conducted among US residents, as well as information from official sources.

However, the majority of authors (see, for example, Grigoreva and Garifova 2015), when forming an integral assessment of economic and/or financial safety apply a score and weight method. This method consists in selecting the indicators, based on expert analysis, that have the biggest impact on economic or financial safety, and then their relative importance is determined (weighing coefficients).

The assessment carried out in such a manner may turn out to be not complete or not quite objective, if different dimensions of the indicators included in the integral indicator are not taken into account, or their importance or weight is overstated/lowered.

The problem of assessing financial safety is also complicated by the fact that the impact many factors have on it may increase or weaken from time to time, depending on the current situation in a country and in the world; and new threats to the social and economic development of states emerge.

There is a number of threats to economic and financial safety (weakening of a country's scientific, technical and technological potential, economic disintegration, social differentiation, criminalization of social relations, and others), however, one of the most serious of them is development of shadow economic relations in a country (Grigoreva and Garifova 2015; Popkova et al. 2015). Development of the shadow sector of economy threatens strategic interests of states, reduces the efficiency of the states' financial policy, and constitutes a real threat to the implementation of economic, political, and social reforms. Thus, shadow economy is one of the most crucial issues for the development of the world community, on which the state of the world countries' economy and population's welfare level directly depend.

Literature aims to study the shadow economy of states, as well as to developing methods of its assessment (Thomas 1992; Johnson et al. 1998; Giles 1999; Tanzi 1999; Schneider and Buehn 2016; Dell'Anno 2007; Dell'Anno et al. 2007; Buehn and Schneider 2012) noted that tax burden, labor remuneration, and social security rates are one of the key factors of shadow economy development in a state. The results of studies show that elements of the shadow economy sector are characteristic both of developing (Amendola and Dell'Anno 2010; Nchor and Adamec 2015; Ene and Stefanescu 2011) and developed countries of the world (Dell'Anno 2007; Dell'Anno et al. 2007).

Growth of the shadow economy sector, along with the abovementioned factors, also stimulates ineffective state laws, red tape, and corruption in public authorities (Johnson et al. 1998; Friedman et al. 2000; Dreher and Schneider 2009; Dreher et al. 2009; Schneider and Buehn 2016; Buehn and Schneider 2012; Teobaldelli 2011; Amendola and Dell'Anno 2010). Besides, negative situation in the labor market and barriers existing in the entrepreneurship field contribute to an increase in the shadow economy share in relation to the countries' total GDP (Johnson et al. 1998; Friedman et al. 2000; Kucera and Roncolato 2008; Schneider and Buehn 2016).

Consequences of the shadow economy sector growth are reduction of government revenues, as well as worsening of the countries' population life quality. Research conducted by Johnson et al. (1998), Schneider and Buehn (2016), Feld and Frey (2007), and Dreher and Schneider (2009) show that countries with higher tax revenues, lower tax rates, efficient legislation, and low corruption level are characterized by a lower shadow economy share in relation to their total GDP.

Studying shadow economy is complicated by the fact that to analyze it one needs a certain set of known and measurable indicators characterizing illegal economic activity. However, due to the shadow nature of such activity, indicators are difficult to be measured numerically. In this regard, to assess the shadow economy scope and level of development, Ene and Stefanescu (2011), Dell'Anno (2007) and Nchor and Adamec (2015) most frequently use the Multiple Indicators Multiple Causes (MIMIC) method. This approach is based on using econometric models including a number of measurable quantitative indicators reflecting illegal economic activity in a country. In particular, for instance, Ene and Stefanescu (2011) considered as the model parameters the following indicators: tax revenue level; corruption index; direct tax share in relation to a state's GDP; indirect tax share in relation to a state's GDP; GDP per capita in a country; official unemployment rate; and investment expenditure share in relation to GDP. Further, the authors assessed dependencies of the resulting indicators, which were population activity rate; real GDP index; and monetary aggregates M1–M2 ratio based on these factors.

The results of studies (Ene and Stefanescu 2011; Dell'Anno 2007; Nchor and Adamec 2015) show that an index built in such a way characterizing the shadow economy scope may well serve as an indicator of the efficiency of state policy, as well as of reforms carried out in a country.

The literature (see, for example, Lasar et al. 2008) also emphasize that a set of indicators to form a shadow economy index may vary for different states depending on their specifics.

So, the objective of this work is to carry out a comprehensive assessment of countries' financial safety based on a developed system of indicators of their social and economic situation and shadow economy level, as well as to study the impact such indicators have on the population's welfare level. When studying countries' financial safety, it is important to focus on the shadow economy development degree, since it is the sector that distorts the official statistics for unemployment, official labor force, income, consumption, which eventually reduces public administration quality.

2 Data and Methodology

The efficiency of a state's financial policy is directly linked to the country's financial safety level. Studying and development of methodological approaches to carrying out a comprehensive assessment of the world countries' financial safety becomes particularly relevant in the turbulent conditions of the global financial system and orientation of public financing to the sectors that are maximizing the population's social welfare.

We offer a methodology of assessing countries' financial safety based on a total standardized indicator allowing to assess the social and economic situation of the countries taking into account the shadow economy sector through a specially developed system of indicators that takes into account the controversial and differently directed nature of the interaction between society and economy.

The methodology shall comply with the ease of use requirement conditioned by the accessibility and reliability of source information that is why to solve the task of assessing the authors used official open statistical data from The World Bank Group, The Eurasian group on combating money laundering, and financing of terrorism (EAG), The International Monetary Fund (IMF), The Financial Action Task Force (FATF), Transparency International the global coalition against corruption, The World Economic Forum, the International Organization for Public-Private Cooperation, and The Institute for Economics and Peace (IEP). Approbation of the methodology was carried out based on samples from 45 countries for 2015.

The result of solution of the set task shall represent a consolidated, unambiguous strict measurement—an index, depending on the values of which one may streamline the multitude of studied countries as a list by their social and economic situation taking into account the shadow economy sector indicators.

The selection of indicators for a comprehensive assessment is based on the principles of the balanced system of indicators (BSC) theoretical concept: data reliability; data sufficiency (several dozens of indicators); data importance (use of indicators directly characterizing social and economic situation taking into account the shadow activity); sampling diversity; and unambiguity (the useful effect is expected to monotonically change along with an indicator value).

Three groups of indicators (in total more than 20) have been formed:

- Indicators reflecting the social situation of a country (death rate; men's retirement age rate; women's retirement age rate; unemployment rate, %; birth–death ratio; population's life expectancy rate; birth date; labor force rate; human development index; quality of life index; competitiveness index; and GDP per capita based on PPP, $).
- Indicators characterizing the economic situation of a country (total debt, % to GDP; import, % to GDP; inflation rate, %; export, % to GDP; foreign direct investment inflow, % to GDP; GDP–labor force ratio).
- Country's shadow economic activity indicators (investment outflow abroad, % to GDP%; peace index; terrorism index; number of intentional homicides per 100,000 residents; corruption perception index; belonging to FATF).

A review of a wide range of researches on the issue of this work has shown that in assessing countries' financial safety no proper attention is paid to the threat of terrorism, which, unfortunately, has got widespread in the modern world. That is why the authors suggest to include the terrorism index in the shadow activity indicator group. The index was developed by an international group of experts under the aegis of the Institute for Economics and Peace of Sydney University, Australia. Calculations were made based on data from the Global Terrorism Database of the National Consortium for the Study of Terrorism at the University of Maryland state. The global terrorism index is used to determine the level of terrorist activity within a state by the following four key criteria: number of terrorist attacks, number of dead, number of injured, and tangible damage level.

Calculated individual indicators allowing to assess countries' financial safety may have various dimensions, importance or weight. And carrying out a comprehensive assessment taking into account a special system consisting of the three indicator groups makes it necessary to represent them in a dimensionless form. For the possibility of comparing the indicators, their standardization is carried out. According to this purpose, a linear transformation of the original indicators is applied based on the formulas (1) and (2). Standardized indicators belong to the range [0; 1] (see Table 1).

The transformation allows to save the structure of the indicators and "clean" them from the dimension. The result of the application of the method is comparable indicators that can be combined into these groups (Yashina et al. 2015).

To carry out a standardization process, indicators are classified by two groups of semantic content in Table 1 (by impact on the comprehensive assessment of a country' financial safety): an increase in value of one indicator results in worsening (oppositely directed indicators, the lower the coefficient value, the better), and an increase in value of other indicators results in improvement (co-directed indicators, the higher the coefficient value, the better).

Formation of standardized indicators is carried out according to the formulas (1) and (2):

1 group:

$$K_{ij}^{*} = \frac{K_{ij} - K_{i\ \min}}{K_{i\ \max} - K_{i\ \min}}, 0 \le K_{ij}^{*} \le 1. \quad (1)$$

2 group:

$$K_{ij}^{*} = \frac{K_{i\ \max} - K_{ij}}{K_{i\ \max} - K_{i\ \min}}, 0 \le K_{ij}^{*} \le 1, \quad (2)$$

where K_{ij} is the calculated value of the i^{th} coefficient of the indicator system of social and economic situation taking into account the shadow economy in the j^{th} country, K_{ij}^{*} is the standardized indicator of the i^{th} coefficient of the indicator system of social and economic situation taking into account the shadow economy in the j^{th} country, $K_{i\ \max}$ is the highest calculated value of the i^{th} coefficient, $K_{i\ \min}$ is the lowest calculated value of the i^{th} coefficient.

Actual values of indicators may be applied to compare the social and economic situations in various countries taking into account the influence of shadow activity factors in dynamics, as well as to compare a specific situation of a country with similar indicators of other countries. These coefficients can be used as standards.

To receive an unambiguous quantitative comprehensive assessment of the world countries' financial safety the authors suggest calculating a total standardized indicator allowing to assess social and economic situation of the countries taking into account the shadow economy sector as a sum of values of individual standardized

Table 1 Grouping indicators by the orientation of impact on the comprehensive assessment of a country' financial safety

Indicator group name/indicators	
1. Group: oppositely directed indicators	2. Group: codirected indicators
Total debt, % to GDP	Export, % to GDP
Import, % to GDP	Foreign direct investment inflow, % to GDP
Investment outflow abroad, % to GDP	GDP–labor force ratio
Death rate	Birth–death ratio
Men's retirement age rate	Population's life expectancy rate
Women's retirement age rate	Birth rate
Inflation rate, %	Labor force rate
Unemployment rate, %	Human development index
Peace index	Quality of life index
Terrorism index	Competitiveness index
Number of intentional homicides per 100,000 residents	GDP per capita based on PPP, $
	Corruption perception index
	Belonging to FATF

Source: Prepared by the authors

indicators of a formed assessment system (formula 3). Then its value for a specific country is compared with a corresponding value of the total standardized indicator reflecting the standard value for countries relating to the category with a high level and to the category with low level of financial safety, respectively. It allows to rank countries by the total indicator value with simultaneous breaking them down into groups (high, medium, and low level of a country's financial safety).

Setting the threshold standard values of indicators for conditionally reference countries is carried out by an expert method taking into account the most and the least successfully developing countries, as well as the range of coefficient variation within the set of the 45 studied countries.

$$K^{\text{ses}}_{\text{total } j} = \sum K^{*}_{ij}, \tag{3}$$

where $K^{\text{ses}}_{\text{total } j}$ is the total standardized indicator of the social and economic situation of the j^{th} country taking into account the shadow economy.

The lower the value of a total standardized indicator of the social and economic situation of a country taking into account the shadow economy, the better the country's financial safety and the more efficient the state's financial policy are in the modern context.

The calculation was $K^{\text{ses}}_{\text{total}}$ initially based on the fact that all assessment system indicators have equal weight of projection in the total indicator; however, this assumption is wrongful and may result in inadequate assessments of a situation, which is particularly important when studying the shadow sector that is extremely difficult to be assessed correctly, objectively, and quantitatively. Thus, to increase the accuracy and proximity of the assessment results to the real position of the countries in the world stage it is suggested to take into account different importance of the indicator groups in the total indicator. A method of expert ranking of indicators by decreasing importance, the Fishburn's point estimation rule, is used:

$$w^{N}_{i} = \frac{2(N - i + 1)}{N(N + 1)}, \tag{4}$$

where w^{N}_{i} is the weight of the i-th indicator group, $\sum_{i=1}^{N} w^{N}_{i} = 1$, N is the number of indicators in the system of assessment of the social and economic situation of a country taking into account the shadow economy, $N = 3$, i is the sequential number of an indicator group.

Thus, the total standardized indicator taking into account the importance of the indicator groups of the system of assessing the social and economic situation of the countries taking into account the shadow economy represents a weighted average of the corresponding total standardized indicators by groups taking into account their importance ($K^{*\text{ses}}_{\text{total}}$).

According to assessments by experts, under present conditions the most important is the group of indicators characterizing the social situation of a country, that is

why it comes first by importance (K^{*1}_{total}) with the specific weight of $w_1 = 0.5$, the group of indicators characterizing the economic situation is second by importance (K^{*2}_{total}) with the specific weight of $w_2 = 0.33$, and, therefore, the group of indicators characterizing the shadow activity comes third by importance (K^{*3}_{total}) with the specific weight of $w_3 = 0.17$.

$K^{*\text{ses}}_{\text{total}}$ is calculated according to the formula:

$$K^{*\text{ses}}_{\text{total}} = \left(w_1 \times K^{*1}_{\text{total}} + w_2 \times K^{*2}_{\text{total}} + w_3 \times K^{*3}_{\text{total}}\right). \quad (5)$$

The lower the value of $K^{*\text{ses}}_{\text{total}}$, the better a country's social and economic situation is taking into account the shadow economy and the higher the country's financial safety and population's welfare are. This methodology allows to make a country rating by value size $K^{*\text{ses}}_{\text{total}}$ taking into account the "cutting-off" using conditionally reference countries of the high-level financial safety country categories and low-level financial safety country categories, respectively.

3 Results and Discussion

Practical implementation of this methodology was implemented based on the sampling of data from 45 countries in 2015. A comparative rating of countries is shown in Table 2, by increase of the value of a total standardized indicator allowing to assess the social and economic situation of the countries taking into account the shadow economy sector.

Leading positions are held by the countries where financial safety is at a high level, which is confirmed by the best (smallest) values of the total social and economic situation indicator taking into account the shadow economy. Introduction of conditionally reference countries allows by "cutting off" to detect the categories of countries with a high (a country's value of $K^{*\text{ses}}_{\text{total}}$ is less than 4.058), medium (a country's value of $4.058 \leq K^{*\text{ses}}_{\text{total}} \leq 5.73$) and low (a country's value of $K^{*\text{ses}}_{\text{total}}$ is more than 5.73) financial safety level (see Table 2). The first places in the rating were occupied by the following countries: Switzerland, United Arab Emirates, New Zealand, Ireland, Norway, and others. The category of countries with a moderate financial safety level is formed by France, Spain, Poland, Portugal, Italy, Russia, and others. The last places in the rating are held by countries as Bosnia and Herzegovina, and Ukraine.

Below is a detailed analysis of the situation of some countries based on the studied indicators.

Switzerland shows one of the highest values by many key indicators: high GDP per capita value based on PPP, one of the lowest number of intentional homicides per 100,000 residents, high quality of life index, low terrorism level, etc. Indeed, as of today, Switzerland is one of the most attractive countries for living and conducting business. This is due to a low degree of threats, high level of the population's

Table 2 Country rating by financial safety level (taking into account the assessment system indicator group importance) based on the methodology approbation results, 2015

Country	I. Group. "Indicators characterizing the social situation of the country" ($w_1 = 0.5$)	II. Group. "Indicators characterizing the economic situation of the country" ($w_2 = 0.33$)	III. Group. "Indicators of the shadow economy" ($w_3 = 0.17$)	K_{total}^{*ses}	Rank
Switzerland	2.126	0.437	0.141	2.704	1
United Arab Emirates	1.878	0.846	0.233	2.957	2
New Zealand	2.551	0.434	0.324	3.310	3
Ireland	2.506	0.705	0.147	3.358	4
Norway	2.622	0.619	0.202	3.442	5
South Korea	2.602	0.705	0.170	3.476	6
Australia	2.582	0.781	0.124	3.487	7
Denmark	2.410	0.916	0.171	3.498	8
Netherlands	2.712	0.702	0.152	3.566	9
Sweden	2.735	0.743	0.101	3.579	10
Belgium	2.604	0.846	0.156	3.606	11
Canada	2.689	0.753	0.175	3.617	12
Germany	2.608	0.796	0.324	3.729	13
Austria	2.712	0.804	0.244	3.759	14
USA	2.853	0.833	0.087	3.773	15
United Kingdom	2.855	0.802	0.122	3.778	16
Japan	2.561	1.169	0.127	3.857	17
Finland	2.854	0.822	0.195	3.871	18
Conditionally reference country with a high level of financial safety	3.050	0.792	0.216	4.058	19
France	2.974	0.876	0.285	4.136	20
Slovenia	2.797	0.989	0.394	4.180	21
China	3.119	0.877	0.261	4.257	22
Czech Republic	3.250	0.788	0.283	4.321	23
Estonia	3.409	0.905	0.177	4.491	24
Spain	3.391	0.940	0.201	4.532	25
Slovakia	3.373	0.934	0.238	4.546	26
Poland	3.553	0.910	0.199	4.662	27
Portugal	3.681	0.969	0.127	4.777	28
Hungary	3.547	0.966	0.310	4.822	29
Latvia	3.656	0.908	0.294	4.858	30
Lithuania	3.669	0.954	0.253	4.876	31
Italy	3.760	0.899	0.268	4.927	32

(continued)

Table 2 (continued)

Country	I. Group. "Indicators characterizing the social situation of the country" ($w_1 = 0.5$)	II. Group. "Indicators characterizing the economic situation of the country" ($w_2 = 0.33$)	III. Group. "Indicators of the shadow economy" ($w_3 = 0.17$)	K_{total}^{*ses}	Rank
Romania	3.407	1.100	0.430	4.938	33
Bulgaria	3.371	1.025	0.635	5.030	34
Montenegro	3.858	0.914	0.334	5.106	35
Belarus	3.923	0.932	0.264	5.119	36
Russian Federation	3.994	0.941	0.246	5.180	37
Greece	3.534	1.092	0.574	5.199	38
Moldova	3.567	1.039	0.611	5.218	39
Croatia	4.125	0.856	0.324	5.306	40
Macedonia	3.840	1.066	0.471	5.377	41
India	4.189	1.012	0.353	5.554	42
Iran	4.185	1.110	0.310	5.605	43
Serbia	4.235	1.132	0.361	5.729	44
Conditionally reference country with a low level of financial safety	4.455	0.971	0.303	5.730	45
Bosnia and Herzegovina	4.044	1.324	0.667	6.036	46
Ukraine	4.837	1.043	0.370	6.249	47

Source: Authors' own calculations

income, and high quality of environment and education. According to calculations of a Better Life Index allowing to assess welfare in different countries of the world, Switzerland is among the three top leading countries as per this criterion. Switzerland's economy is recognized to be one of the most stable in the world. The low level of threats makes this country attractive to investors, which can be clearly seen from the amount of foreign direct investment inflow into the economy. In Switzerland, many economic sectors are developed such as energy, mechanical engineering, chemical, textile, food, and watch industry. The country's export exceeds its import, which also gives evidence of its economic self-sufficiency and of large production volumes.

The second line of the 2015 rating was occupied by the United Arab Emirates. The country shows the highest export rate (97% of GDP), low population death and unemployment rates, high peace index, and low terrorism index, as well as one of the largest GDP per capita value based on PPP. High growth rates of the UAE's economy are due primarily to oil production and export; however, other industrial sectors are developed in the county as well: energy, aluminum extraction, food and

textile industry, and shipbuilding. Among other things, the United Arab Emirates is the largest investment and geostructural construction project market, which year on year attracts new investors. The population's quality of life has also significantly increased since the foundation of the state in 1971; its growth is estimated to be 20 times. The UAE has one of the highest standards of life and social security of the population in the world. The state has a wide social protection network that includes family centers aimed at dealing with internal problems. Besides, a well-planned social policy has been adopted in the UAE for its citizens, which provides privileges for the society members: free secondary and higher education, free medical care and operations in any country of the world, no payment for electricity and water consumption and for land use, monetary payments upon conclusion of a marriage, etc.

Now, let us consider the countries, the places of which in the rating clearly indicate unsolved problems in their economy and social sphere.

Bosnia and Herzegovina is one of the most weakly developed economies in Europe. One can observe in this country a negative trade balance, low labor force rate, the highest unemployment rate among all countries included in the rating, low human development and quality of life index, high terrorism index, very low competitiveness, low value of GDP per capita based on PPP, high corruption, and lack of interaction with FATF. Indeed, as of today the country has an extremely high unemployment rate and low wage level, takes one of the last places in Europe by GDP and is heavily dependent on export from foreign countries. The country's dependence on export and low GDP value undermines the financial safety of Bosnia and Herzegovina, and the low quality of life, widespread unemployment and low wages provide a negative impact on the country's population's welfare. So, the abovementioned problems accumulated year by year only aggravate and have a negative impact on the country's financial safety.

The last place in the rating by financial safety is held by Ukraine. Certainly, in recent years the country has been in a crisis and conflicts in its territory undermine stability and have a negative impact on its economy. In 2015, Ukraine had quite a high level of state debt, low birth rate, high death rate, the highest inflation level among the studied countries, a growth in unemployment level, low human development, and quality of life indices. Ukraine demonstrates one of the lowest peace index and high terrorism index, high number of intentional homicides, low value of GDP per capita based on PPP, as well as it is not included in FATF. In 2015, an economic slowdown was observed in Ukraine, despite carrying out a number of reforms by the Ukrainian government. Despite the fact that 2 years already have passed after Euromaidan, Ukraine does not demonstrate an improvement of either economic or social position or the population's safety growth. Political instability leads to multiple conflicts in the country's territory, which gives rise to a whole set of problems: The country's GDP is falling, unemployment and poverty rates are growing, one can see an outflow of highly skilled labor force from the country, the level of threats to population is growing.

4 Conclusions

The authors' methodology allows to:

- Make a rating of countries by the financial safety level based on a total standardized indicator of social and economic situation of the countries taking into account the shadow economy sector.
- Break down the countries under review into categories by the financial safety level.
- Take into account the importance of a calculated indicator group in the assessment system when determining a country' financial safety.
- Carry out a real, objective, and quantitative assessment of leading and outsider countries.

Results of practical implementation of this methodology are useful for the development of efficient managerial decisions to achieve the maximization of a country's financial safety and its population's welfare growth.

An analysis of the suggested methodology approbation results confirms its credibility in the whole. The formed indicator system to a large extent characterizes countries' financial safety.

The authors have found out that a critical value of a specific assessment system indicator (enlarged group indicator) does not constitute a threat to a country's financial safety in whole. However, it is a signal to strengthen control in a corresponding area and to become oriented toward the policy of prosperous countries by specific indicators.

Detailed review of the countries that took the first and the last places in the financial safety level rating taking into account the importance of indicator groups allows to come to the conclusion that the positions of the countries in the rating fully correspond to a real situation of one or another state. Besides, it is obvious that the higher a state's financial safety, the higher its population's welfare is, in other words, there is an inverse link between the population's welfare and threats to the economy of a specific country, which is also confirmed by the given results.

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Part II
Regional Studies

Evaluation of the Interregional Cooperation Influence on Innovative Development of Russia

Julia Dubrovskaya and Elena Kozonogova

Abstract The aim of this study is to assess the importance of interregional cooperation for innovative development of economy. We have carried out our study on the example of Russian regions. In this work, firstly, the system of indicators has been determined describing the level of research, infrastructural and industrial potentials' development for separate territories. Then, we calculated the integral indices of research, infrastructural and industrial potentials for these regions. Secondly, research, sociopolitical, and economic forces behind territories' interaction have been estimated. This made it possible to measure the level of interregional cooperation of economic subjects applying the gravity model. Thirdly, the econometric model has been constructed so that to determine the influence of interregional cooperation on the territorial differentiation level. Fourthly, the influence of changes in the level of interregional differentiation on the innovative development of territories has been assessed. Our findings reveal high level of functional dependence of innovative development from efficient interregional cooperation.

Keywords Innovative development · Interregional cooperation · The gravity model · Interregional differentiation · Economic mathematical methods

1 Introduction

Misbalances in territorial development are one of the most important problems for many countries today, including Russia. Drastic differentiation in the development levels of separate territories inevitably leads to the growing number of underdeveloped regions in a country—and thus, to escalation of interregional contradictions or even conflicts. This, in turn, leads to complications in carrying out one common

J. Dubrovskaya (✉) · E. Kozonogova
Economics and Finances Department, Perm National Research Polytechnic University, Perm, Russia

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policy of socioeconomic transitions within the same country. As a result, overall rates of economic and innovative development slow down too.

According to the calculations of European Institute of Business Administration, Russia ranks only 45th out of 127 countries present in The Global Innovation Index in 2017 (GII 2017). The most negative factors in this regard are: unstable political environment (ranked 100th), inefficient regulatory environment (94th), ecological sustainability (83rd), low level of investments (95th), and underdevelopment of intangible assets (87th). Separately we need to mention here the index called innovation linkages, for this parameter Russia got 105th rank only (GII 2017). Meanwhile, this highly important today integral index includes the following subindicators: university/industry research collaboration; state of cluster development; R&D financed from abroad; number of joint venture–strategic alliance enterprises, etc.

So, what is the impact from economic subjects' interaction on the level of innovative development of the whole country? The idea of economic subjects' cooperation with the aim to reduce costs and increase competitiveness at the same time is not really new—it originated back in the middle of the nineteenth century. This idea in 1826 also becomes the core one in the theory of agricultural location by Thünen (1926). Further, in 1890 it was explained in more detail by Marshall (1920) in his description of the industrial districts in Great Britain, and later—also by Weber (1929) while presenting his theory of industries' location.

The pivotal role belongs to integration of the three central economic subjects: enterprises, universities, and public authorities. In this regard, we, of course, need to mention the well-known Triple Helix Model by Etzkowitz and Leydesdorff (2000) which assumes that synergy effect emerges from cooperation of political powers, business, and universities. Cooperation of economic subjects tends to often go beyond the territorial/political borders of their own municipalities, regions, or even countries. Such economic subjects interact using various forms and tools of cooperation and partnership, including: mutual exchange of resources (investment, labor, commodity, production, etc.); cooperation in the field of research and innovations; joint development of natural resources and their further joint use; cooperation in the area of information systems' development; in the field of infrastructure development (transport, road construction, energy sector, etc.); mutual exchange of experience in the fields of public and municipal administration (development and implementation of regional target programs and strategies of socioeconomic development), and many other.

The issues of interregional cooperation have been studied by the representatives of many schools of economic thought: within the theory of "core—periphery," theory of production location, theory of growth poles and development centers and also theory of innovations' diffusion. As the key advantage of interregional cooperation, the scientists usually mention the support to innovations' development—by means of wider opportunities at the labor market and also by means of increased information flows (Fritsch and Lukas 1999). From the standpoint of Pyke and Sengenberger (1992), interregional cooperation is the key success factor in

contemporary regional policy. Reiterer (2006) sees interregional cooperation as an efficient basis for international cooperation but on the regional level.

The European Union annually allocates about 70 million euros on implementation of interregional cooperation programs (European Commission 2011). And one of the key conditions for getting subsidies under these programs is participation of at least three EU member countries in a same project.

Our overview of research literature on this issue has revealed that the problems of interregional cooperation are usually considered today either in the context of globalization when economic subjects are joining efforts with the aim to survive through international competition (Torre and Rallet 2005; Ovcharenko 2001), or in the context of regional enterprises' provision with necessary production resources (Pyke and Sengenberger 1992; Song 2007; Pligun and Kiselev 2009), or with the aim of overcoming special fragmentation and maintaining unity of the country (Gagarina 2013; Simarova 2014; Zolotarev 2012). Quite a number of publications on this topic have been also dedicated to detecting the connection between interregional cooperation and innovative activeness of the related regions and/or units within them (Fritsch and Lukas 1999; Fritsch 2003; Nikulina and Burets 2016). In any case, nearly all these authors admit the fact that productive interregional cooperation has its positive effect on the indicators of regional development.

Among all these studies on the problem of interregional cooperation and its development prospects, there is hardly any research to explain and ground the role of cross-regional interaction from the standpoint of its capacity to lower the territorial differentiation. In this regard we can mention several works which indirectly touch up this highly important problem. First of all, it is a study by Simarova (2014) dedicated to special economic relations arising in the process of interregional and inside-regional cooperation. Simarova (2014) notes, inter alia, that competition between regions is the major cause for interregional differentiation. Secondly, it is the study by Gagarina (2013) on the concept of spatial integration development management for the regions of Russian Federation. This author states that expansion of cooperation and mutual dependencies between the regions tends to promote the gradual leveling of their socioeconomic development. Thirdly, we would like to mention the work by Goloborodko (2006) who studied the interaction of regional economies within the framework of developing economic space. Gagarina (2013) considered that significant differentiation between the regions by the level of their socioeconomic development leads to internal instability of regional economies, and this, in turn, leads to the necessity to improve the overall tool kit used in political regulation of interregional economic relations. At the same time, in the course of our detailed analysis of the already available research studies, we have failed to find any relevant qualitative results which would have grounded the potential opportunities to level the regional differentiation by means of increasing interregional cooperation.

Therefore, despite achievements in the field of interregional cooperation and studying its influence on economic development, studies concerning the effect of this type of cooperation on the decrease of territorial differentiation remain to be rather scarce. At the same time, this aspect of economic development remains to be rather topical for Russia's economy overall since the current level of regional

economic differentiation can be called critical already. Thus, in the opinion of one famous Russian scientist, today European countries have more reasons to be considered one common country than the separate regions within Russian Federation (Lvov 2006).

Interregional differentiation in Russia is preconditioned, first of all, by rather radical economic reforms of the 1990s. A significant share of the already formed production and trade connection inside the country and also with other former Soviet republics has been destroyed or partially damaged. As a result, the overall volume of interregional economic relations went drastically down, roughly fourfold. These negative trends exacerbated after the strategic transition to the model of "core regions" development back in 2005. Current institutional conditions and legislative norms in Russia do not promote interregional cooperation. On the opposite, as a result of these changes, we can observe tight competition between Russian regions when territories compete for subsidies. This may lead only to some sort of regional separatism and strong spatial asymmetry, and also divergence and slowing down of economic development of the whole country.

We guess that productive and efficient interregional cooperation is able to decrease this differentiation between the regions. Verification of this hypothesis as well as assessment of influences from the positive externalities on the innovative development of the economy is thus the key aim of the presented here research.

2 Data and Methodology

As information and empirical grounds for this research serves the database of the Federal Service for State Statistics of Russian Federation as well as the results of sociological surveys, data from innovation development rankings (among the subjects of Russian Federation; these ranking are calculated by the Institute for statistical research and knowledge economy of the Higher School of Economics (ISSEK 2017). Additionally, legislation documents and data from mass media have been used.

We run correlation, regression analyses, cluster analysis, and the gravity model. Gravity model is derived from Newton's law of gravity and used to predict the degree of interaction between two places. Gravity models have been widely used in the literature to explain trade flows and integration dynamics among regions and countries (Ageliki and Ioannis 2016; Karagoz and Saray 2010; Suvankulov and Guc 2012). Our gravity model is based on the assumption that the degree of interaction is proportional to the product of value indicators (volume, number) of the objects under study and is at the same time inversely proportional to the distance between them.

$$F_{ij} = G\frac{q_i q_j}{d_{ij}^2}, \tag{1}$$

where F_{ij} is the indicator of the strength of interaction between the objects i and j, G is the constant of this interaction, q is a certain measure of value for the objects j and i, and finally d_{ij}^2 denotes the distance between i and j.

Usage of this particular model is predetermined by the fact that it describes social an economic interactions between spacial objects (countries, regions, municipalities, etc.) and because it is frequently used in regional and spacial analysis in economics. Our study also assumes introducing a gravity model so that to assess the strength of interregional cooperation.

The research study consists of the following elements:

- Determining the system of indicators which describe the level of research, infrastructural and industrial potentials' development for separate territories.
- Calculating the integral indices of research, infrastructural and industrial potentials for these regions.
- Estimating the research, social, political, and economic forces behind territories' interaction.
- Measuring the level of interregional cooperation of economic subjects applying the gravity model.
- Constructing the model so that to determine the influence of interregional cooperation on the territorial differentiation level.
- Assessing the influence of changes in the level of interregional differentiation on the innovative development of territories.

Interregional differentiation is assessed here on the basis of gross regional product per capita values. The integral indicator of differentiation is calculated using the formula for variation coefficient:

$$\vartheta = \frac{1}{N}\frac{\sum (x_i - \overline{x})^2}{\overline{x}}, \tag{2}$$

where ϑ is this variation coefficient, x_i—the indicator of gross regional product (GRP) per capita in region i; $\overline{x}$—the average in the country value of GRP per capita; and N is the number of regions.

In order to estimate the "contribution" of a particular region into the integral indicator of GRP per capita differentiation, it is necessary to calculate the "contributions" of the regions into the integral indicator of differentiation:

$$s_i = \frac{1}{N}\left(\frac{x_i}{\overline{x}} - 1\right)^2 / \vartheta^2, \tag{3}$$

where s_i is the estimate of region i "contribution" into the integral indicator of differentiation (coefficient of variation) of GRP per capita, ϑ^2 is the squared value of variation coefficient. From this, it is obvious that $\sum s_i = 1$ (Shiltsin 2010).

3 Results and Discussion

We have already mentioned that decreasing regional differentiation required higher levels of interregional cooperation. The obvious consequence from lower regional differentiation would be also higher level of innovative development of the national economy overall. The empirical part of our study rests on the Triple Helix model which grounds and explains three types of economic subjects' (university–industry–government) interaction. These interactions precondition the connectedness and interdependencies of territories and thus tend to produce three types of forces:

- Research forces, describing the research potential of a region (Key subjects of interaction here are universities and research centers).
- Sociopolitical forces predetermining the infrastructural potential of a region (key subjects of interaction—public authorities).
- Economic forces predetermining the industrial potential of a region (key subjects of interaction—enterprises, mostly large ones).

For further calculations of interaction forces, we have developed a system of indicators describing the levels of development for research, infrastructural and industrial potential of separate territories. Using this system, we have calculated the following three integral indices (Table 1).

We must note here that linear transformation has been applied so that all the indicators are measured by the same scale. Further, we obtain the integral indices by means of finding the arithmetical average of all these indicators. Building the matrices of interaction forces according to formula 1 has been performed in several steps.

Step 1 Determining G, the constant of interaction.

The value of interaction constant is assumed to be equal to one, since unlike with physical model, this parameter cannot be reliably estimated with taking into account the existing information (Simarova 2014).

Step 2 Calculating the intermediate matrices (that is, calculating the numerator for formula 1).

Since indices QLI, PPI, and RTI are calculated for each region, we get three column-vector.

To get the intermediate matrices (IM_{QLI}, IM_{PPI}, IM_{STI}) the related vector-column must be multiplied by the vector-line, obtained by means of transposition:

Table 1 System of indicators for calculation of territorial interaction forces

Forces of territorial interaction	Integral indices	Indicators forming the integral index, measurement units
Research forces (RF)	Index of research and technical and educational potential (RTI)	• Head count of staff involved in research and development, men • Number of students trained by the programs of undergraduate studies, MA course, and 5-year studies per 10,000 people, men • Internal research and development costs, million rubles • Number of university teachers at educational institutions of higher education, men • Volume of innovative goods, work, services in the rate of total volume of fulfilled work, %
Sociopolitical forces (SPF)	Index of quality of life and infrastructure (QLI)	• Total area of living space per head on the average, square meters • Population size per one hospital bed, men • Density of public hard-surface roads, kilometers of roads per 10,000 square kilometers of territory • Pollutant emissions from stationary sources, 1000 tons
Economic forces (EF)	Index of productive potential (PPI)	• Volume of factory shipments (work, services) according to the type of economic activity "processing production," million rubles • Investments in fixed assets (without budget funding) per capita, rubles • The ratio of fixed assets' renewal, % • Circulation of products (services) produced by small enterprises, including microenterprises and sole proprietors, 1000 rubles

Source: Authors' own study

$$\mathrm{IM}_{\mathrm{QLI}} = \mathrm{QLI} \times \mathrm{QLI}^{T} \tag{4}$$

$$\mathrm{IM}_{\mathrm{PPI}} = \mathrm{PPI} \times \mathrm{PPI}^{T} \tag{5}$$

$$\mathrm{IM}_{\mathrm{STI}} = \mathrm{STI} \times \mathrm{STI}^{T} \tag{6}$$

Step 3 Determining the distance matrix.

The authors opted to use the matrix of shortest distance D between the political centers of Russian regions (Abramov and Gluschenko 2000).

Step 4 Constructing the matrix for the forces of regional interaction.

In order to get this matrix we need to divide the values of intermediate matrices by the square value of the distance matrix.

Step 5 Calculating the total matrix of interaction forces.

For most comprehensive measure of regional interaction (which has different types and origin) we thus obtain the total matrix by means of adding together three matrices—of the sociopolitical, economic, and research forces of interaction.

In such a way we have obtained the matrices of interaction forces for 78 regions of Russia (statistical data of the year 2015). As an example, more detailed analysis of interaction is provided on the data of Perm Krai interaction with other regions. Table 2 shows that Perm Krai has strongest sociopolitical connections with the Udmurt Republic as well as with Sverdlovsk and Kirov oblasts.

Perm Krai has strong economic connections with Sverdlovsk oblast and again, with Udmurt oblast, Tatarstan goes third in the ranking of interactions (see Table 3).

Situation with research connections is very much similar to that of economic interaction, however, fourth rank is being taken by Chelyabinsk oblast (see Table 4).

In the overall result, Perm Krai demonstrated the strongest connections of various natures with Sverdlovsk, Udmurt, and Kirov oblasts (see Table 5).

Further, we have assessed the influence of interregional cooperation on territorial differentiation. At this, we have taken into account the nature of forces' interaction. For constructing this model, we used the values of interaction matrices for each region and calculated the average values for all the forces in question. Regional differentiation is evaluated here on the basis of GRP per capita, see formula 2. As of 2015, the rate of regional differentiation in Russia was over 70%. "Contribution" of each region into this aggregate indicator of differentiation is calculated according to formula 3.

Our calculations have shown that in Russia the largest contributions to variation in GRP per capita belong to Sakhalin oblast (32.1%) and Tyumen oblast (28.2%). The sum of squared deviations in all other 76 regions makes less than the half of overall variance. Table 6 presents the results of correlation-regression analysis.

Model 1 assesses the influence of sociopolitical (SPF), economic (EF), and research forces (RF) of interaction upon regions' differentiation by the level of GRP per capita. The model clearly shows that the influence of research interaction between the regions does not have any significant impact on regional differentiation. However, the level of economic interaction has a positive influence on the indicators of regions' contribution into differentiation. Therefore, the more intensive is regional interaction in the field of industrial development—the larger is getting the gap between them, which means that differentiation is only growing. This conclusion of ours actually corresponds to the policy currently being implemented in Russia—the one of the core regions' development.

Model 2 assesses how cumulative influence of various interacting forces between the regions affects their differentiation (CIIF). From the assessment of the coefficients in this model, we can see that the overall increase of interactions of various types leads to lower differentiation. Further we assume that increased differentiation

Table 2 Matrix of sociopolitical forces' interaction (fragment for Perm Krai)

	Perm region	Udmurt republic	Sverdlovsk region	Kirov region	Chelyabinsk region	Kurgan region	Republic of Tatarstan	Mari El Republic	Chuvash Republic
Perm region	0	0.0194	0.0163	0.0118	0.0056	0.0051	0.0049	0.0043	0.0037
Udmurt Republic	0.0194	0	0.0068	0.0123	0.0035	0.0034	0.0205	0.0134	0.0103
Sverdlovsk region	0.0163	0.0068	0	0.0036	0.0311	0.0206	0.0031	0.0028	0.0025
Kirov region	0.0118	0.0123	0.0036	0	0.0021	0.0022	0.0050	0.0033	0.0041
Chelyabinsk region	0.0056	0.0035	0.0311	0.0021	0	0.0402	0.0018	0.0018	0.0016
Kurgan region	0.0051	0.0034	0.0206	0.0022	0.0402	0	0.0019	0.0019	0.0018
Republic of Tatarstan	0.0049	0.0205	0.0031	0.0050	0.0018	0.0019	0	0.1510	0.0593
Mari El Republic	0.0043	0.0134	0.0028	0.0033	0.0018	0.0019	0.1510	0	0.0449
Chuvash Republic	0.0037	0.0103	0.0025	0.0041	0.0016	0.0018	0.0593	0.0449	0

Source: Authors' own study

Table 3 Matrix of economic forces' interaction (fragment for Perm Krai)

	Perm region	Sverdlovsk region	Udmurt republic	Republic of Tatarstan	Tyumen region	Kirov region	Chelyabinsk region	Republic of Bashkortostan	Nizhny Novgorod region
Perm region	0	0.0152	0.0103	0.0056	0.0055	0.0052	0.0050	0.0029	0.0022
Sverdlovsk region	0.0152	0	0.0039	0.0038	0.0246	0.0017	0.0295	0.0059	0.0012
Udmurt Republic	0.0103	0.0039	0	0.0144	0.0021	0.0033	0.0019	0.0015	0.0018
Republic of Tatarstan	0.0056	0.0038	0.0144	0	0.0025	0.0029	0.0021	0.0036	0.0106
Tyumen region	0.0055	0.0246	0.0021	0.0025	0	0.0011	0.0143	0.0033	0.0010
Kirov region	0.0052	0.0017	0.0033	0.0029	0.0011	0	0.0009	0.0007	0.0053
Chelyabinsk region	0.0050	0.0295	0.0019	0.0021	0.0143	0.0009	0	0.0086	0.0008
Republic of Bashkortostan	0.0029	0.0059	0.0015	0.0036	0.0033	0.0007	0.0086	0	0.0012
Nizhny Novgorod region	0.0022	0.0012	0.0018	0.0106	0.0010	0.0053	0.0008	0.0012	0

Source: Authors own study

Table 4 Research forces' interaction (fragment for Perm Krai)

	Perm region	Sverdlovsk region	Udmurt republic	Republic of Tatarstan	Chelyabinsk region	Kirov region	Tyumen region	Nizhny Novgorod region	Republic of Bashkortostan
Perm region	0	0.0142	0.0075	0.0044	0.0043	0.0042	0.0027	0.0026	0.0024
Sverdlovsk region	0.0142	0	0.0034	0.0035	0.0305	0.0016	0.0147	0.0016	0.0060
Udmurt Republic	0.0075	0.0034	0	0.0106	0.0015	0.0025	0.0010	0.0020	0.0012
Republic of Tatarstan	0.0044	0.0035	0.0106	0	0.0018	0.0024	0.0013	0.0126	0.0031
Chelyabinsk region	0.0043	0.0305	0.0015	0.0018	0	0.0008	0.0079	0.0010	0.0081
Kirov region	0.0042	0.0016	0.0025	0.0024	0.0008	0	0.0006	0.0064	0.0006
Tyumen region	0.0027	0.0147	0.0010	0.0013	0.0079	0.0006	0	0.0007	0.0018
Nizhny Novgorod region	0.0026	0.0016	0.0020	0.0126	0.0010	0.0064	0.0007	0	0.0016
Republic of Bashkortostan	0.0024	0.0060	0.0012	0.0031	0.0081	0.0006	0.0018	0.0016	0

Source: Authors own study

Table 5 The aggregate matrix of forces' interaction (fragment for Perm Krai)

	Perm region	Sverdlovsk region	Udmurt republic	Kirov region	Republic of Tatarstan	Chelyabinsk region	Tyumen region	Republic of Bashkortostan	Nizhny Novgorod region
Perm region	0	0.0458	0.0373	0.0212	0.0150	0.0148	0.0109	0.0087	0.0081
Sverdlovsk region	0.0458	0	0.0141	0.0069	0.0103	0.0911	0.0510	0.0184	0.0044
Udmurt Republic	0.0373	0.0141	0	0.0182	0.0455	0.0068	0.0049	0.0057	0.0084
Kirov region	0.0212	0.0069	0.0182	0	0.0103	0.0039	0.0028	0.0029	0.0271
Republic of Tatarstan	0.0150	0.0103	0.0455	0.0103	0	0.0057	0.0048	0.0099	0.0353
Chelyabinsk region	0.0148	0.0911	0.0068	0.0039	0.0057	0	0.0292	0.0267	0.0029
Tyumen region	0.0109	0.0510	0.0049	0.0028	0.0048	0.0292	0	0.0068	0.0023
Republic of Bashkortostan	0.0087	0.0184	0.0057	0.0029	0.0099	0.0267	0.0068	0	0.0047
Nizhny Novgorod region	0.0081	0.0044	0.0084	0.0271	0.0353	0.0029	0.0023	0.0047	0

Source: Authors' own study

Table 6 Results of correlation-regression analysis

Dependent variable			
"Contribution" of a region to the overall indicators of GRP per capita differentiation			Russian regional innovation index
	Model 1	Model 2	Model 3
Intercept	0.0085 (0.0334)	−0.0356 (0.0236)	−0.4655** (0.2329)
ln_SPF	−0.0357*** (0.0113)		
ln_EF	0.0406** (0.0181)		
ln_SRF	−0.0103 (0.0097)		
ln_CIIF		−0.0088** (0.0042)	
ln_GRP			0.0634*** (0.0184)
N	312	156	156
R^2	0.15	0.05	0.14

Note: Standard errors in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$
Source: Authors' own study

leads to higher levels of innovative development in regions taken separately as well as in the national economy overall. Model 3 assesses the correlation between the logarithm of GRP per capita and the indicators of RRII (Russian Regional Innovation Index). The correlation is positive, which means that increase in GRP would lead to increase in the RRII indicator for a particular region.

4 Conclusion

The carried out research has confirmed our initial assumption that productive interregional cooperation is able to decrease territorial differentiation. Obtained results have confirmed that stronger cooperation between well-to-do regions leads to their increasing GRP, therefore, the divergence also becomes stronger. However, more active sociopolitical interaction between the regions, on the opposite, leads to lower differentiation.

In the course of our evaluation of the influence from the interregional cooperation on the innovative development of the economy, we have determined a positive correlation. Here we also need to take into account that regional differentiation tends to decrease by means of "smoothing" of GRP per capita values in the regions. That is, decrease in differentiation will happen only when GRP per capita is increasing in the most underdeveloped regions, and this, in its turn, will cause increase in the innovative potential of the whole country.

The practical value of the model presented here lays in the opportunities for further use of the results obtained here in the course of regional development policies' formation aiming at the increase of innovative potential.

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Demography and Flexibility: The Two Vital Issues for the European Union

Aleksandrs Fedotovs and Oksana Sakalosh

Abstract In recent years EU has faced a number of problems: "sanctions war" with Russia, migration crisis, Brexit, terrorism, growing euroscepticism and populism. The aim of the paper is to draw attention to a potentially overlooked fundamental reason for these problems: Europe's demography. Research methods used include application of economic theory, analysis of EU official documents, statistical data and publications on European demography, author's own calculations. We find that territorial extension of EU has been driven by need for markets and resources, especially labor. The findings indicate that now EU has to concentrate upon internal problems, pointing out natural increase in population as one of the crucial ones. Unless Europe regains ability to rely upon its own human resources, the problem of maintaining European national and cultural identity has no solution. The study also finds that the EU regional policy should be more efficiently used to reduce territorial disparities within the Union in order to slow down depopulation of poorer member states.

Keywords European Union · Labor resources · Natural increase in population · Immigration · Reformation of the EU

1 Introduction

Slowing down natural increase in population, ageing of society and, ultimately, threat of depopulation are problems familiar to Europe since the second half of the twentieth century. Fertility rates in EU as a whole are well below the replacement rate necessary to keep the population stable over time. Natural increase in population is steadily approaching zero due to fall in the number of births and increase in the

A. Fedotovs (✉)
Department of Economics and Finance, RISEBA University, Riga, Latvia

O. Sakalosh
College of Business Administration, Riga, Latvia

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number of deaths as the society continues to age. Thus, statistics is predicting negative natural change in population in the future. In 2015, deaths already outnumbered births in the EU-28 for the first time since the statistical time series began in 1961, resulting in natural decrease in population (Eurostat 2016).

Explaining reasons of the situation, scholars traditionally refer to demographic transition—decline in birth rates along with modernization of society—as a global trend, though still argue on direct factors causing this phenomenon (McConnell et al. 2015). No doubt, changing attitudes toward religion, wider career opportunities for women, and increasing costs of raising children are among the factors, but the overall system of values in society seems to be also one of the crucial ones.

Activities related to fertility policies have increased over time at the EU and member states' level. During the past decade the EU has set several initiatives concerning fertility issues. Many member states also admit that they have or consider policy measures to raise fertility (Neyer et al. 2017). Unfortunately, results of these efforts are modest. Despite assertions that "demographic change has become a major policy concern in literally all EU Member States" (European Commission 2015, p. 43), comparatively few is done to combat the negative demographic trends. Actually, Europe seems committed to more simple, but not the best solution: immigration. It seems taken for granted that Europe on itself is unable to meet its need for human resources and therefore all hopes are put on attracting of population from outside.

By definition, the population is totality of all individuals living in a country; therefore, it includes both natives and foreigners (Weeks 2015). Besides natural increase, another component to change in population is net migration. The declining contribution of natural increase to total population growth in the EU is the combined result of low natural increase and growing immigration. Immigration has turned into the main factor of population growth in Europe decades ago. Since 1992, the contribution of immigration to total population growth has exceeded the proportion of natural increase. In 2013, natural increase contributed just 5% to population growth in the EU while 95% of the growth came from immigration (European Commission 2015). In 2015, the increase in population of the EU-28 could be fully attributed to net migration. Net migration (together with statistical adjustment) in 2015 accounted for an increase by 1.9 million persons, approximately twice the increase in 2014 and the largest increase recorded since the statistical time series began in 1961 (Eurostat 2016). The population growth in the EU becomes therefore completely dependent on immigration.

Population resources' considerations are obviously present in the EU's inconsistent behaviour under the migration crisis in 2015 and following years. Initial thoughtless "We'll accept all" was soon replaced by agreement with Turkey in order to beat down the excess immigration wave. We argue, however, that any radical turn in the EU immigration policy seems possible only when perceived dangers of immigration will outweigh benefit expectations.

2 EU Extension: In Chase of Population Resources

Attraction of sharply needed population resources to the advanced EU countries was being reached not only via immigration flows from outside the EU, but also via territorial enlargement of the EU itself. All preceding history of the EU before Brexit witnessed gradual territorial extension of the Union. According to political wording easily adopted also in economic literature, European Union is "a family of democratic European countries, committed to working together for peace and prosperity" (Mankiw et al. 2013, p. 524). In less idealized economic reality the enlargement of the EU was driven by global competition for markets and resources, labor resources in particular. Eastern expansion of the EU can be viewed as a way to acquire the remaining labor resources in the European continent.

Entry of 10 new member states in 2004 increased population of the EU by nearly 20%. After enlargement of the EU to 28 countries, the share of 13 new member states in population of the Union reached around 21% (Eurostat Database 2017; authors' calculations). This newly acquired population substantially contributed to consumers' market size and to labor resources of the EU. Cheap East European labor was acquired by the EU employers in two ways:

1. Acquiring and running enterprises in the territories of new member states;
2. Due to migration within the EU—actually, pumping out the labor resources from new member states to the West- and North European countries.

As a whole, globalization and international economic integration objectively accelerate drain of resources from poor countries and regions ("periphery") to more advanced ones ("core"). In particular, this is true in regard to labor resources. Single European market substantially increased international mobility of labor and encouraged flow of human resources from less developed EU member states to the rich ones. Among demographic consequences of integration in the EU common labor market there was increasing emigration from the EU new member states to the West- and North European countries.

Share of the 13 new EU member states in the total population of the EU-28 is now about 1/5; as Fig. 1 depicts, this share has slightly decreased since 2004 because of unfavorable demographic trends in the new member states and intensive emigration. Actually, the new EU member states are continuously losing their population to the "old" EU-15.

The point is reached when there is almost no space for further extension of the EU. Just some small states—last remainders of former Yugoslavia and Soviet Union—have left in the south-east of Europe as actual or potential EU candidates. Hasty drawing them into the EU would just cause new problems. Impatient attempt to quickly link Ukraine to the EU has already resulted in painful Ukrainian crisis and spoiled relations with Russia. Ideas of joining some countries lying outside Europe—such as Georgia, Armenia, or Azerbaijan—do not fit the fundamental concept of the Union as a European one. Brexit seems to contain a clear message that the EU has reached the limit of its territorial expansion.

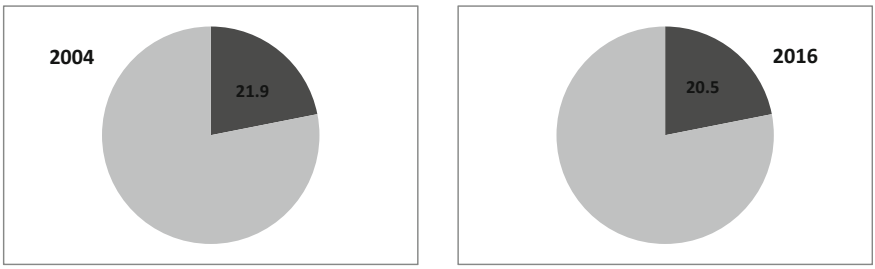

Fig. 1 Share of the 13 new member states in the EU-28 population, 2004 and 2016. Note: Dark grey reflects the share of population of 13 new member states in the EU-28 population. Sources: Eurostat Database (2017); authors' calculations

Immigrant labor has been for decades substantially contributing to progress of the European economy. It is worth mentioning that potential economic difficulties Britain would face without immigrant labour are among the main arguments exploited by Brexit opponents. However, in the long run, continuous use of migrants' labor has not solved demographic problems of the EU and has simultaneously aggravated other economic, political and social questions. Ultimately, as concluded in the Eurostat report, "migration alone will almost certainly not reverse the ongoing trend of population ageing experienced in many parts of the EU" (Eurostat 2017, p. 11).

Forecasts concerning the working age population in the EU are even more pessimistic than projections of the total population. Working age population in the EU has started declining in 2010. The number of population in the working age is expected to decline by an average of 0.3% per year by 2060 while the number of elderly people tends to increase by no less than 1% every year (European Commission 2015). According to some research, EU-28 population could stagnate in 2050 at approximately 500 million people, losing 49 million people of working age—among them 11 million in Germany and 7–8 million in Spain and Italy (Boussemart and Godet 2018). As a result, in the coming decades Europe has to face unfavorable changes associated with an ageing society—changes which will have impact on a wide range of areas, including labor market, pensions and provisions for healthcare, housing and social services (Eurostat 2016).

3 Emptying Periphery

By now, demographic situation in the EU as a whole is still characterized by slow population growth. In Eurostat's projections, by 2050 population of EU-28 will increase to around 529 million (Eurostat Database 2018)—which in fact means miserable annual growth in population by just 0.1% of its present number. According to these forecasts, increase in the total EU-28 population is expected to continue until 2050; after that, quite rapid depopulation will follow (Fig. 2).

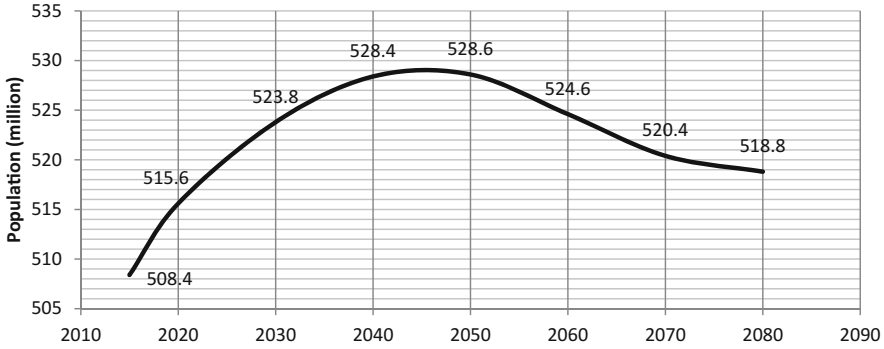

Fig. 2 Projection of the EU-28 population, 2015–2080. Source: Produced by authors on the basis of Eurostat Database (2018)

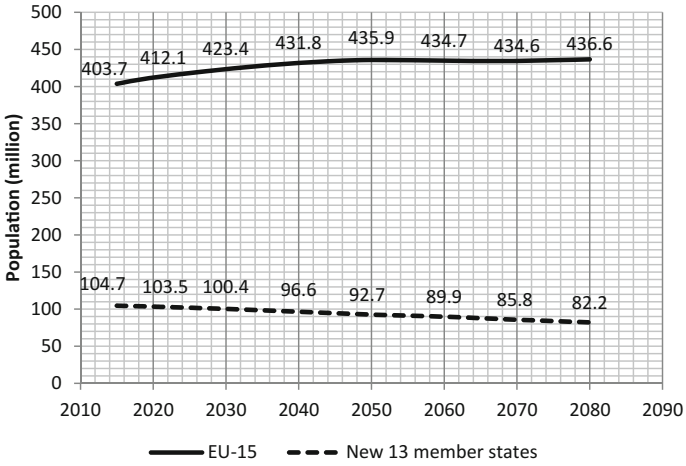

Fig. 3 Population projection for the 15 "old" and 13 new EU member states, 2015–2080. Sources: Produced by authors on the basis of Eurostat Database (2018)

While population of the EU as a whole still continues to grow at slowing rate, the population is already declining in 11 member states. These are first of all the new EU member states—Bulgaria, Estonia, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, and (since 2013) Cyprus; in recent years they proved accompanied by the two poorest "old" EU members—Portugal (since 2010), and Greece (since 2012). It is easy to notice that all above-mentioned countries are situated in eastern and southern periphery or the EU.

Decomposition of the forecasted long-term EU population change by two groups of countries—the "old" EU-15 and 13 new member states is presented in Fig. 3. Consistent population increase until 2080 is forecasted by Eurostat for Belgium, Denmark, Ireland, Spain, France, Luxembourg, Netherlands, Sweden, and the United Kingdom, as well as (outside the EU) in Norway. It implies that population

increase in the West- and North European countries is going to keep on, at least partly, at the expense of continuing emigration from the poor periphery of the EU.

Emigration in combination with low rates of natural increase in population has resulted in actual depopulation of Eastern Europe. Depopulation in the EU East European member states has reached impressing levels: by 2016,

- Bulgaria has lost above 1.6 million (more than 18%) of population since 1990;
- in Hungary the number of population has fallen from 10.7 million in 1980 to 9.83 million, thus having dropped below the level of 1960;
- Romania since 1990 has lost 3.45 million, or nearly 15%, of population;
- Population of Poland since 2004 declined, with minor fluctuations, from 38.19 to 38.06 million and proved approximately the same as in 1990;
- Population of Estonia is by 16% less than in 1990, having returned to the level of the late 1960s;
- Population of Lithuania is by almost 22% less than in 1990 and has dropped to the level of mid-1960s;
- In Latvia number of population is by 26% lower than in 1990 and proves less than in 1959 (Eurostat Database 2017; Gosudarstvennii komitet SSSR po statistike 1989; authors' calculations).

Especially rapid depopulation, turning into demographic catastrophe, takes place in the three Baltic states—Latvia, Lithuania, and Estonia, though current situation and forecasts for Bulgaria and Romania do not look much better. For instance, in the Eurostat projections, population of Bulgaria may decrease from 7.15 million in 2016 to 5.56 million in 2050 and to 4.59 million in 2080; for Romania the corresponding numbers are 19.76 million in 2016, 16.33 million in 2050, and 14.53 million in 2080 (Eurostat Database 2018).

Historically, demographic problems in the form of low fertility, slow natural increase in population and depopulation threats, are typical for the Baltic states; in Estonia and Latvia such trends are dating back at least to the second half of the nineteenth century. However (except the years of World War I and World War II), no actual depopulation was observed in the region. The process began in the 1990s, after collapse of the former Soviet Union, when the three Baltic states regained their national independence. After having reached its historical maximum in 1990, population of all the three Baltic states is steadily decreasing (Fig. 4).

During the struggle for independence from the Soviet Union in the late 1980s, idea of preserving national identity and escaping Russification belonged to the most influential ones among the native population of the Baltic countries. Paradoxically, under regained independence, given the present size of emigration, survival of the three Baltic nations looks more endangered than any time before.

Under progressing depopulation, shortage of labour resources is urgently put on the agenda in the Baltic states. Even before the present immigrant crisis in the EU, need for imported labour force was publicly discussed in the Baltic states. The issue proves, however, politically very sensitive in regard to preservation of ethnic identity of the small Baltic nations. Big part of the native population remains hostile towards wide-scale immigration and is against the immigration quotas imposed by the EU. In

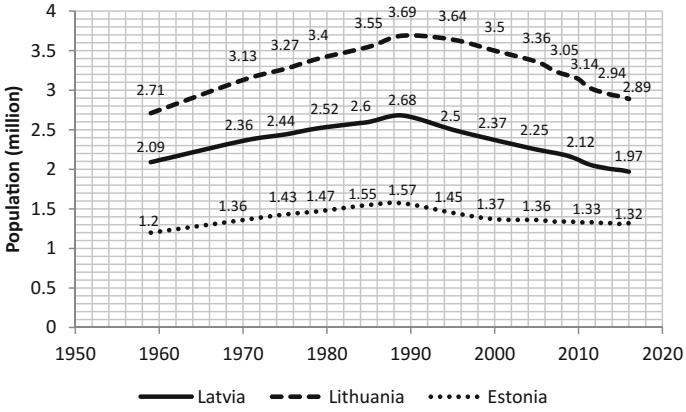

Fig. 4 Population of the Baltic states, 1959–2016. Sources: Produced by authors on the basis of: Eurostat Database (2017), Gosudarstvennii komitet SSSR po statistike (1989)

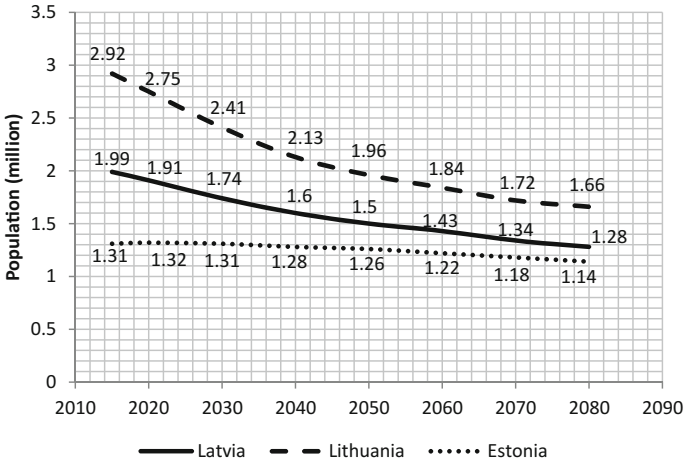

Fig. 5 Population projection for the Baltic states, 2015–2080. Sources: Produced by authors on the basis of Eurostat Database (2018)

any case, the Baltic states with their comparatively low wage levels and mediocre overall living standards cannot be attractive for long-term settling of immigrants. In fact, even for immigrants from much more poor countries of Asia or Africa, the Baltics remain just a corridor or a jumping-off ground for desired access to the rich EU countries.

Demographic situation in the Baltic states seems to continue aggravating in coming decades. Eurostat projections mentioned above predict up to 36–57% decrease in population of these states by 2080: in Latvia to 1.28 million, in Lithuania—to 1.66 million, and in Estonia (where depopulation is more moderate)—to 1.14 million (Fig. 5). Of course, such long-term forecasts can always be

doubted. Nonetheless, it is clear that the three Baltic states are in situation of severe demographic crisis.

Loss of population has turned into major threat for future economic and social development of the Baltic nations. This fact is now officially admitted at state level. Recognizing the scale of the problem, Latvian government, for example, approved in 2013 a special 4-year plan of support measures to repatriation of emigrants (Latvijas Republikas Ekonomikas ministrija 2013). As could be reasonably expected, however, the term of the plan expired in 2016 without any noticeable results. Obviously, a vast complex of economic, social, and political decisions is necessary to correct the dramatic demographic situation.

The EU is a unique international entity which managed to create joint regional policy functioning not only at the member states', but also at sub-national level (Armstrong 2011). Implementation of this policy, however, does not prevent the emigration trends and depopulation in the EU periphery. The EU regional policy therefore should be more efficiently used to reduce territorial disparities within the Union in order to slow down emigration trend from poorer member states. In particular, since education and health care systems in the periphery countries of the EU are preparing labor resources for the rest of the EU, then, in accordance with the theory of externalities, more of financing for the above-mentioned sectors in the periphery countries should be granted from the centralized EU funds.

Reallocation of human resources in the EU contributes to regional disparity within the Union rather than promotes territorial cohesion. A hackneyed slighting expression in economic and political literature of previous decades was "agrarian appendix", a term applied to less developed countries dependent on industrial states. At present, however, even this label cannot be relevant in regard to some periphery countries of the EU. Neither their industry, nor agriculture seems much needed in the EU. As a result, instead of "agrarian appendices" these countries may turn into just ecologically pure outskirts of the EU—territories free of any economic activity and, ultimately, of population.

4 Implications for Policy and Theory

So far, the European Union proves stuck to its traditional policies in regard to both territorial expansion and immigration. The EU institutions continue considering immigration to be a way out of the demographic straits. This policy goes on despite growing dissatisfaction of a big part of the European population clearly manifested in public opinion and reflected in publications (Murray 2017). By such action, the European Union is actually repeating fatal political mistakes of the former Soviet Union; in fact, those are the mistakes which ultimately ended in disintegration and collapse of the Soviet Union.

In the former Soviet Union hopes were cherished by theoreticians and politicians that prolonged co-existence of nations in one state, intensive migrations and progressing mechanical mixing of different ethnicities would strengthen unity of

the society and create "brotherly friendship of peoples". A concept of "new international community of people—the Soviet people" was invented and propagated (what is important, however, this concept denied assimilation and loss of national identity or national culture). Any manifestations of local nationalism were banned and severely punished. Ultimately, though, the ambitious social project ended in ethnic tension and conflicts; growing nationalism turned into one of the major factors of eventual crash of the USSR.

Unfortunately, no lessons from history were derived in the EU. At present, action and results quite similar to those of the above-mentioned Soviet national policy can be observed in the European Union. Integration and multiculturalism have become dogmas of modern European political phraseology. However, the forcibly imposed multiculturalism and fake integration of nations in European reality have turned into:

- Unceasing sporadic immigration which, moreover, is increasingly prohibited to criticize;
- Essentially changing ethnic composition of population and cultural environment, especially in cities;
- Failure to integrate immigrants into the native nations. On the contrary, the immigrants become those aggressively opposing their mentality, culture, and way of life to the locals.

The results are quite disappointing. Widespread public concern in Britain on immigration issue proved to be among the crucial factors of Brexit. Divergence in views among the member states upon the immigration quotas substantially contributed to the present-day problems of the EU. Euroscepticism and populism found good excuse in perceived immigration-caused threats to European culture and identity. Preserving national identity, national pride and an ethnic conception of nationhood prove among the important reasons for radical right voting in European countries today (Lubbers and Coenders 2017).

Explaining effects of international labor mobility, economists traditionally prefer to analyze material aspects of the process: economic costs and benefits, effects on wages, efficiency and output, fiscal impacts etc. (Krugman et al. 2015; McConnell et al. 2015). It is useful, however, to remind of other effects of migration in context of the concept of quality of life. It must be recognized in theory and policy that traditional cultural environment—language, traditions and habits, religion and other elements of national way of life—are also essential components of the quality of life. Without going into broader theoretical debate on definition of culture, we shall confine ourselves to the definitions commonly used in literature on international business, namely, that culture is a system of values and norms including language, religion, education, social structure, political and economic philosophy (Hill and Hult 2017). Massive immigration is reasonably perceived by native population as a threat to national culture and therefore negatively affects the quality of life. Unfortunately, this important aspect is still neglected in official publications dealing with the quality of life in the EU (Eurostat 2015).

Another major aspect of the immigration issue is the pattern of decision-making in the present-day EU. Territorial extension of EU within recent decades has been

followed by continuous attempts to increase political centralization of the Union. Reaction of the EU central institutions to new challenges in the recent years was predictable and straightforward: increasing political, economic, and legal pressure on the countries reluctant to accept immigrants, intimidating Britain and other countries with high cost of Brexit, tightening grip on member states to prevent potential other exits. However, further centralization would tend to rather inspire opposition than restore consensus in the EU. In authors' opinion, further strengthening of political integration of the EU goes beyond objective economic and social preconditions; "United States of Europe" does not look realistic in visible perspective. European nations with their historical tradition of statehood don't seem ready too easily give up their sovereignty and national identity. The EU should demonstrate more respect to national sovereignty of member states, especially in such sensitive issues as immigration.

Brexit is a clear illustration of the fact that even big countries ultimately prefer to get rid of the Brussels dictatorship. Again, instead of attempts to punish Britain or to issue it a huge bill for exit, it would be much more productive to maximally quickly put an end to uncertainty and agree upon mutually benefitting free trade. Brexit itself would prove much less costly for both parties if it were not deliberately hampered by various attempts of economic, political or judicial obstruction and sabotage of the process.

As to demography problems of modern Europe, they obviously need more efficient solutions. Projects to create jobs in Africa or elsewhere in order to reduce immigration to Europe may have only limited effect. Solution of European demography problems lies not outside, but in Europe itself. The EU has to concentrate upon social issues, pointing out demography as one of the crucial ones. It has been argued sometimes that policies aimed at raising birth rates by monetary and non-monetary incentives (in France, Italy, Australia and other countries) never proved able to reach any substantial success (McConnell et al. 2015). In fact, it does not seem exactly so. At least, France has birth rate above the European average. Some success stories of birth-encouraging policy can be found in the Baltic states in the late 1980s (under former Soviet Union); at present, Russia claims gains in raising fertility due to purposeful long-term government policy. In any case, efforts in this area must be continued both at the EU and member states' levels. In addition to material incentives, it seems necessary to radically change public attitude to the demography issue in order to restore traditional family values and prestige of raising children.

Unless problem of natural increase in population be solved, Europe will continue to increasingly depend on imported human resources. Any biologic population unable to reproduction is doomed to extinction. Depopulation would create vacuum inevitably filled by immigration; as a result, a new Great migration of peoples will drastically change Europe. In the late fifth century AD, Roman Empire was swept by the Great migration of peoples, the main role in which was played by German tribes: Goths, Francs, Anglo-Saxons, and other. Ironically, 1600 years later, European Union which is consolidated first of all around Germany, may be cracked by a new Great migration.

5 Conclusion

To summarize, authors' main conclusions are as follows:

Fundamental solutions of the problems facing Europe must be searched in Europe itself. Instead of promoting immigration or further territorial extension, the EU has to concentrate upon its internal problems, admitting demography to be one of the crucial ones.

Unless Europe regains ability to rely upon its own human resources, the problem of maintaining European national and cultural identity has no solution. Restoring birth rates and natural increase in population must be recognized in the EU's economic and social policy as a vitally important task.

Activities related to fertility policies have increased in the EU during recent years. However, results of these efforts prove insufficient. Problems of natural increase in population deserve greater attention and more active efforts.

Internal migration within the EU combined with negative natural increase in population resulted in depopulation process in the EU's periphery countries. The EU regional policy should be more efficiently used to reduce territorial disparities within the Union in order to slow down emigration trend from poorer member states.

Approaches chosen by the EU to cope with new challenges do not seem efficient. Instead of further centralization under the slogan of "More Europe!" higher degree of flexibility is needed in the EU structures. Reshaping, which EU sharply needs, should make the Union less rigid, able to learn from history and better adjust new realities. Possibly, an international economic integration model based upon less degree of centralization may prove more reasonable.

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Problems in Eurasian Container Supply Chains

Katarzyna Anna Kuzmicz

Abstract Transportation of goods exchanged between China and Europe is performed mainly in containers. Due to economic reasons, most of the containers are transported by maritime corridors. Within the frame of the Chinese initiative One Belt One Road (OBOR), often referred to as the New Silk Road (NSR), substantial investments are made to develop rail connections between China and Europe. In this paper, major challenges in container transportation on the route China-Europe on strategic, tactical and operational level are analysed. Among others they include infrastructure design, location problems, container handling, allocation of resources, service network design, routing and scheduling as well as adjustments deriving from dynamic changes in environment. The main focus is on empty container repositioning problem.

Keywords Container transportation · Supply chains · Optimisation · One Belt One Road · New Silk Road

1 Introduction

The Chinese undertaking to develop a land bridge and maritime route linking Europe with China entitled One Belt One Road (OBOR), also referred to as the New Silk Road (NSR), raises public attention and is reflected in the current research studies (Sahbaz 2014; Herrero and Xu 2016; Nazarko and Kuźmicz 2017; Seo et al. 2017, Kuzmicz and Pesch 2017; Sheu and Kundu 2018; Ejdys 2017; Nazarko et al. 2017). The idea behind is to create economic growth by developing logistic infrastructure enabling seamless flow of goods throughout a network of corridors on the Eurasian route. The name One Belt embraces a rail and consequently intermodal corridor. The name One Road refers to the twenty-first century maritime route. There is no one

K. A. Kuzmicz (✉)
Faculty of Engineering Management, Bialystok University of Technology, Bialystok, Poland
e-mail: k.kuzmicz@pb.edu.pl

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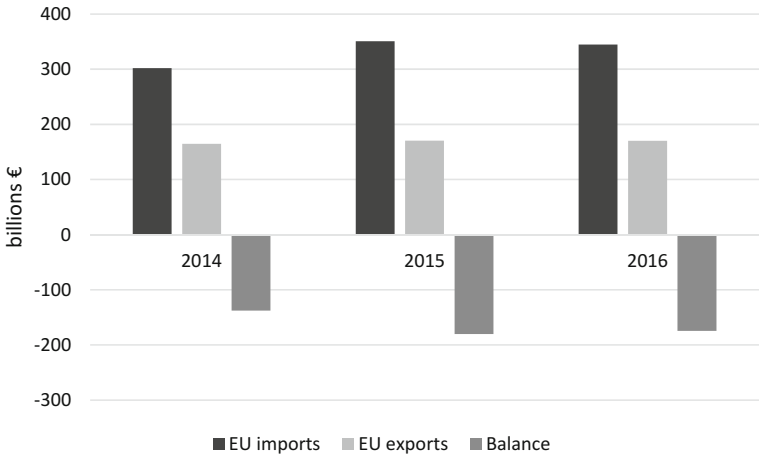

Fig. 1 EU—China trade imbalance in the years 2014–2016. Source: European Commission (2017)

defined route of the NSR, it should be rather perceived as a network of corridors. Taking into consideration the viability of the NSR project the corridor through Russia, Belarus and Poland as a gate to Western Europe prevails. The Asian Infrastructure Investment Bank and the Silk Road Fund are funding the infrastructure development within the frame of the NSR. Many countries are willing to take part in this endeavour expecting economic benefits.

Reduction of transport time and cost as well as overcoming the bottlenecks in transportation, are going to be the main factors facilitating trade exchange. The Chinese exporters will definitely benefit from the facilitation of the goods transportation, however some European producers are concerned by the possibility of big flow of the Chinese products. European importers look for niches in Chinese market that they have a potential to fill in.

The European Union is the most significant trading partner for China and China is the second important partner for the EU after the United States (European Commission 2017). The trade deficit between EU and China (Fig. 1) is substantial. The structure of mutual trade seems to contribute to this outcome, the EU imports from China mostly include industrial and consumer goods: machinery and equipment, furniture and lamps, footwear and clothing, and toys. In the EU exports to China food, pharmaceuticals, chemicals and agricultural products dominate (Nazarko et al. 2016).

Transportation of goods exchanged between China and Europe is performed mainly in containers. Due to economic reasons, most of the containers are transported by maritime corridors but within the frame of the NSR a significant shift to the rail and intermodal route may be expected. Containerised transport is developing. The biggest exporters of containerised cargo are China, USA, South Korea and Japan. The only European country in the first 10 of these exporters is

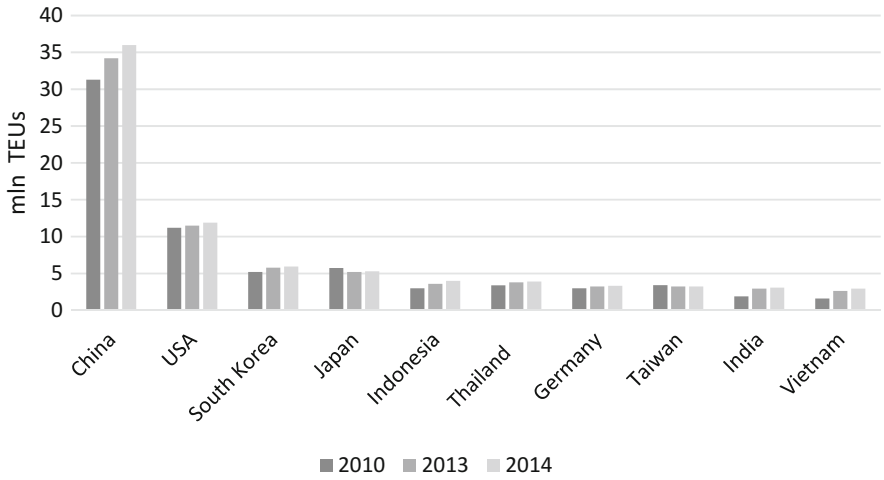

Fig. 2 The 10 biggest exporters of containerised cargo in the world (in mln TEUs) in the years 2010, 2013, 2014. Source: IHS Global Insight, World Trade Service, World Shipping Council (2017)

Germany (Fig. 2). In most of these countries the trend of exporting cargo export is growing.

USA is leading in importing containerised cargo, followed by China and a considerably lower share of South Korea, Indonesia, Germany, Great Britain, Taiwan, Australia and Vietnam (Fig. 3). The difference between the countries' export and import of containerised cargo points to the problem of empty container repositioning.

The big surpluses of containers emptied from the loads exported from China and waiting for future demand is a problem of cost and no revenue. Since import to China from European countries is much lower the problem is significant. In this paper importance of container transport as a research field is underlined, later major challenges on strategic, tactical and operational level in the field of container transportation on the route China-Europe in the light of the NSR initiative are indicated. They include infrastructure design, location problems, container handling, allocation of resources, service network design, routing and scheduling as well as adjustments deriving from dynamic changes in environment. The special focus is on empty container repositioning problem.

2 Intermodal Transport in China

The rail part of the NSR relies on the idea of The New Eurasian Continental Bridge (NECB), also referred to as The Second Eurasian Continental Bridge (SECB). Seo et al. (2017) indicate that based on NECB China opened Yuxinou (YXO) rail line

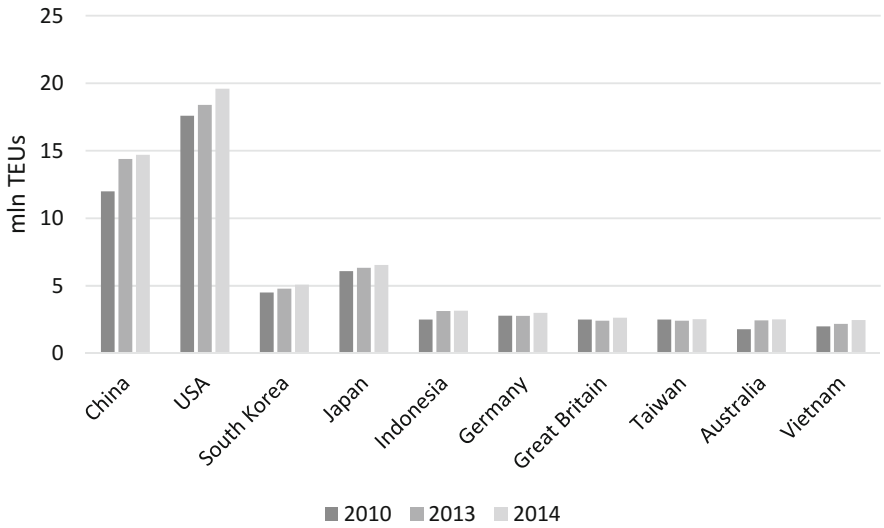

Fig. 3 The 10 biggest importers of containerised cargo in the world (in mln TEUs) in the years 2010, 2013, 2014. Source: IHS Global Insight, World Trade Service, World Shipping Council (2017)

starting from Chongqing in China running through the Yulan and Yuan railways, Sinkiang Alataw Pass to Kazakhstan, Russia, Belarus, Poland leading to Duisburg and Rotterdam in Germany. This line exemplifies the realisation of the Chinese policy to enhance export trade and to internationalise the logistics framework of the southwest region of China.

The rail transport on the Eurasian route is considered as the middle option in terms of cost and lead time between faster but more expensive air transport and cheaper but more time-consuming maritime transport. It is an attractive option for companies with: high value cargo, non-perishable goods or those to be shipped between inland locations.

The Chinese government consolidated trains within the NSR frame under the China Railway Express brand. Rail connections with Europe are highly supported in China, currently 16 Chinese cities have developed active rail freight services to 15 cities of Europe (Shepard 2017). This number is systematically growing. For example DB Schenker (2015) has an already well developed network of connections with China linking for example: Chongqinng–Dusiburg; Chengdo–Lodz; Zhengzhou–Hamburg; Wuhan–Hamburg; Suzhou–Warshau; Leipzig–Shenjang. The lead time on this route is up to 23 days, for instance for Leipzig (Germany)—Shenjang it is 19 days. The consolidation of the trains takes place in Shanghai and Chengdu. Deconsolidation in Malaszewicze (Poland) from where the goods are transported by transit to different European countries.

Intermodal transport brings benefits from the seamless transport during the rehandling process. Usage of standardised containers: 20-foot (TEU), 40-foot

(FEU) and standard handling equipment safes time and cost of rehandling cargo. In this way intermodal transport contributes to lowering cost of delivery. In China intermodal transport has been intensively developed in recent years. China's railway network was insufficient and in comparison to the well developed countries like US or Germany the volume of intermodal transport was much lower (Seo et al. 2017). For example in such countries the ocean-rail mode usually is about 20–40% of the total port container throughput, in China is was about 1.5%. Therefore in China road-ocean transport still prevails. The current achievements like the intensive development of railway network system and national express lines help China to reduce their national intermodal bottlenecks. China also invested in widespread usage of 20-foot and 40-foot standard containers and 40 high cube containers as well as information technologies necessary for seamless intermodal transportation. They also use double-stack trains and electronic customs clearance (Seo et al. 2017).

3 Container Transportation Research Areas

Container transportation is a relevant issue as a subject of current scientific research. We analysed matchings of a usage of a term *container transportation* in scientific papers and books between this term and the often related terms. A bibliographic base comprising papers listed in Web of Science database was compiled and used. To perform the analysis the publications were limited to articles, proceedings papers, chapters of books and books recently published in the years 2013–2016. To construct a map we used a VOSviewer programme developed by Van Eck and Waltman (2007, 2010). The abbreviation VOS stands for visualization of similarities. Terms were extracted from titles and abstracts of the publications. The minimal number of occurrence of a term to be included was determined as 10 and most relevant 274 out of 14,400 terms met the threshold. For each of the 274 terms the relevance score was calculated and on this basis the default choice of 60% of most relevant terms was made. Then the author verified the selected terms by rejecting pronouns, articles and words concerning methodology of writing a paper such as "author", "research problem", "aim".

The developed map is a distance-based map which means that the distance between two items reflects the strength of the relation between the items. A smaller distance illustrates a stronger relation (Van Eck and Waltman 2010). The size of the item's circle depends on the weight of the item. The weight of an item can be determined by the weight (or normalized weight) column in a map file. When a network is available, two weights are provided automatically (Van Eck and Waltman 2016). One weight is the number of links of an item, the other weight is the total strength of the links of an item. Colours of the circles mark clusters.

The developed map (Fig. 4) illustrates co-word network analysis. It indicates main clusters—fields of research in the area of container transportation. Additional loops have been used to provide visibility of clusters in black and white printout. The first cluster is operational research and optimisation problems related to container

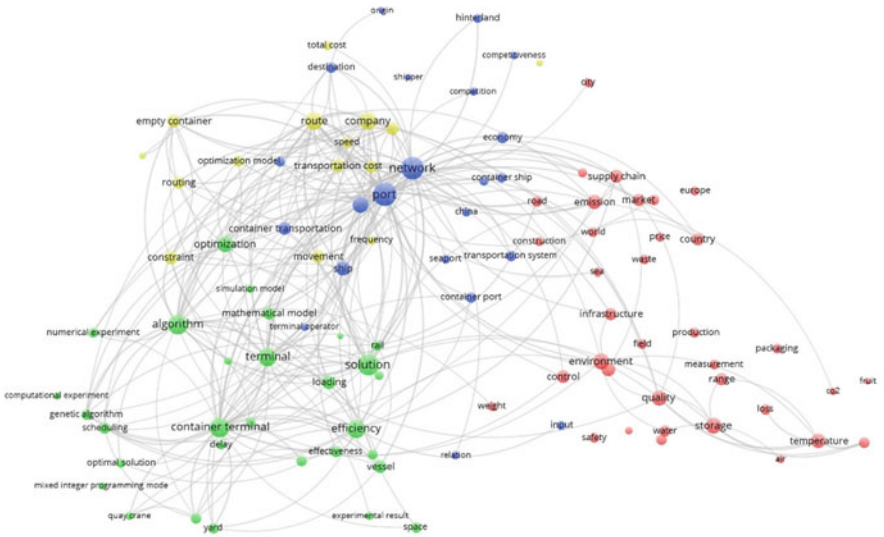

Fig. 4 Container transportation—co-word network analysis. Source: Author's elaboration in VOSviewer programme

terminals including efficiency issues, quay crane operations and in general yard operations and loading problems. The second cluster includes problems of container transportation and shipping related to sea transportation and in this context shipping networks and competitiveness, with particular indication on China and Europe as shipping destinations. The third cluster includes optimisation models of empty container repositioning and routing problems. The fourth cluster refers to papers on container transportation in the light of supply chains and environmental issues and problems with storage policies.

4 Major Challenges in the Container Supply Chains

The expected rise in rail container transport within the frame of the NSR raises attention to the strategic, tactical and operational problems that need to be solved. The examples of such problematic areas are presented in Table 1. They include cooperation strategies in intermodal chain, location problems, transport network design, intermodal terminal design, layout planning, infrastructure development, service network design, pricing strategies, decisions about consolidation network, routing problems, resource allocation, scheduling of jobs and staff and problems with empty containers. To solve the mentioned logistic problems solutions based on operations research are proposed. In the table the example areas for optimisation on different levels of problems in container transportation are presented.

Table 1 Problems for optimisation in container transport on strategic, tactical and operational level

	Level of problems in container transport		
	Strategic	Tactical	Operational
Example areas for optimisation	Cooperation strategies in intermodal transport chain	Service network design	Vehicle or cargo routing
	Location of hubs, terminals, etc.	Pricing strategies	Resource allocation
	Terminal design	Decisions about capacity levels of equipment and labour	Scheduling of services
	Intermodal transport network design	Redesign of operational routines and layout	Redistribution of railcars, load units etc.
	Regional strategic development of intermodal transport	Decision between a type of consolidation network (point-to-point network, a line network, a hub-and spoke network a trunk-collection-and-distribution network)	Scheduling of jobs
	Intermodal infrastructure development planning	Decisions about frequency of service, train length, allocation and capacity of equipment	Scheduling of staff
	Strategies of empty container balancing	Empty container relocation	Empty container storage and reshuffling

Source: Authors own study based on Cranic and Laporte (1997), Macharis and Bontekoning (2004), Caris et al. (2008)

Sheu and Kundu (2018) in the context of the NSR propose a spatial-temporal logistics interaction model integrated with Markov chain to asses real-time logistics distribution patterns. They consider political and trading uncertainties triggered by the NSR as well as the objectives of this project referring to the development of international logistics along the corridors. The aim is to investigate the logistics distributions flows of the freight and forecast time-varying logistics distributions patterns along different corridors within the frame of the NSR. The study embraces finding the optimal distribution flow path from a set of potential paths so that the total relevant cost and flow time are minimized and the service level requirements are satisfied (Sheu and Kundu 2018; Klose and Drexl 2005). The model is tested on the example of Chines oil supplies from West Africa and the Middle East within the frame of the NSR.

Among the problematic areas mentioned in Table 1 there are strategies of empty container balancing on global level (between the regions of big surplus and those with shortage of containers) and relocation of empty containers indicated as tactical problem which can be considered as relocating containers between importers, exporters and depots located in the close geographical location. On an operational level empty container storage and reshuffling moves also require optimization in terms of storage space and avoiding unnecessary reshuffling movements deriving from poor planning and forecasting of future container movements. Due to the

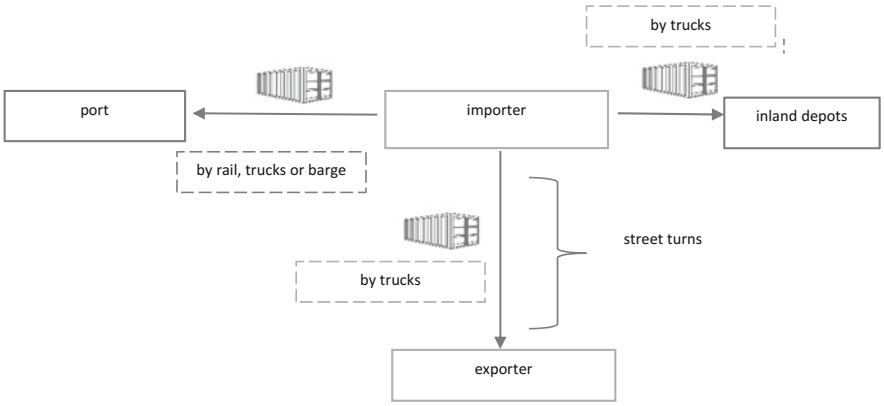

Fig. 5 Empty container movements. Source: Author's elaboration based on shipping container icon by Asa (2017)

substantial imbalance of the flow of full and empty containers between Europe and China, deriving from substantial trade imbalance, this problem is vitally important.

Empty containers after being unloaded by an importer either come back to the port transported by trucks, rail or barge or they are transported by trucks to inland depots where they wait for future demand. Another option is transportation of empty containers directly to exporters, which is referred to as street turns. It requires a knowledge about available containers at importers and meeting various criteria matching with exporter's needs like times windows, type of containers etc. The possible movements of empty containers are illustrated in Fig. 5.

Empty container repositioning is widely studied in the literature. The attempts to solve this problems include technical solutions and optimization methods application (Kuzmicz and Pesch 2019). Mathematical models of mixed integer programming are developed considering the problem from different perspective. Some models analyze empty container repositioning as network design problem (Huang et al. 2015), service network design (Braekers et al. 2013a), inventory sharing game (Xie et al. 2017), location problem (Mittal et al. 2013), routing problem (Braekers et al. 2013b), routing and assignment problem (Nossack and Pesch 2013), inventory control problems (Dang et al. 2012). Technical solutions include foldable containers (enabling folding 4 or 5 containers into one to save transport and storage space) and connectainers (a type of containers that can be joined into one 40-foot container or disjoined into two 20-foot containers) (Kuzmicz and Pesch 2019).

Empty container relocation is a significant problem in Eurasian transport because it generates costs in transport and in storage not generating revenue. Therefore attempts are made to model the problem with the aim of solving the global strategic problem of diminishing the big surpluses of containers in China for instance and provide them in regions where there is a demand and to solve the problem on tactical and operational level. Models presented in the literature address container allocation problem, trade imbalances, scheduling problems, distribution planning, fleet

management, uncertainties of demand and environmental aspects of empty container transport.

5 Conclusions

The NSR raises public attention and researches interest as a trigger of changes in global supply chains in a consequence of broadening transportation possibilities. Smooth transport on the long route requires solving many logistic and transportation problems on strategic, tactical and operational level. These problems are mostly addressed by the application of optimization methods.

The dynamics of the grow of rail connections between China and Europe allow to anticipate that there will be a shift of some type of cargo transport that needs faster transport than maritime. Lead time is an important component of logistic costs and shorter lead time provides more flexibility to the supply chain. Therefore rail container transport will be an interesting option for those goods transportation for which time is an important factor.

One of the main problem in Eurasian container transport is management of empty containers. Since they generate cost and do not generate revenue all the stakeholders are interested in reducing the problem. In the study possible movements of empty containers and different approaches to reducing the problem were indicated. An interesting research field would be therefore studying cooperation relations among the stakeholders in the empty container supply chain. Another direction of further studies are pricing strategies in container lease in the context of solving empty containers problem.

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Recent Developments in the Sustainability Field: Energy and Economic Indicators in the European Union in 2015

Maria Alexandra Maassen

Abstract For the past decade renewable energy represented a main source of technological and environmental progress in the European Union, as well as on a global scale. During these years the renewable energy installments have steadily built significant sources of energy of national economics, but also contributed to the progress for achieving energy dependence decrease and the EU 2020 sustainability strategy. In the present chapter the Pearson coefficient was used to determine connections between ten main economic and energy indicators from the European Union in 2015, which revealed development trends of the member states depending on the evolution of each indicator for the year mentioned. The study revealed significant correlations, such as the negative correlation between the energy dependence and the share of renewable energy consumption in gross final energy consumption. Other correlations of the chapter present further connections between economic and energy indicators, having a direct impact on the sustainability strategy of the EU and on the energy consumers. The relevance of the study lies in the analysis of the most recent available data regarding the selected indicators from the European Union, that will contribute to the future development of the economic landscape significantly depending on current renewable energy trends.

Keywords Correlation · Renewable energy · Energy intensity · Energy consumption · Sustainability

1 Introduction

In the last decade new cost competitive renewable energy markets have emerged, contributing significantly to the progress toward a sustainable energy market for the future. The rapid development of renewable energy technologies, policy initiatives,

M. A. Maassen (✉)
Faculty of Business Administration in Foreign Languages, The Bucharest University of Economic Studies, Bucharest, Romania
e-mail: maria.nichifor@fabiz.ase.ro

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increased access to projects financing, energy efficiency and sustainability concerns and objectives of the European Union, but also globally, have been major factors for the stimulation of increased production and consumption of renewable energy, that are expected to replace gradually the traditional sources of energy.

Several conventions and objectives globally are focusing today on the evolution toward a sustainable energy market, considering the tendency of global warming, pollution levels, and the need to preserve the environment more for future generations. For example, the European Commission 2010 objective 20-20-20 imposes an increase of the share of renewable energy to at least 20% of consumption until 2020 and in 2015, 195 countries agreed to a limit of the global warming to less than two degrees Celsius at the United Nations Framework Convention on Climate Change's (UNFCCC) 21st Conference of the Parties (COP21) in Paris (REN21 2016).

Furthermore, various economic and energy indicators, such as the GDP, energy intensity, are evaluated yearly for political, economic, and environmental purposes for improving the current economic and environmental context. An example is the latest Eurostat data from 2015 that indicates progress in terms of energy consumption efficiency comparing to the levels of 1995: energy intensity of the European Union decreased by approximately 43% to a level of 120.4 kg of oil equivalent per 1000 € in 2015 comparing to 1995 (Eurostat 2017a), but also progress in terms of GDP that rose by approximately 14% from 2007 to 2015 (Eurostat 2017b). While on the level of the European Union several countries have improved their contributions toward economic and sustainability progress, each country has reacted to the renewable energy necessity, economic environment and other political and social changes in a different manner, thus showing the importance of establishing specific national targets, strategies, and objectives depending on the internal context of each region.

The main objective of the present chapter is to analyze ten main economic and energy indicators of the European Union in 2015, in order to determine the most significant correlations between these factors and their possible meanings and implications for the sustainability development in Europe. The case study focused on the 28 member states of the European Union, respectively: Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Luxembourg, Lithuania, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, and the United Kingdom.

The chapter is structured as follows: after the introduction, the next part will focus on presenting main perspectives of scientific research from other authors regarding correlations, as well as the evolution of economic and energy indicators from the European Union member states in 2015. Furthermore, the chapter will continue with the methodology implemented based on the Pearson coefficient and afterwards with the findings and analysis of the obtained correlations of the ten economic and energy indicators obtained within the study. The last part will refer to conclusions of the research.

2 Literature Review

The economic and energy sectors have encountered major changes in the past 20 years in productivity, efficiency, and technological terms especially, focusing on increasing sustainability through increasing energy efficiency, generating energy from renewable, nonpolluting sources, and finding new ways of adding sources of income. This process takes place on a microeconomic, as well as on a macroeconomic level. One of the main targets on a macroeconomic level is the growth of the GDP as an indicator of the economic growth.

According to Divya and Devi (2014), a high GDP indicates robust growth of an economy and vice-versa and therefore, each country pursues the maximization of GDP growth rate. Economic growth is linked to some main factors of influence, such as: savings, population grow, resulting in an increased number of workers, technological progress, and finally productivity increases (Burda and Wyplosz 2001). Bassani (2001) emphasized that factors such as differences in investment rates and human capital as well as in R&D, trade exposure, financial structures and macroeconomic conditions and policy setting are significantly influencing levels of GDP per capita across countries and thus, contributing to economic growth of the countries, while high inflation levels appear to be negatively influencing directly the GDP per capita as well as physical capital accumulation in the private sector, thus contributing to decrease of the economy. When referring to the GDP, one can refer to the nominal value of GDP as for indicating the performance in economic terms of a country or a region or a GDP per capita, takes into consideration the amount of population of the country or region as well.

Another frequently used indicator in terms of energy and economy is the energy intensity of a country, defined as energy use per dollar of gross domestic product (Bernstein et al. 2003). Polenske (2006) mentioned more specifically that energy intensity is the amount of energy consumed to produce one unit of output. A main concern with rising levels of carbon-intensive industries has been represented by strategies used to decrease energy intensity and increase energy efficiency. For example, Metcalf (2008) emphasized that at the level of the United States between the period 1970–2001 three quarters of the reduction in energy intensity have occurred because of improvements in energy efficiency, the country benefitting directly from offshoring energy-intensive economic activities and only reimporting the carbon-intensive consumer products, thus not implementing carbon-intensive production on a national level. Furthermore, Sequeira and Santos (2018) indicated the tendency of lower energy intensity as per capita output is rising, thus, richer countries have lower energy intensity levels, especially as the economies become more service intensive and less industry intensive. In the case of the European Union the energy intensity was calculated as gross inland consumption of energy divided by GDP (kg of oil equivalent per 1000 € (Eurostat 2017c), the tendency was also that the energy intensity decreased steadily starting with 2010, as illustrated in Table 1.

While the objective for increasing energy efficiency and decreasing energy intensity is pursued intensively, a major issue occurring simultaneously is energy

Table 1 Energy intensity of the economy of European Union between 2007 and 2015

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Energy intensity (kg of oil equivalent per 1000 €)	138.5	137.5	135.5	137.7	130.4	130	128.3	121.6	120.4

Source: Eurostat (2017c)

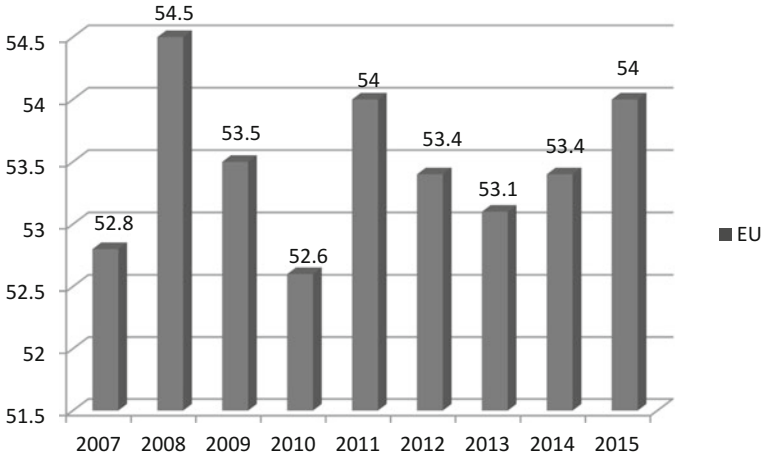

Fig. 1 Energy dependence (%) in the European Union between 2007 and 2015. Source: Eurostat (2017d)

dependence. The energy dependence (calculated as net imports divided by sum of gross inland energy consumption plus bunkers) is an indicator showing the extent to which the economy needs imports in order to cover energy needs, according to Eurostat (2017d). Thus, the European Union seeks to decrease the energy dependence of the member states and increase the energy security through ensuring new production capacities in periphery regions, ensuring appropriate transport of energy, technology, and other such additions (Dannreuther 2004). In 2015 in the European Union the level of energy dependence was 54% as indicated in Fig. 1.

In terms of progress toward a sustainable economy the share of renewable energy consumption in gross final energy consumption is one main factor used to indicate how much the use of renewable energy has expanded, thus, the proportion to which renewable fuels have replaced polluting fuels, such as fossil and/or nuclear and therefore bringing a share to the decarbonizing of the EU economy (Mehedintu et al. 2018). The tendency of increasing the share of renewable energy in final energy consumption is a major objective due to the 20-20-20 strategy of the European Union, that imposes a minimum limit of 20% of this indicator for the region of the European Union (Scarlat et al. 2015) and is also supported by stimulating policies of the member states to promote renewable energy installations and usage (Mehedintu et al. 2018). Related to the encouragement of sustainability the environmental taxes

have been introduced to stimulate the budget of the European Union and to stimulate measures of more efficient resource allocation and diminishing polluting factors and waste. The environmental taxes include taxes for energy (including for CO_2 emissions), the transportation, the pollution, and the resources taxes (Piciu and Trică 2012) and are classified according to the fact that the criterion was or not respected or was respected with certain issues arising in terms of the budget, efficiency, and equity criteria.

The implicit tax rate on energy is a specific indicator measuring the ratio between energy tax revenues and final energy consumption calculated for a calendar year (Eurostat 2017e). Regarding correlations of several of these indicators, in the literature, various correlations have been analyzed among indicators from different fields, such as: the renewable energy field, such as the article of Zhou et al. (2016), that identified a correlation between the solar wind speed (SWS) and sea surface temperature (SST) in the region of the North Atlantic Ocean, as well as in the economic field and other related domains, such as the paper of Szigeti et al. (2013), that analyzed correlations between the GDP, environmental performance index and human development index.

Campo and Sarmiento (2013) found correlations between the GDP and other factors in their study, namely, energy consumption, were Campo and Sarmiento who inquired the relationship between real GDP and energy consumption for the ten selected countries from Latin America of their study, whereas the GDP had a positive effect on energy consumption. The authors' research indicated, for example, that for Colombia and Venezuela, a 1% increase in real GDP increased the energy consumption by 0.82%.

3 Methodology

For the present chapter ten economic and energy indicators for the member countries of the European Union have been selected in order to be introduced in the calculation of the correlation coefficients. These indicators included: gross domestic product per capita, gross domestic product, energy dependence, gross inland energy consumption by fuel type (1000 ton of oil equivalent), share of renewable energy consumption in gross final energy consumption, environmental taxes Mil Euro, greenhouse gas emissions intensity of energy consumption, electricity generated from renewable energy sources % of gross electricity consumption, implicit tax rate on energy EUR per ton of oil equivalent, energy intensity of the economy or gross inland consumption of energy divided by GDP (kg of oil equivalent per 1000 €) (as defined in the Eurostat (2017c)). The European Union countries that were taken into consideration for the calculation of potential correlations of the mentioned indicators included: Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Luxembourg, Lithuania, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, and the United Kingdom.

Table 2 Correlations between the selected energy and economic indicators in the European Union 2015 and their significance level

Indicators of calculation	Value of Pearson coefficient
GDP nominal–gross inland energy consumption by fuel type	0.971 *F* statistic: 444.32[a]
GDP nominal–environmental taxes million euros	0.970 *F* statistic: 421.90[a]
Share of renewable energy consumption in gross final energy consumption–electricity generated from renewable energy sources % of gross electricity consumption	0.785 *F* statistic: 41.7585[a]
GDP per capita–energy intensity of the economy (calculated as gross inland consumption of energy divided by GDP (kg of oil equivalent per 1000 €)	−0.57 *F* statistic: 12.54[a]
Implicit tax rate on energy EUR per TOE or tons of oil equivalent–Energy intensity of the economy	−0.635 *F* statistic: 17.59[a]
Energy dependence–share of renewable energy consumption in gross final energy consumption	−0.462 *F* statistic: 7.09[a]
Environmental taxes Mil Euro–Implicit tax rate on energy EUR per TOE (calculated as energy tax revenues and final energy consumption calculated for a calendar year according to Eurostat (2017))	0.486 *F* statistic: 8.04[a]
Energy dependence–energy intensity of the economy (calculated as gross inland consumption of energy divided by GDP) (kg of oil equivalent per 1000 €)	−0.483 *F* statistic: 7.94[a]

Source: Author's own research based on Eurostat (2017f) data
[a]Denotes a significant level of $p < 0.05$

4 Findings and Analysis

As a result of applying the Pearson coefficient calculation for linear correlations, six relevant correlations were obtained, as shown in Table 2.

As shown in Table 2, the strongest correlation (0.971) was found between GDP and gross inland energy consumption by fuel type. Thus, the big economies that consume large amounts of energy have close percentages of the energy consumption by fuel type. Smaller economies with large value of energy consumption by fuel type such as Bulgaria (percentage of energy consumption by fuel type divided by GDP = 40.9) do not affect the value of the correlation in a significant manner. Large economies with large GDPs have similar percentages of the energy consumption by fuel type, for example Germany (10.4), Italy (9.5), and France (11.5).

Between energy intensity (calculated as gross inland energy consumption divided by GDP) and gross inland energy consumption by fuel type divided by GDP there was a correlation of 0.992.

Another correlation is between GDP per capita–Energy intensity of the economy −0.57. This average negative correlation suggests the tendency of countries with a higher GDP per capita to have a lower energy intensity of the economy and to be thus more efficient from the point of view of energy consumption. As in the case of

Table 3 Correlations between GDP–Environmental taxes per year (2007–2015) for the European Union member states

Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014	Year 2015
0.9837	0.9825	0.9788	0.9783	0.9751	0.9651	0.9684	0.9633	0.9705

Source: Author's own research based on Eurostat (2017d)

Denmark (GDP per capita 127) the energy intensity is low 65.1, the country being more efficient in energy consumption in comparison to countries like Estonia and Croatia that have lower levels of GDP per capita and high levels of energy intensity and energy consumption.

Furthermore, the study revealed the correlation between GDP Nominal–environmental taxes (million euros) respectively 0.970. Large economies have performing industries that pollute less and can afford to renew technologies easier, have electrical transport, so environmental taxes although high, the percentage of the tax is lower and thus have more efficient economy. They impose the high correlation between the GDP and environmental taxes. From 2006 until 2015 in Germany the environmental taxes have increased by 3.57% and in Romania by 105%. All correlations in Table 2 had a significant level with $p < 0.05$.

The correlations between the GDP and environmental taxes have also been calculated for the period 2007–2015, as shown in Table 3. This represents the correlation between GDP and environmental taxes in each year for the 28 European Union countries, respectively for the year 2007, 2008 up to the year 2015.

The correlation between the share of renewable energy consumption in gross final energy consumption and electricity generated from renewable energy sources % of gross electricity consumption was a positive correlation of 0.785. A part of the energy is used for heating and other uses except for electricity. There are other sources of renewable energy that are not transformed in electricity.

A negative correlation of −0.635 between the implicit tax rate on energy EUR per ton of oil equivalent–energy intensity of the economy was also found. This negative correlation implied that countries with a high implicit tax rate on energy tended to have a lower energy intensity of the economy, while countries with a high implicit tax rate on energy tended to have a higher energy intensity of the economy. This could be explained by the fact that high levels of tax rates on energy contribute to the rationalization process of energy consumption in the sense of increasing energy consumption efficiency. However, this is also influenced by the political factor. For example, countries with a high tax rate of energy and a low energy intensity in 2015 were Germany (implicit tax rate on energy 209.66 € per TOE and 112.6 energy intensity level or Denmark 409.34 € per TOE tax rate on energy and a very low level of energy intensity 65.1).

The average negative correlation value between energy dependence and energy intensity of the economy (−0.483) is explained by the fact that even if energy dependent, some countries have an efficient economy. Most countries of the European Union are energy dependent by at least 50%.

5 Conclusions

As a conclusion, the correlations emphasize the tendency that large economies have an advance in comparison to the developing economies in terms of energy consumption efficiency (correlation GDP–Energy intensity of −0.57), lower tax percentages although environmental taxes tend to be higher (correlation GDP Nominal–environmental taxes (million euros) respectively 0.970). Furthermore, the high levels of tax rates on energy, although negatively affecting income and revenues, contribute to the rationalization process of energy consumption in the sense of increasing energy consumption efficiency (−0.635 between the implicit tax rate on energy–energy intensity of the economy).

Although the European Union overall and its members have made economic progress as well as progress in the direction of achieving the sustainability targets of 2020 and even more in certain cases, there are still challenges regarding the adapting process at a sustainable economy, that implies focus on renewable energy integration, reducing energy consumption, and increasing energy efficiency. Sustainability will imply that changes will be made in the political, economic, and social strategies of the countries at all levels of activities, including at companies' level, educational level, the social level and especially at the political, regulatory level, that directs the framework for achieving the proposed targets.

The development of renewable energy installments, production, and consumption level, the subvention schemes offered for the production of energy from green sources, as well as the increased requirements on a global scale for having people and environmentally focused activities represent already a start of the future strategies implemented at all levels of the society in order to reach its goals, but also preserve the environment. Practically, the energy rationalization process through the decrease of energy intensity, as well as adapted behavior of acting at a national level, but also at social and company level, represents already two of the main concerns besides the financial objectives.

The research showed that developing countries registered favorable levels of shares of renewable energy consumption, however still having much progress to do in terms of energy intensity efficiency increase, where there are still high values registered. This indicates more strategies at political, educational, company, and social level have to be implemented in order to reduce intense energy consumption, that contributes negatively not only to the environmental aspects of a country, but also to its resources and finances on a long term.

For future research, a main objective would be to study these indicators for a period of more years in order to see how they will evolve depending on a changing economy influenced by technological and sustainability requirements and development and their meaning for the analyzed regions and potential strategies of improvement for the future.

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Systemic Irregularities in the EU Fund Law: Context of Public Supervision over Public Procurement Market

Jarosław Odachowski

Abstract The issue of the obligation to comply with the public procurement legal regime in the European Union (EU) fund law is related to the requirement to follow all applicable laws in a case. Problem of violating these regulations is connected with an occurrence of individual (existence of the beneficiaries) and systemic irregularities (functioning of the management and control system). This publication is an attempt to analyse components of the notion of systemic irregularities in the context of a public supervision over the public procurement market. It will allow to show a complexity of systemic irregularities, their relation to individual ones and negative effects in the area of public procurements. These legal problems have a very important meaning for the whole process of implementation of EU funds, because there is a necessity to use all of the public resources in appropriate way in line with all binding provisions—while each irregularity violates these provisions. In the case of systemic irregularities, there is a significant problem—the source of these ones is placed in the system of management and control. It is worth mentioning that discussed problems are important for all EU State Members. Moreover, there are not many scientific publications on this topic. Methodology is connected with an analysis of legal regulations (EU and national law) and legal literature.

Keywords EU funds · Operational programs · Management and control system · Individual irregularities · System irregularities · Public procurement

1 Introduction

The issue of the obligation to comply with the legal regime of public procurement (more on public procurement, Babiarz et al. 2013; Pieróg 2017; Piwowarczyk 2012; Skubiszak-Kalinowska and Wiktorowska 2017) in the EU fund law (more about the

J. Odachowski (✉)
Faculty of Law, Administration and Economics, Uniwersytet Wrocławski [Wroclaw University], Wrocław, Poland
e-mail: jaroslaw.odachowski@wsb.wroclaw.pl

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EU funds, Cieślak 2008; Gwizda et al. 2014; Jóźwik et al. 2012; Miemiec 2012; Pawlicki 2014; Poździk 2009) is related to the requirement to apply all the applicable laws to a case. Their proper application should be always preceded by precise interpretation of the laws.

In the practice of delivering projects co-financed from the EU funds under the 2014–2020 budgetary perspective, these are not only case-by-case (individual) irregularities which are important (see Odachowski 2012d), related to a breach of different public procurement regulations by beneficiaries. Similarly, various defects in the operational programmes related to activities performed by the institutions participating in the management and control system become an issue. These dysfunctions are defined as systemic irregularities. The terms are defined in Article 2 item 38 of the Regulation (EU) No. 1303/2013 of the European Parliament and of the Council of 17 December 2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006—the general regulation.

Apart from Article 2 item 38 also note the provisions of Article 2 item 15 of the Act of 11 July 2014 on the rules applicable to the implementation of cohesion policy programmes financed within the financing framework 2014–2020—the implementation law, which defined "systemic irregularity" as the irregularity mentioned in Article 2 item 38 of the General Regulation.

The term is a composition of several elements that must occur jointly while containing a number of blurred and imprecise concepts. This publication is an attempt to analyse components of the notion of systemic irregularities in the context of a public supervision over the public procurement market. There is a necessity to analyse the following problems: question of individual irregularities, repeatability of these ones and functioning of the management and control system (as a source of systemic irregularities). It is also worth mentioning what kinds of systemic irregularities in the area of public procurements may occur under financial period 2014–2020 (type, specific character, examples).

This publication will allow to show a complexity of systemic irregularities, their relation to individual ones and negative effects in the area of public procurements. These legal problems have a very important meaning for whole process of implementation of EU funds, because there is a necessity to use all of the public resources in appropriate way in line with all binding provisions—while each irregularity violates these provisions. In the case of systemic irregularities, there is a significant problem—source of these ones is placed in the system of management and control. It is worth mentioning that discussed problems are important for all EU State Members. Moreover, there are not many scientific publications on this topic. Methodology is connected with an analysis of legal regulations (EU and national law) and legal literature.

2 Individual Irregularities

In the light of the provision of Article 2 item 38 of the general regulation, "systemic irregularity" means any irregularity, which may be of a recurring nature, with a high probability of occurrence in similar types of operations, which results from a serious deficiency in the effective functioning of a management and control system, including a failure to establish appropriate procedures in accordance with this Regulation and the Fund-specific rules.

The presented comments introduce us to the analysis of the definition. First, the EU legislator indicates that it is "any irregularity" that he means. It is necessary to indicate that this term is according to term, "any individual irregularity".

Definition of this category of irregularities is governed by the provisions or of Article 2 item 36 of the general regulation (Article 2 item 14 of the implementation law contains only a reference to the provision), any breach of Union law, or of national law relating to its application, resulting from an act or omission by an economic operator involved in the implementation of the EFSI Funds, which has, or would have, the effect of prejudicing the budget of the Union by charging an unjustified item of expenditure to the budget of the Union.

In the scope discussed in the chapter, there are three co-existing components. First, it is about breaching law—EU law, national law, guidelines, communiqués, *soft law* or programme documents such as operational programmes (see Odachowski 2012a)—since any individual irregularity (and, in consequence, also a systematic irregularity) is an event of breaching the law. Therefore, referring the deliberations to the issue of the public procurement market supervision, note that the issue of systematic irregularities will also include breaches of regulations that apply to public procurement.

Another premise that an individual irregularity occurred is "an act or omission by an economic operator involved in the implementation of the EFSI Funds". In the analysed scope, the EU legislator assumes a dichotomy: a breach of law may result from both man act and omission (c.f. Karwatowicz and Odachowski 2009). Therefore, it also applies to the public procurement sphere.

The third and the last premise that defines the concept of an irregularity is related to the notion of prejudicing the EU budget—...which has, or would have, the effect of prejudicing the budget of the Union by charging an unjustified item of expenditure to the budget of the Union (see also Odachowski 2016).

3 Repeatability of Irregularities

The legislator points out that systemic irregularities involve situations where a single irregularity may be of a recurring nature, with a high probability of occurrence in similar types of operations.

The foregoing fragment of Article 2(38) of the general regulation serves as a starting

point for a series of laws that designate specific irregularities categorised as systemic from the perspective of their object, which enables us to determine the legal meaning of such irregularities in the field of public procurement.

Importantly, in the area under examination, the legislator points out to the number of irregularities, and not to the types of subjects responsible for committing them, as well as specific types of behaviour that meet the defined criteria. In consequence, in this passage the legislator not only does not specify a closed catalogue of such irregularities, but even falls short of giving any examples.

Insofar as a single irregularity appears already when a specific legal situation occurs (a joint occurrence of their constituents means the occurrence of a specific type of infringement), in the case of systemic irregularities, a single case does not imply the occurrence of a systemic irregularity yet. For instance, legal scholars have claimed that as a rule, a systemic irregularity involves a set of multiple events (Dołowiec et al. 2016a, b).

In this context, "repeatability" is the issue of key importance. However, the legislator does not specify the number of repeated (subsequent) occurrences of certain behaviours that together would add up to constitute a specific fact. In theory, it could be assumed that "repeatability" is the opposite of "singularity" and thus a systemic irregularity would occur as soon as two infringement took place. As a result, no need to determine a higher number of such infringement would be required. This would apply to the analysed public procurement area as well.

Nonetheless, when analysing the passage from Article 2(38) one cannot help noticing that the EU legislator associates the element of repeatability with the aspect of optionality, explicitly providing that it may be of recurring nature. As a consequence, the multiple (or at least double) occurrences is not necessary for a systemic irregularity to take place (which applies in the context of public procurement as well).

The important thing is, therefore, the sole possibility that the occurrence can (at least) repeat itself. At the same time, the legislator does not specify the (potential) number of such occurrences. It is possible then to stand by the view that the possibility of a single occurrence of an infringement is sufficient—in such a case, the discussed situation would contain at least two elements, a "real" one and a "potential" one (see also Dołowiec et al. 2016a, b). Hence in literature we find apt references to a potential or actual recurrence (Dołowiec et al. 2016a, b).

Yet another issue that needs to be examined is the applicability of optionality o the "first" irregularity as well (and not only to subsequent ones). To say that optionality applies would imply that no single irregularity needs to occur for a systemic irregularity to take place. In consequence, a systemic irregularity would merely involve a conviction that irregularities would occur in a specified future.

This opinion should be dismissed as incorrect. In the context of the legal provision in question, optionality applies only to the situation after a specified (here: first) single irregularity has taken place, and such an irregularity must be real. This is confirmed by the verbatim wording of the law, which refers to (any) "irregularity"—without adding a quantified that would imply such optionality. In consequence, the mechanism of identifying and removing systemic irregularities (see item 7) can be triggered only once the "first" (single) irregularity has taken place.

This solution should be supported, especially in view of the fact that the occurrence of a systemic irregularity may involve certain sanctions (item 7). If a systemic irregularity could exist even without any (real) infringement occurring, one should reconsider the purposefulness of sanctioning the sole danger of an irregularity materialising itself. This is without prejudice to the fact that a situation where even a mere danger of infringement occurs calls for being remedied by taking appropriate actions.

In consequence, the need to ensure that duties in the field of public procurement are met cannot justify the view that a sole threat of a certain infringement occurring in the future is a systemic irregularity. Another aspect worth consideration is the interval at which the specific analysed constituents of a systemic irregularity—both real and potential—should take place. There is no doubt that they should be examined in the context of a specific financing framework (in this case, 2014–2020). In the remaining scope, it could be concluded, at least at first glance, that any interval could apply. However, one issue that needs to be examined is the likelihood that the irregularity will repeat itself. This premise should be taken into account. High likelihood of a (subsequent) irregularity occurring should suggest that it can recur following the lapse of a shorter, rather than longer, period. And hence the issue of the interval during which a series of recurring behaviours by beneficiaries occurs (can occur) gains special importance also in the context of public procurement. In this area, the interval under consideration should not be long. For instance, if we examine a scheme where the first single irregularity occurred at the beginning of the programming period, while the second one only at its end, we need to examine how likely the irregularity was and became to repeat itself. One can challenge the option that the likelihood of repeatability was high, and, in effect, that the occurrence of irregularities meant that a systemic irregularity occurred as well.

When discussing the aspect of repeatability, one needs to emphasize that it is not about typical repeatability of any irregularities, but also of such irregularities whose recurrence was probable to a sufficient degree. *Ratio legis* behind this solution involves rejecting the cases of consecutive occurrence of irregularities each of which is of a different type. Such situations—though no doubt negative and requiring relevant preventive, identification and remedial measures do not fall within category under examination. One needs to emphasize that, from practical perspective, a single occurrence of a certain type of irregularity (if no repeatability—also of optional nature—is involved) does not translate into serious obstacles or barriers to the implementation of an operational programme. What is more, the lack of repeatability can be a sign that appropriate protective measures have been put in place.

Additionally, in the case of public procurement, systemic irregularities are not defined as the joint occurrence of any infringement of law in this field. As a result, a systemic irregularity is not, for instance, a Contracting Authority's failure to carry out a required audit (to read more on control measures in operational programmes consult Odachowski 2012c; Szymański 2012) combined with inappropriate activities undertaken by the CA (after the lapse of a certain period) as a result of an erroneous interpretation of public procurement law. In fact, such cases of infringement of effective law have nothing in common—obviously apart from the fact that

they both belong to the sphere of public procurement law. As such, they should be treated as different single irregularities to be eliminated in compliance with appropriate procedures—without any relevance to the legal institution of systemic irregularities.

Apart from the quantitative criterion—i.e. repeatability—there is also the qualitative aspect related to the possibility of infringements occurring in similar types of operations. Pursuant to Article 2(9) of the general regulation, an operation means a project, contract, action or group of projects selected by the managing authorities (MA) of the programmes concerned, or under their responsibility, that contributes to the objectives of a priority or priorities; in the context of financial instruments, an operation is constituted by the financial contributions from a programme to financial instruments and the subsequent financial support provided by those financial instruments.

Legal scholars have claimed that the term "systemic irregularities" can be applied only with respect to irregularities that concern a specific types of projects (e.g. road projects) or irregularities concerning the types of projects that are similar in certain aspects (e.g. road and railway projects, as concerning land transportation) (Dołowiec et al. 2016a, b).

Furthermore, it is also important to examine whether the criterion of "high degree of likelihood" pertains to repeatability or similarity of operations. There should be no doubt that it is applicable only to the former. Meanwhile, the latter element must necessarily occur.

4 Functioning of the Management and Control System

In its further part, the general regulation being examined specifies the source of single irregularities (they are, in the end, constituents of the legal construct analysed in this chapter), and, in consequence, of systemic irregularities as well. The legislator has emphasized that they result from a serious deficiency in the effective functioning of a management and control system (Article 2(39) of the general regulation provides that serious deficiency in the effective functioning of a management and control system means, for the purposes of implementation of the Funds and the EMFF under Part Four, a deficiency for which substantial improvements in the system are required, which exposes the Funds and the EMFF to a significant risk of irregularities, and the existence of which is incompatible with an unqualified audit opinion on the functioning of the management and control system). In consequence, the issue of systemic irregularities, despite its connection to single irregularities, has its source in the functioning of the management and control systems (and not *stricte* in beneficiary behaviour). The specificity of this system was taken into account in Articles 6(1) and 6(2) of the act implementing EU law (more on this topic in Jaśkiewicz 2014; Dołowiec et al. 2016a, b).

The legislator pointed out to the content of the system (terms, conditions and procedures), obliged entities (institutions participating in the implementation of

operational programmes), the scope of the system (e.g. management, monitoring, reporting) and its legal basis (e.g. commonly binding laws, guidelines). It is worth noticing that the legislator aims at ensuring the effective functioning of the system. In consequence, the starting point for any discussion is not just the functioning of the system as such, but only the effective (correct) functioning. One could conclude that the discussed fragment of the law does not contribute anything new, as any analysis always relies on a system that functions in an appropriate way.

However, the analysed portion of the law suggests that the issue of systemic irregularities, although related to the occurrence of a specified number of single irregularities, for which—in line with general laws—beneficiaries are responsible, is pertinent to the issue of identifying subjects liable for them. The liability "is transferred" to the institutions of the management and control system (also in the area of public procurement). In the end, the legislator points out to the existence of defects within the system; nonetheless, to determine the occurrence of a systemic irregularity (and to transfer the related liability) serious deficiencies must take place. Minor deficiencies, even though their impact is negative and they require to be removed and prevented in the future, do not cause systemic irregularities.

It must be said that the seriousness of irregularities concerns the functioning of the management and control system, and not the type and extent of infringement by a beneficiary. Importantly, as far as the legal structure of a single irregularity is concerned, the foregoing issued are irrelevant for the determination than an irregularity has occurred. Equally irrelevant is the issue of the potential fault of the beneficiary.

With respect to these issues—in conjunction with Article 24(11) of the act implementing EU law that pertains to the consequences of occurring systemic irregularities. If a single irregularity is a direct consequence of an action of or omission by: (1) The competent institution, or (2) State authorities—expenses are adjusted by decreasing the expenses included in the declaration of expenses and the application for payment lodged with the European Commission by the amount corresponding to the estimated value of the financial correction resulting from the irregularity; legal scholars point out that Article 24(11) introduces an exception concerning a single irregularity resulting directly from an action or omission by the competent institution or state authorities. The condition of "directness" should be construed as a situation where a specific activity or omission by a competent institution or state authorities is in a direct cause–effect relationship with the occurrence of a single irregularity on the part of the beneficiary. In other words, it is a situation where—without a competent institution's or state authorities' omission or action—a specific single irregularity would not have taken place (Jaśkiewicz 2014).

Other authors add that the determination that a specific set of single irregularities constitutes a systemic irregularity must involve confirming that such irregularities result from (cause–effect relationship) a serious deficiency in the management and control system (Dołowiec et al. 2016a, b). What is more, this criterion should be considered met if the conduct of the subjects addressed at the beneficiary in any way was the only cause resulting in the occurrence of the irregularity and put the beneficiary in a situation where they had no choice (Dołowiec et al. 2016a, b).

What is more, as we read in legal literature competent institutions or state authorities' should be construed as all entities that exercise authority having an influence on the assessment, the approval of applications for payment or the awarding of financing. The act does not require that the omission or action by institutions or state authorities causing a single irregularity be culpable or illegal in any way (Jaśkiewicz 2014). Other scholars add that a "competent institution" should be interpreted as any institution of the implementation system that enjoys a direct influence on the implementation of projects within an operational programme (Dołowiec et al. 2016a, b). On the other hand, "state authorities" are any public administration authorities, including local governments, which, acting within their public authority and in breach of law, caused the irregularity (Dołowiec et al. 2016a, b). In this sense, state authorities also include authorities responsible for legislation, such as the Sejm, the Senate and the Council of Ministers—for instance in the case of failure to implement EU law (Dołowiec et al. 2016a, b).

5 Examples of Systemic Irregularities in the Public Procurement Area

In order to identify the sources and causes of systemic irregularities, it is necessary to discuss relevant examples, taking into account the system within which management and control institutions are obliged to verify the compliance of beneficiaries of EU funds with their duties in the context of public procurement law. In the scope being examined, the legislator specifies one cause only (. . . including a failure to establish appropriate procedures in accordance with this Regulation and the Fund-specific rules). This provision stipulates for an open catalogue of such causes, as manifested by the expression "including". The conclusion is that the catalogue can include any cases of dysfunctions, on condition that they concern the functioning of the management and control system.

However, in view of the same definition of systemic irregularities, laid down in Article 2(38), irregularities cannot be classified in terms of their gravity into more and less significant ones. Such a classification can only be based on the analysis of the nature of specific infringements (for instance, it is a more serious infringement not to carry out a planned public procurement control at all then to carry it out in a negligent manner), as well as their admissible consequences (minor serious consequences). Nevertheless, the analysed provision in itself is insufficient to make such findings.

The sole case of irregularity specified in item 38 refers to the failure to establish "appropriate procedures". First of all, one should clarify that this is an example of a systemic irregularity that involves an omission. Secondly, there is no doubt that liability for its occurrence lies with the management and control system institutions, and not beneficiaries. In the end, only the former are tasked with implementing procedures. However, it must be emphasized that, in practice, the dysfunction will

result in single irregularities being committed by beneficiaries (the first element of a systemic irregularity).

It is worth noticing that, in the case under consideration, the foregoing will apply to all the required procedures, including public procurement rules. Legal literature lists, for instance, implementation instructions, control guidelines, etc. (Dołowiec et al. 2016a, b). A procedure is being implemented (in the context of the duty) not only based on the general regulation but "other rules" as well. This term should be interpreted as inclusive of programme documentation. In consequence, these institutions can oblige themselves to introduce appropriate procedures.

When discussing other examples of systemic irregularities in the context of public procurement, it is necessary to mention the problem of incorrect interpretation of law performed by the management and control system institutions. This pertains to all public procurement regulations, including soft law or programme documentation. In this context, we are dealing both with rules established by other entities (e.g. EU law) and by the institutions themselves (such as programme documentation). If those rules are interpreted incorrectly, the determination of a beneficiary's status with respect to its rights and obligations within project implementation (in connection with the public procurement procedure) will be wrong as well. As a result, a single irregularity can appear on the part of the business entity as a result of defects committed by the institutions.

Other possible systemic irregularities occur when management and control system institutions establish certain rules (e.g. guidelines or programme documentation) without being authorised to do so (e.g. public procurement guidelines issued by intermediate bodies—IB) or infringe them. Accordingly, one should also mention a situation where an institution establishes rules that infringe higher level regulations (for instance, issued public procurement guidelines that are non-compliant with relevant EU directives or the Public Procurement Law Act of 29 January 2004). In consequence, such cases can cause beneficiaries obliged to apply various public procurement rules to commit single irregularities.

One important problem is the legislator's failure to adopt required law (such as failure to implement public procurement directive in Polish law) or implementing it incorrectly. In a situation being discussed, incorrect (at least partially) public procurement laws are in force. As a result, it is highly likely that the situation will cause beneficiaries to commit infringements (for instance when they receive, in compliance with such rules, a specific amount of funding). At the same time, such infringements can be classified with a high degree of probability as systemic irregularities, as in such a context, similar infringements related to the application of incorrect rules will recur (or, potentially, one infringement will occur and its recurrence will be classified as very likely).

In the situation in question, we are dealing with a legal construction that causes infringement of law for which, *prima facie*, three different categories of subjects could be liable: beneficiaries for the infringement of law, management and control system institutions for systemic irregularities, while the actual cause of the dysfunction is the incorrect conduct by the legislator. Legal scholars have been right to note that in this case beneficiaries should be exempted from liability (Dołowiec et al.

2016a, b; in such a case, the exemption of beneficiary from liability relies closely on CJEU case law which provides that member states cannot rely on the failure to implement a directive as a result of their own omission with respect to individuals, see CJEU judgement of 5 April 1979 issued in the case C-148/78, judgements of 1979, p. 01629; of 26 February 1986 in the case C-152/84, judgements of 1986 p. 00723 and the judgement of 14 July 1994 in the case C-91/92, judgements of 1994 p. 03325).

An important category of systemic irregularities involves public procurement control. A number of examples could be found in this field. The first case to mention would be the lack of control within an operational programme (this, however, should be considered a purely theoretical situation, as one could hardly imagine the lack of any control at all). Cases of practical importance can be found elsewhere. From the perspective of the controlled entity, one could mention the failure to control a specific beneficiary (if control was required); meanwhile, when it comes to the extent of control, relevant examples would include failure to carry out a (required) audit of all contracts awarded by the beneficiary (while controlling some of them). Accordingly, one could point out to situations where contracts are audited, but in an incomplete way (for instance, the content of tender announcements are not verified). Other major problems can include incorrect interpretation of relevant provisions on business entity control or a general lack of diligence on the part of auditors.

Legal scholars are right to note that specific types of deficiencies in the management and control system potentially resulting in a correction are also listed in Article 30(2) of the supplementing regulation (Dołowiec et al. 2016a, b). The regulation in question is the Commission Delegated Regulation (EU) 480/2014 of 3 March 2014 supplementing Regulation (EU) No. 1303/2013 of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund (EU OJ L.2015.102.33 as amended).

One should note that in a specific case the deficiency can be a sum of two (or more) single deficiencies. Article 2(38) explicitly refers to "deficiencies", which should be construed broadly, a single irregularity can be caused by a single deficiency, or by two (or more) of them occurring jointly. For instance, when it comes to public procurement, an entity can issue guidelines that are non-compliant with EU or national legislation and, at the same time, in certain specific cases, interpret them incorrectly. Moreover, it is possible to imagine a situation where a systemic irregularity involves more than one institution. This would be the case if, for instance, MA issued—without legal basis [the act implementing EU law in a legal context after 2.9.2017 does not allow MA to issue programme guidelines any more (Article 7)]—programme guidelines, while the specific IB (see Odachowski 2012b) started to interpret them incorrectly at the stage of implementation.

6 Conclusions

Beneficiaries willing to implement projects co-financed with EU funds need to comply with all applicable rules, public procurement rules included. An infringement of those rules results in single irregularities. Nonetheless, such infringements can translate into a variety of systemic irregularities. This, in turn, necessitates the adoption of, and the subsequent compliance with, new legal solutions applicable to EU funds that address irregularities that fall into this category.

The specificity of systemic irregularities lies in the fact that they originate from a variety of dysfunctions for which different institutions of the management and control system are responsible. There is no doubt that the proper functioning of the system relies on the correct and legal functioning of these institutions. It makes sense to control EU funds beneficiaries from the perspective of their compliance with public procurement rules only when the controlling authorities follow the law themselves.

Secondly, even though a single irregularity committed by a specific business does not necessarily involve systemic irregularities, the latter occur only in a situation where a single irregularity has (already) taken place. In consequence, the dysfunctions in the functioning of the system can lead to the infringement of law "on both sides".

The legal structure of these irregularities implies that they can be construed as a sum of various overlapping dysfunctions (forming one whole) for which two (or even more) institutions can be liable. Such situations occur also in the context of performing one's obligations in the area of public procurement.

Yet another important issue for this category of irregularities is the repeatability of single irregularities (somewhat mitigated by the aspect of optionality). While one (single) irregularity of a specific type can cause a variety of adverse effects, recurring irregularities will have an even more damning influence on the entire system of implementing EU projects. Furthermore, the repeatability testifies to the weakness of the system and its inability to prevent subsequent similar infringements. The most important aspect of the legal structure of systemic irregularities is the specific "transfer" of liability for a single irregularity form a business entity to management and control system institutions. This is a consequence of classifying the cause of infringement committed by the beneficiary as a dysfunction of that system.

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New Public Management at Local Self-Government Institutions

Dalia Rudyte and Monika Kontrimaite

Abstract An increasing number of governments are using e-governance as a new form of communication with residents, information exchange, and accessibility with the goal of offering improved electronic services, improving quality of services, increased transparency, and cost reduction as traditional public services in today's society do not meet citizen's demands. E-governance is the use of information and communication technologies in the public sector to increase the public's and interested parties' interaction. Governmental websites are one of the key determents for public organizations to increase this interaction. Although there are enough explored conceptual access, technological innovation, to evaluate e-provision of services and the introduction of e-government, e-management of determinants is not yet understood. This chapter addresses the problems that arise when applying new public management at local self-government institutions. The actual situation and the options are compared.

Keywords E-government · E-governance · E-democracy · Citizen-centered

1 Introduction

Information and communication technologies are used to improve accessibility and information stream using IT technologies. New methods have been adopted by world governments of communicating with citizens using Internet as well making possible simplify and fasten access to information of public significance by introducing e-governance. In the past decade, the interest of scientists in investigating e-government as e-governance concepts. According to Saparniene (2013a), e-government and e-governance are the strategic aims in public administration

D. Rudyte (✉)
Economical Department, University of Siauliai, Siauliai, Lithuania

M. Kontrimaite
Western Union Processing, Global Back Office Operations, Vilnius, Lithuania

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modernization and are clearly reflected in today's public administration reforms in Europe. The results of traditional public administration, the traditional public services in today's society do not meet citizen's demands, the government institutions quite often are inefficient, not transparent, not accountable, why benefits of technological initiatives are evident. The Government of the Republic of Lithuania is aiming to promote and develop e-participation of Lithuania. In 2014, the program information society (2014–2020) development was released which involves objectives and targets for the reduction of the digital exclusion, to encourage residents to use ICT and develop their knowledge and skills for the effective use of information. The Government Digital Strategy of the United Kingdom was released in December 2013 and sets out how the government will redesign its digital services to make them user friendly and convenient so all residents who are capable of using it would prefer to do so. This strategy sets out how the government will become digital. Strategies always need updates and close monitoring in order to reach the most efficient response. Governmental websites are one of the key determents for Public organizations to increase this interaction. Although there are enough explored conceptual access, technological innovation, to evaluate e-provision of services and the introduction of e-government, e-management of determinants is not yet understood.

This chapter will be focusing on the citizen-centered e-governance by providing the comparing analysis between Lithuania and the United Kingdom self-government institutions. As well, it will indicate what could stand behind the low participation rates relating to two different cases, which will help to provide tools to increase participation. Research problem is the increasing rollout of e-governance process and programs, there has been increasing communication between legislators' and citizens to effective democratic representation. Political process becomes more and more complex devising the institutional means for citizen/legislator communication is the core and persistent problems in the practice of democracy (Norris 2007).

The research object is new public management. The research aim is to explore citizen-centered e-governance development trends at local self-government institutions, taking as research cases of Siauliai (Lithuania) and Leicester (United Kingdom) Municipalities. In this chapter following research methods will be used: literature review, document analysis, departmental statistical analysis, municipalities' websites analysis, and case study.

2 E-Governance Development in the Context of New Public Management: Theoretical Background

New type of management, administration, culture, the emergence and development of a sign is an e-government concept formation, e-government ideologies development and dissemination of extremely rapid e-government and technology organizational forms creation, dissemination, implementation, and continuous modernization. E-government concepts and opportunities started to take an interest in approximately

1995 during the expansion of information technologies. Today, there are quite a number of organizations and scientists who are interested in this area. They are talking about e-government trends, the importance of the operational efficiency of government institutions to enhance democracy and development, and other features of the scientific literature on the various attitudes, highlighting one aspect at the time. So there are number of different definitions of e-government in the literature. Some are rather narrow, focusing on using ICT, particularly the Internet, others view e-government more broadly as efforts to transform government (Jansen 2005).

This research will be focusing on the broader definition, which states that e-government means transforming the accessibility, quality, and cost-effectiveness of public services using the power of information and communications technology to help transform the accessibility, to help invigorate the relationship between customers and citizens and the public bodies who work on their behalf (Bowrey 2006). E-government concept notion is associated not only with the application of ICT in providing public services and the reorganization of public institutions, but also to the development of innovation policy and administration. E-government is increasingly recognized as the new management paradigm, where e-government is treated as a socio-technical system and assessed the technological, economical, organizational, legal regulations, social, political, ethical, and other aspects (Navarra and Cornford 2006).

The literature on the various attitudes is usually highlighting e-government trends, the importance of government institutions to increase efficiency and the development of democracy. A lot of different definitions are providing a plurality of e-government interpretation of the concept and its assessment, however, in many discussions, it is recognized that the key feature of e-government is the fact that the application of information technologies are opening new opportunities for cooperation between government institutions, agencies, NGOs, and citizens. Many scholars are mentioning the bottom-up approach to empower residents (see Fig. 1). E-government goals and objectives may differ in individual countries according to the development levels of the state, needs, and opportunities, but the purpose of all of

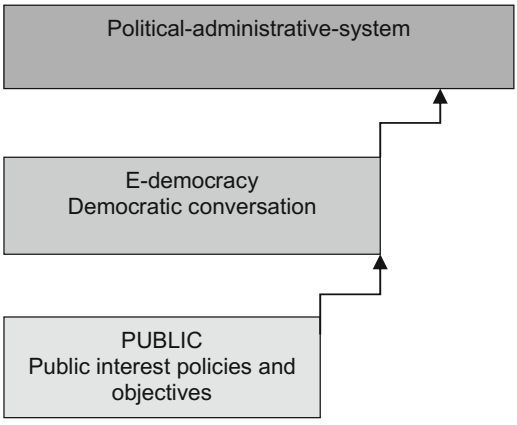

Fig. 1 The concept of e-government. Source: Developed by the authors based on Saparniene (2013a) and Weiss (2010)

them is the same—more successful government between citizens, more efficient public services, and improvement of management. It distinguishes three main forms:

- E-services—online services for citizens, business, and nonprofit organizations
- E-democracy—online voting and consultation with the public ways
- E-management, administration, and management—policy formulation and implementation ways of using ICT, including the inter-institutional communication and management bodies inside ways.

It became obvious that e-government development model is representative of the main ICT policy in the public sector in areas of strategic planning, coordination, implementation, monitoring and evaluation, resulting in a direct connection between them. These models serve as guidelines in this area for policy-makers and implementers professionals. Summing up the various e-government models, whose purpose can be concluded that the main installation of e-government is to create user friendly, easily accessible and useful public services, and also to ensure that the information and communication technologies would be effectively used for regional public sector modernization? All this justifies the fact that the implementation of ICT in the public sector is a slow process because of the conservatism of state institutions, greater resistance to possible changes, and heavier take-up of new technologies.

E-governance as a governing process is relatively new. It takes a wider scale and involves more bodies to the governmental process. Public governance has been a transitory stage in the evolution from traditional public administration to what is New public governance and the main difference is transferred focus from political system to organizational environment. E-governance highlights e-democracy tools to interact with residents and involve them in the governing process. E-governance aims to give citizens a voice and involve them in decision-making.

3 Considerations for Citizen-Centered E-Governance

E-government has become an instrument of action to improve state authorities to get in touch with the public, stimulating and shifting the public sector in an efficient administration direction. In order to positively affect the quality of life, e-government development should relate to society's vision. Technology should be a tool for this vision's implementation, and citizens should participate directly in the public process. Then talking about citizen-centered e-governance, it is often presented as being either to engage the citizenry in government in a use centered manner or to develop quality government services and delivery systems that are efficient and effective (Bertot et al. 2008). The development of citizen-centered e-governance services that achieve cost savings implies that governments know what citizens want from e-governance, want to meet these identified citizens' expectations and needs and actively want to discover what citizens need from the e-government on ongoing basis. Many users look at e-government as a valuable source of information, considering

e-government sites to be "objective authoritative sources." Public satisfaction with e-government services available however is limited (Reddick 2010).

Across Europe, a new trend of citizens feel disconnected and trust relationship issue arises in the way politics is being achieved. According to Ipsos Mori (2014), only 16% of Britons trust politicians believing that they are telling the truth—a lower number than trust estate agents or bankers. Distrust is trending in other countries as well, such as Germany, 68% of citizens are distrusting politicians, and however, France seems to be an exception as 86% of French people do. The latest Eurobarometer survey shows that just 32% of British adults trust parliament, however, only 28% of French citizens, Germans are showing higher percentage of 40% of Germans and only 24% of Italians trust their government. It is hard to find studies in e-government literature that has investigated or tested the relationship between benefits and user satisfaction. In the e-commerce context, studies have tested the relationship between consumer satisfaction and benefit dimensions (Weerakkody et al. 2013). A recent report by the European Commission highlights the imperative of citizen trust to the usage of e-governance, and notes the particularly complex challenges faced by larger countries (such as the United Kingdom). Kolsaker and Lee-Kelly (2016) are talking about the value of e-government and e-governance for citizens. The aim of the chapter was to increase the understanding of citizens' perceptions of e-government and e-governance.

E-governance is the main focus of the 2030 Agenda of Sustainable Development. United Nations in the World Public Sector Report (2015) indicates six dimensions which been agreed among all Member States. The first dimension talks about citizen participation in decision-making, planning, and implementation of all policies, participation of all stakeholders, and strengthened society. The second dimension is all about ICT or from the aspect of e-governance—access to the information (access to the government proceedings, regulations, data, and easy to understand procedures for accessing public services). Both dimensions take a part of three-level model of citizen engagement.

Taking the consideration for citizen-centered e-government, it is important to acknowledge that it is iterative and requires an ongoing commitment and provisional such as to measure service quality; to constantly look for measures to determine the degree of the services and how it meets customer needs; and a willingness to learn and implement changing needs. According to Bertot et al. (2008) in order to successfully engage residents to e-government, there are several assessments needed to be practiced, such as range of iterative and integrated planning and design processes such as conducting an information and service needs assessment, technology needs assessment, determining the availability of user-friendly content and services planned according to citizen's needs, creating a possibility of citizens to engage in e-government services due to information and technology literacy, building a knowledge of government determining where certain services can be provided, constant usability and functionality testing as well as safety of private users information, accessibility testing, and so on. These considerations are essential for the development, implementation, and continual improvement of user-centered

e-government services. Continuously practicing those assessments should help to improve and develop e-government website.

4 Research Strategy and Methods

As e-government has many parameters, the assessment of development is a very difficult task, and there are many methods used by international organizations, research institutions, and individual researchers: general, global e-government evaluation method, or model does not exist. Based on various criteria, there are various different indicators for e-governance. Document analysis is a social research method and is an important research tool. Document analysis is a method that is taking into account the research object, research goals, and objectives, this method is considered to be the most important data collection (receipt) method. Selected data sources, scientific books and magazines; official statistics; websites; and national annual website reports (UK and Lithuania). To examine in detail the documents presented in various social practices, using various forms from a written word to a visual image. Documentation is important because of its presence in historical context and the broad range of social research objectives. According to Saparniene (2013a), documents can be classified as documents found (existing documents in organizations such as staff or public records) or a research paper (created by the researcher for the purposes of the research such as notes and images) (see Fig. 2).

Leicester City Council website and Siauliai city municipality website were chosen to conduct the research and to make the comparison analysis. In terms of Lithuania, Siauliai is the fifth biggest city with a population of approximately 104,569 inhabitants. Leicester city is slightly bigger as there are approximately 342,627 inhabitants; however, it is only 11th largest population in the United Kingdom. Both cities have higher education institutions, airports (only used for private flying or training purposes), have a history of industrial force and geographically do not have access to the sea or ocean. Siauliai city website is evaluated as one of the top 15 best governmental websites in Lithuania and Leicester city council's

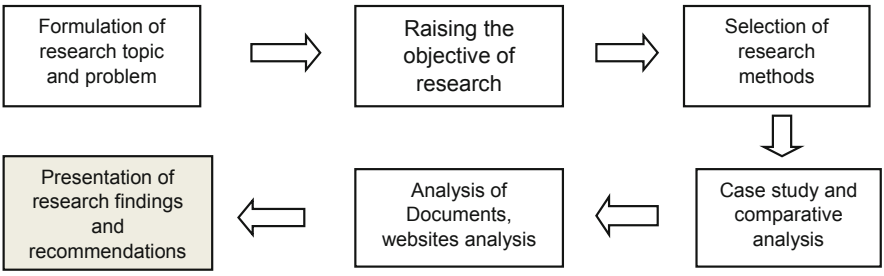

Fig. 2 The strategy of research. Source: Authors

website has three stars out of four. In this thesis, non-probability quota sampling will be used.

Multiple case studies gave the opportunity for a better understanding of how local governments are running their websites, how easy it is to find information, what kind of new innovations are implemented in order to achieve the best results into engaging residents in the e-governance process. As the website by many scholars is highlighted as the key element of e-governance, this research is focused on the website design, how informative they are, the requirements of website evaluation. The case study strategy enables the researcher to outline plans on how to answer research questions.

The number of researchers is classified case studies into a single, which is holistic in nature, or a few analytical units can be embedded. For some case study, data from a single instance is sufficient enough for the purpose of the study, and comparative situation studies require two or more cases to achieve research goals. The primary virtue of the case study is the depth of analysis. The technique of analysis employed in a case study is not simply function on a sheer number of within-case observations available (Gerring 2007). Meters are designed for readers to address specific real issues that do not have easy answers. Most of the case studies require critical and analytical skills and also promote collaboration (Pimple 2002).

This research study, resercher's emphasis is on working papers, archival records, e-government strategic plan, including other documents that provide information in respect of the background of the case study organizations. Archival records include public documents, service records, maps, charts, and survey's data. Websites will be compared by the following criteria according to Sakowicz (2004): website design; e-governance; e-democracy (to engage and collaborate); e-services (the quality of services, feedbacks, provision); privacy and security; and technological capacity.

To investigate how websites are designed, three sections will be investigated: social, educational, and economical. In order to evaluate e-democracy and e-services all possible services will be taken from websites and compared. To investigate privacy and security and technological capacity online website check will be done.

5 Results of the Research

It is important to understand the criteria of evaluation of governmental websites from Lithuania's and UK's perspective. In order to understand both statese evaluation criteria, "*The report of Lithuanian governmental websites* (2015)" was analyzed and "*Better connected"* for UK surveys for all 418 UK local authorities were analyzed. According to the annual report of Lithuania municipal website in 2015, which is presented annually by The Interdisciplinary Research Institute, websites are well presenting general requirements and overall 94% are fulfilling them (for comparison, in 2014 it was—93.5%). According to the report, 97.6% are meeting website requirements (for comparison, in 2014 it was—96.6%) and well in line with the

structure of website requirements—94.4% (For comparison, in 2014 it was—93.7%) and the informational requirements of websites corresponded to 91.8%, and in 2014 it was—91.9%. The study evaluated 60 municipalities affiliated institutions websites (19 institutions websites more than in 2013).

Betterconnected.socitm.net was launched in the autumn of 2015 in the United Kingdom. Full results from 2015 and 2016 surveys appear on this site, with more limited results from 2015 and 2014 surveys. All site visitors can see headline results from "*Better connected"* surveys for all 418 UK local authorities, as well as a range of contextual data relevant to their web/digital performance (population, households, deprivation, web visits, Twitter followers, etc.). *Better connected* surveys explore the ability of websites to provide quick and easy "customer journeys" and successful resolution of a series of top tasks. "Top tasks" may be informational (find out about keeping fit) or transactional (pay parking fine). Scores are then aggregated into a star ranking for each website. To get a four star site ranking, a site must achieve 12 out of a possible 16 "task stars," get 3 or 4 stars for the navigation/search/A to Z and mobile experiences, and pass the accessibility test (i.e., score 2 or 3 where the range is 0–3). Forty-four councils have been awarded four stars overall in *Better Connected* 2015 and 2016, and a further 138 have been awarded three stars, indicating that 44% of UK local government websites provide a good or very good experience from a user perspective.

To compare Siauliai City Municipality (Lithuania) and Leicester City Council (United Kingdom) websites let us say that Siauliai City municipality website—Q1; Leicester City Council website—Q2.

Social Section Q2 website is more diverse as it is not only informative, but as well ready to help residents to achieve the required outcome. Interactive complaint forms are giving up to date feedback of services which helps civil servants to understand disadvantages and improve their service. Q1 website offers a complaint option in general, but not for specific sections. Social section does not have a specially designed section on the website, but subsections are informative and clear to understand. However, in order to apply for services, it will take longer than on the website Q2 as forms are not interactive and after filling them up an e-mail ought to be sent to an institution.

Educational Section There are more interactive options in website Q2 than Q1. As well there are plenty of interactive icons that lead to the systematic information on websites Q2 and Q1 do not have any in the Educational section. However, there are some interactive icons on the website Q1 but they are in the different sections. From this part of websites, some consistency issues reveal: Q1 website does not have a clear unidirectional sequence. Q2 website offers "choice advice service" to help residents pick the right school, "appeals against school decisions" are available online.

Economic Section Economic sections on both websites are located under a few different sections. Q1 website has "Economics," "Administrative information," and "For business" Q2 website has "Business" and "Your community." In the Table 1,

Table 1 Website optimization evaluation in Lithuania

Websites of municipality	Be present online	Get found	Be secure	Be fast	Overall
Kaunas city	100	31	33	57	55
Panevezys city	89	38	23	43	48
Siauliai city	42	9	23	43	29
Druskininkai city	89	8	50	57	51
Ignalina district	42	9	60	14	31
Joniskis district	56	0	40	43	35
Kaisiadoriai district	56	45	60	57	55
Kedainiai district	67	18	70	43	50
Klaipeda city	56	27	70	43	49
Kupiskis district	89	23	20	43	44
Pakruojis district	42	0	31	43	29
Silute district	42	18	46	43	37
Utena district	N/A	N/A	N/A	N/A	N/A
Vilnius city	89	55	75	57	69
Rokiskis district	44	31	23	43	35
Kalvarijos district	42	0	60	57	40
Zarasu district	42	15	23	43	31
Palanga district	42	9	30	43	31
Birstonas district	56	7	60	57	45

Source: Made by the authors according to Lithuanian Website performance 2015
N/A not available

only “Business” and “Economics” will be reviewed as a lot of sections under “For Business” on the website Q1 have the same links to the same information which you can find under “Economics.” As well the information provided is similar. During the investigation recurrent subsections connected to the economic section were found such as “licenses and permissions,” “support for business,” “useful information for businessman,” “taxes and perks,” and “self-employment.” Subsection “sales of public procurement” can be found under “for business” and “areas of activity” but could be underlined under Economics. Another subsection under “for business” is “services” which can be found on the interactive buttons on the left of the main websites side on the horizontal menu. If the recurrent sections would be deleted from “for business” column it would leave this section with “investment and economics environment” which could go under “economics” section so the “for business” column would be empty and there would only be four main sections. During investigation of the Economic section, a lot of recurrent sections which are linking to the same information feed where found on website Q1. “For business” section only has one original subsection “investment and economics environment” which could go under the “economics” section in order to avoid confusion. Website Q2 has a strong structure and excludes six interactive icons. Subsections have two design principles: interactive icons and informative interactive text with “quick links.” Q1 website provides with more legal documents and statistics. All attachments in Q2

Table 2 Website optimization evaluation in the United Kingdom

Websites of council	Be present online	Get found	Be secure	Be fast	Overall
Adur &Worthing	89	8	100	57	64
Argyll & Bute	89	27	100	57	68
Blaby District	89	18	70	43	55
Bristol City	89	46	100	57	73
Calderdale District	100	38	25	57	55
Cantenbury City	100	9	100	57	67
City of Cardif	89	54	100	57	75
Chichester City	100	55	100	57	78
Cornwall City	89	27	100	57	68
Dorset City	89	38	100	57	71
East Renfrewshire	78	9	100	57	61
East Riding & Yorkshire	78	0	70	57	51
Eden District	89	36	100	57	71
The City of Edinburgh	100	27	100	57	71
Leicester city	89	46	100	57	73
Bedford Borough	56	27	100	43	57
Chesterfield Borough	89	62	100	14	66
Daventry City	44	23	100	57	56
Lincoln City	89	8	100	43	60

Source: Made by the authors according to data from better connected (United Kingdom website evaluation), how well optimized is your website?

website opens within the website and residents can download it if the information is useful, however, in website Q1 then you click on documents attached it automatically downloads it to the device.

In total website optimization analysis was done for 40 councils/municipalities, for 20 municipalities in Lithuania (see Table 1) and for 20 counsils in United Kingdom (see Table 2). Overall results show that Lithuania may not have set standards for technical requirements as results differ on a large scale, however, it seems that section “be present online” have some pattern as the lowest result is 42 as well as “be quick” as the strongest pattern is 43. Two different attempts were made to check Utena District municipality but it was not detected by the site as there was something wrong with the website address. Where should be more considerations focused on the security of municipal websites? Leicester city Municipality has three stars in overall governmental website ranking (1–4 stars available) and shows a high optimization level. Leicester as the rest of websites has very high-security standards. The lowest results of both websites are in the “get found” column. It could be because governmental websites are well known by residents. There should be some implements in order to bring out the information to the public.

6 Conclusions

During investigation of the Economic section, a lot of recurrent sections which are linking to the same information feed were found on the website Lithuania. "For business" section only has one original subsection "investment and economics environment" which could go under "economics" section in order to avoid confusion. Website United Kingdom has a strong structure and excludes six interactive icons. Subsections have two design principles: interactive icons and informative interactive text with "quick links."

Lithuania website provides with more legal documents and statistics. All attachments in the United Kingdom's council website has a prewiew optional and if information or form is useful residents can press download button to save it in their device, however Lithuania's municipality website has no such preview option and in order to read the document or form residents have to downoald it as a first instance.

After a review of website requirements and investigating social, economic, education sections, and comparing provided services on Lithuania and the United Kingdom websites, it could be said that the efficiency of websites is formed by the central governments in a matter of what kind of requirements they set up and what kind of assessments they are using to check if requirements were met.

Lithuania website still needs to implement e-voting, e-payments (through website) to restructure sections and to make sure that none of the subsections are repeating and to transfer more services online. From the information point of view, documents need systemization of information and creation of standards like design, format while focusing on nonprofessional citizens. Although, the United Kingdom website has a lot of services online and user-friendly document standards they could have more statistical information as well. The Pingit app implementation is a relatively new process and it only has one bank so it needs to be developed.

Recommendations for Lithuanian municipalities representatives: review the structure of website: review all sections and optimize it; focus on the security of the website; focus on the promotion of website, optimize website for mobile devices, integrate Facebook like button; and review information provided to create nonprofessional friendly reports. Recommendations for the United Kingdom councils representatives: to develop online mobile payment app; to create survey option for education related matters for residents to express their opinion; to customize section "get found" to improve the search engine using key words in order for residents to find desired information quicker.

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What Does Housing Price in Russian Regions Depend On?

Liudmila A. Guzikova and Ekaterina V. Plotnikova

Abstract The housing sector is one of the priority areas of national economy. Its development characterizes the level of well-being of the country's population. The availability of housing for the population is determined based on the level of housing market prices. The objective of the study is to identify the factors which have a significant impact on the housing price. The conducted literary review confirms the relevance of this objective. The study used qualitative and quantitative approaches. The data were obtained from sociological survey and state statistics. As the result of the study it was determined that the main factors of the housing price identified by the use of quantitative and qualitative approaches are different. This allowed concluding that the image of the good housing the people have in thoughts, differs from the housing they pay for, purchasing it in the market.

Keywords Housing · Housing price · Housing affordability · Housing equipment · Housing properties

1 Introduction

Housing construction contributes to meeting one of the most significant needs of the population, namely, the creation of comfortable housing conditions. Provision of housing is the most important indicator of social development, characterizing the level of citizens' well-being, and the quality of life in general. Living standards of the society are constantly growing, which, in turn, increases the requirements for material living conditions, including the requirements for comfortable living conditions and housing size. The above considerations allow us to classify housing construction as one of the priority branches of the national economy and conclude that the state should pay attention to the housing sector and stimulate its development.

L. A. Guzikova (✉) · E. V. Plotnikova
Graduate School of Public Administration and Financial Management, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation

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There are two types of strategies for financial incentives for the development of priority industries: (1) strategies based on supply stimulation; (2) strategies based on stimulating demand. Strategies of the first type go back to the historical period when production development level did not allow to fully meeting the needs of society in terms of commodities. During this period, the main task was to expand the production, while a limited range of solvent potential buyers competed for products. The task of production was to ensure minimal costs, which allowed expanding the range of customers due to lower prices. With the development of production and the emergence of fierce competition in the markets, a new type of incentive strategy has emerged. In the process of competition, manufacturers are constantly increasing production volumes, improving the quality of the products offered and expanding their range, but the consumer, despite the desire of unlimited increase in the level of comfort, is not able to pay for the entire output volume. The reaction to the threat of the overproduction crisis turns out to be stimulation of demand.

At present the issue of providing citizens with affordable and comfortable housing is extremely acute in Russia, which forces us to use element combination of the first- and second-type strategies with the aim of balancing supply and demand. On the one hand, by increasing the efficiency of the housing finance system, developing bank lending to developers and introducing other measures to stimulate producers, volume increase in housing construction is stimulated. On the other hand, the demand for housing is supported and stimulated, which, in particular, is backed up by mortgage loans. To have the need for housing fully satisfied, it is necessary we purposefully stimulate both demand and supply. In order to do this, we should influence the market price of 1 sq. m. of housing through the factors determining it.

In connection with the above, the objective of this study is to identify the factors having a significant impact on the price of housing in Russia. In the framework of this study, the authors, by means of the sociological survey, analyzed the attitude of potential home buyers to the formation of prices in the housing market. A number of factors were also identified, which are a priority for buyers when choosing housing. Then, on the basis of open data and state statistics, the correlation–regression method was used to identify the main factors of the housing market price.

2 Literature Review

Modern studies of the housing situation in Russia focus on models of housing distribution, assessing the affordability of housing, forecasting the development of the real estate market and methods of financing construction. Glazunov and Samoshin (2008) draw attention to the inefficiency of housing and communal services functioning and offer the development of housing construction in three main areas: the construction of individual houses; houses for commercial renting; municipal rental houses. Khachatryan (2001) emphasizes the fact that at present housing in Russia is inaccessible for the population. In this regard, he introduces an indicator of housing stock availability and mainly explores the development of social

housing stock. Assessment of the housing affordability is also analyzed by Sternik et al. (2014). These authors propose a prototype procedure for assessing the affordability of housing, expanding the possibilities for analyzing the state of the problem. Expanding the possibilities of analysis is ensured by the indicators allows to differentiate the calculations of the population group income, according to the object characteristics, as well as by calculating not only the affordability coefficient, but also the proportion of the population, which can afford a certain category of housing.

The main housing problems of European countries covered by Pittini (2012), Ribeiro et al. (2015), Arapoglou (2016) are, on the one hand, the congestion of territories by the housing stock, and on the other hand, lack of housing. According to Pittini et al. (2016), the European Commission cannot develop a strategy to solve these problems in terms of social policy. Various financing schemes are the main tool in trying to solve these problems.

As noted by Schwartz (2014), the problem with housing in the United States nowadays is extremely acute. In 2011, 49.8 million households experienced housing shortage and spent annually over 30% of their income to finance its construction. Smith et al. (2010) argue that housing is one of the indicators that reflect the "health of the nation" and analyze the impact of housing policies on the welfare of the population and the state of housing in Chicago.

Studying the housing situation in China, researchers are concerned about the contradictions arising in the implementation of housing policy. For example, Zou (2014) argues that the implementation of governmental affordable housing programs is the reason for increasing housing inequality in the country. Shi et al. (2016) examine the advantages and shortcomings of implementing affordable housing programs in the country. As one of the problems, acceleration of the urbanization processes in the country is being investigated.

The analysis of the research dedicated to the factors affecting the market value of housing revealed the following. Kamal et al. (2016) identified the place of housing deployment as the main factor. Pettinger (2017) identifies six factors that determine the cost of housing: economic growth, unemployment, mortgage loan availability, supply, interest rates, and the degree of consumer confidence to credit. Matthews (2016) identifies eight factors affecting the market price of 1 sq. m. of housing: location of the facility, facility equipment, neighbors, site inspection reports, estimated cost of the facility, the economic situation, interest rates, and availability of real estate investors.

3 Methodology

The research methodology involves the analysis of theoretical and scientific publications on the financial and economic aspects of the housing problem and the analysis of official state statistics. The study was conducted in two stages: (1) a sociological survey of the country's population; (2) correlation–regression analysis of state statistics. The sociological survey was conducted during the period of July–

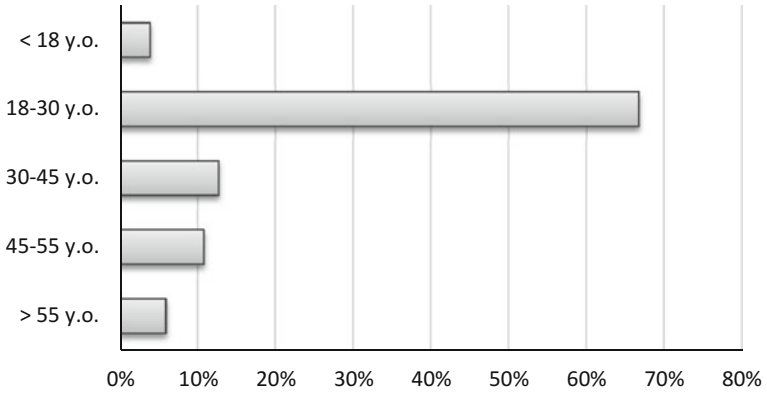

Fig. 1 Age of respondents in the survey. Source: Compiled by the authors

August 2017 by placing links to the survey in various social networks (for example, Facebook). The evaluation of the factors was carried out according to the following scale: absolutely unimportant; does not matter; it sooner does not matter, than it matters; it is more important, than unimportant; important; very important. The sociological survey contained a set of questions concerning the following parameters:

- Age
- What is the most important for you in housing?
  - Comfortable housing (hot water, heating, etc.)
  - Transport accessibility
  - Criminality of the region
  - The environment (ecological situation)
  - Building density
  - Accessibility of educational institutions
  - Accessibility of health care
  - Availability of shops
  - Accessibility of cultural and entertainment facilities

The age range of the respondents is shown in Fig. 1. The main age range of potential home buyers is 18–30 years (66.7%). This category of respondents most likely does not have real estate in the ownership. Persons belonging to this group are more constrained in earnings and are slightly less selective than the older age group. The second category (30–55 years) constitutes 23.7% of the entire group. This type of respondents has already got their own housing, and their task is to improve their living conditions or help solve the issue of real estate to their relatives. They are more selective, more demanding in detail, more concerned about potential risks. The revealed features of the age categories must be taken into account in processing the results.

The survey helped to identify qualitatively the important factors taken into account by buyers of housing. For each qualitative characteristic revealed during

Table 1 Correspondence of qualitative characteristics of housing with quantitative indicators

Qualitative characteristic	Indicators
Housing conveniences	Share of housing equipped with water supply
	Share of housing equipped with sewerage
	Share of housing equipped with heating
	Share of housing equipped with bathtubs (shower)
	Share of housing equipped with gas supply
	Share of housing equipped with hot water supply
	Share of housing equipped with electric cookers
Transport accessibility	Density of public roads
	Passenger flow
Criminality of the region	Number of recorded crimes
Environment	Discharge of contaminated sewage
	Emissions to atmospheric air from stationary sources
	Disease incidence for 1000 inhabitants
Density of housing	Number of inhabitants
	Migration flow ratios per 10,000 inhabitants
	Share of urban population
Accessibility of educational institutions	Number of general education institutions
	Number of higher education institutions
Accessibility of health service	Number of hospital beds
Availability of stores	Retail turnover
	Wholesale trade turnover
Accessibility of cultural and entertainment facilities	Number of spectators in the theater per 10,000 inhabitants
	Number of visits to museums
	The share of households with access to the Internet
Construction activity	Average actual cost of 1 sq. m.
	Structure of investments in housing construction (%)
	Investments in fixed assets
Living standard	Amount of subsistence minimum
	Average income per capita
	Unemployment level
	GRP per capita

Source: Compiled by the authors

the first stage of the study, the correspondence with the set of indicators allowing quantitative measuring was established (Table 1). In the second stage of the study, on the base of these indicators, the quantitative analysis was carried out by means of correlation–regression method. Market value of 1 sq. m. of housing area was accepted as a resultant factor.

Additionally two indicators were included: construction activities and living standards of the population. These factors were not present in the survey because

the respondents cannot have direct impact on them. For example, the local authorities determine the territory for building as well as the amount of the subsistence minimum. In the course of residential space selection respondents are interested in analyzing the market price of 1 sq. m. of housing, while ignoring the actual cost of housing. The data on 77 regions of Russia were involved in the study (Rosstat 2017). If there was no information at least on one of the selected indicators the regions were excluded from the study.

4 Basic Provisions and Results

4.1 Results of the Survey

There were 102 respondents residing in Russia, who took part in the survey, with the number of women being 60%. This can be explained by the fact that the search for an apartment is mainly done by a woman, whereas the buyer who signs the contract is a man. Therefore, to carry out a study aimed at analyzing the important factors in housing, it is appropriate to take into account the identified peculiarity. Visualization of the survey results is presented in Figs. 2 and 3.

The respondents highlighted livability of housing as a decisive factor, as 79 respondents said it was very important. This circumstance is very predictable. Regardless of the housing location and the availability of various social institutions, housing without hot water or heating will not be in demand. This fact is also confirmed by the constant state monitoring of the housing comfort level through regulatory levers of influence. Transport accessibility issues ranked second, as 46 respondents considered transport

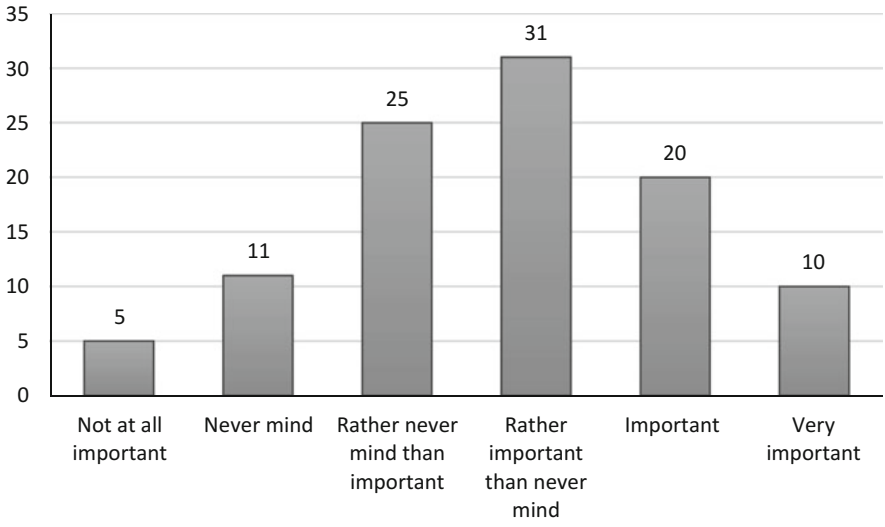

Fig. 2 Respondents' answers on housing livability. Source: Compiled by the authors

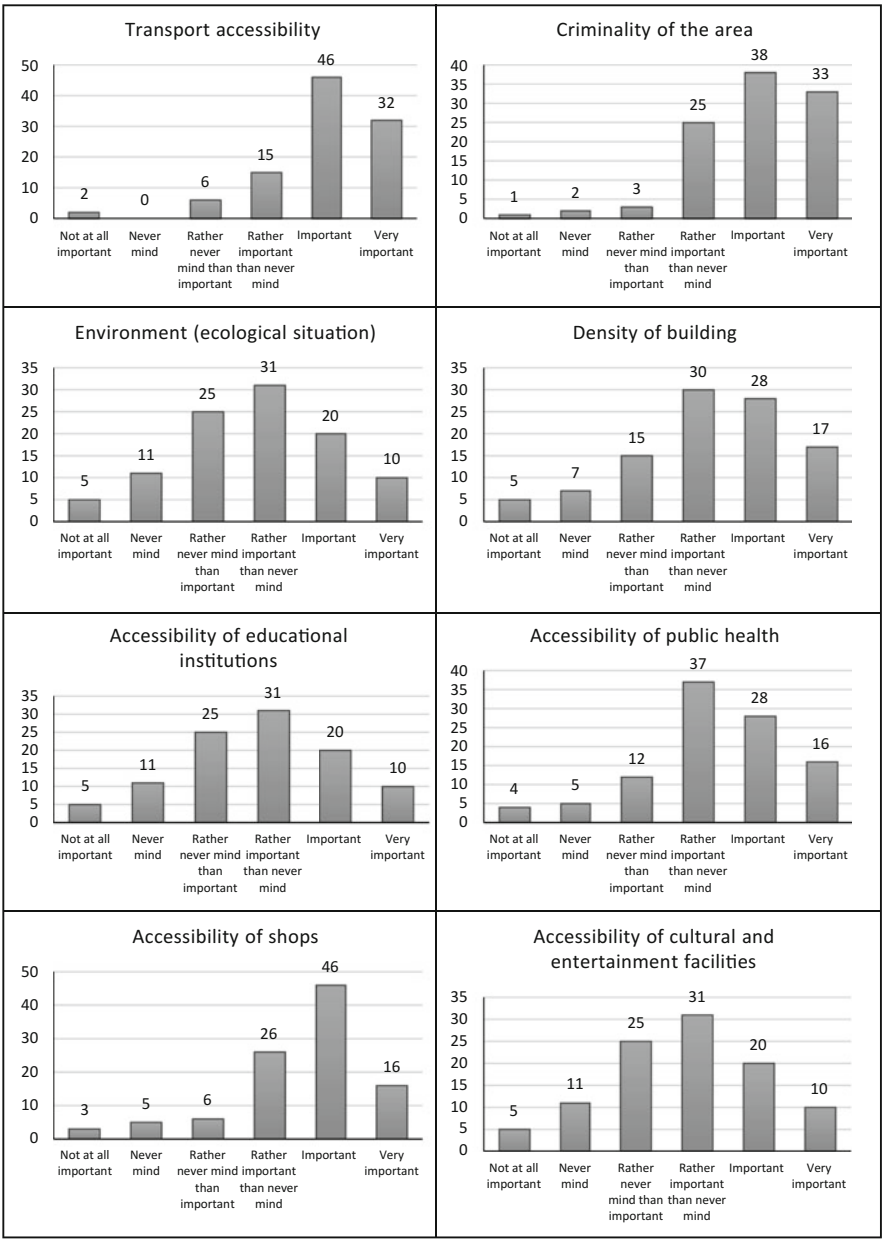

Fig. 3 Distribution of respondents' answers. Source: Compiled by the authors

accessibility of housing to be important, and 31 respondents believed it was very important. Buyers pay attention to the proximity of public transport. Nowadays construction is carried out mainly in the suburbs of densely populated cities in the areas, which are different in terms of transport accessibility.

Similarity of the results obtained for two factors should be noted: these are the ecological situation in the regions of the country and their criminality. Virtually all the respondents' answers were distributed in three categories—very important; important; and more important than unimportant. As a result of the opinion poll it was found out that the respondents pay attention to the pollution of the surrounding area, the number of crimes in a particular region, but these factors are not decisive for them when choosing housing. An example may be Moscow, which ranks first in crime in the country, which, nevertheless, does not reduce the number of people wishing to purchase housing in this region.

The majority of the respondents rated the "density of building" factor as "more important than unimportant." The current situation is explained by the age range of potential buyers. In the study, the most respondents were 18–30 years old, did not have their own housing, and were less critical with respect to any housing features. The answers of the 30–55 age category respondents, who have already got the own housing, demonstrate their sensitivity to such characteristics as location, density of construction, number of floors, number of apartments on the floor and in the house.

The results of the survey showed an ambiguous attitude of the respondents to the "accessibility of educational institutions" factor. In our opinion, this is explained by the social portrait of the buyer. For example, proximity of housing to schools is important for most buyers, but is especially relevant in the real estate segment of economy and comfort class, while buyers of elite housing are often guided not by the school location but by the school status. As a rule, the most frequent buyers of two- and one-bedroom apartments close to educational institutions are married couples with children.

Identical results were obtained concerning the following two factors: accessibility of medical institutions and stores. In both cases, the respondents were inclined to answer "it is more important than unimportant." As for the factor of "accessibility of cultural and entertainment facilities," over 50% of the respondents turned out to be indifferent to their location. In the survey they accentuated the fact that, if necessary, they could independently get to any cultural facility.

Thus, the sociological survey of the inhabitants highlighted the following decisive factors in the choice of housing: its livability, transport accessibility, access to health care, and availability of stores.

4.2 Results of Quantitative Analysis

To assess the relevance of the relationship between the market value of 1 sq. m. and the above set of indicators, the coefficients of pair correlation were calculated. The analysis of the correlation indicators made it possible to reveal the following:

– The indicator "the number of educational institutions of higher education" has the most close correlation (0.82) with the market value of 1 sq. m., which contradicts the results obtained in the survey.

Table 2 Regression estimations

Variables	Model 1
Market price of 1 sq. m	18,913.67*** (5.435)
Average construction cost	0.6132*** (4.909)
Number of educational institutions	730.73*** (13.87)
Number of spectators	−22.3206** (−2.39)
GRP per capita	0.01435*** (3.169)
Investments in fixed assets	−0.01129** (−2.51)
Observations	77
Adjusted R^2	0.88

Note: *t*-Statistics are in parenthesis
Source: Compiled by the authors
***Significant at the 1% level, **significant at the 5% level, *significant at the 10% level

– Two indicators "emissions into the atmospheric air from stationary sources" and "disease incidence per 1000 people" have the least correlation with the resultant factor. These indicators characterize the environmental situation in the region. The obtained result corresponds to the answers of the respondents who considered this factor to be indecisive.
– All indicators of housing livability have an insignificant connection with the market value of 1 sq. m. of housing. This can be explained from the legislative point of view. The developer will not be able to put into operation a residential complex without the availability of a water supply, sewerage, heating, baths, hot water supply, and electric cookers. Negative correlation between the resultant factor and the availability of gas in the housing is connected with the developers' refusal to use gas supply in the new housing stock.
– For further analysis, the indicators which have most significant (over [0.5]) correlation with the resultant factor were selected: average actual construction cost per 1 sq. m.; number of higher education institutions; number of hospital beds; public road density (km); passenger flow; number of spectators in the theater; number of inhabitants in the region; average income per capita; GRP per capita; and investments in fixed assets.

As a result of the phased cut-off of statistically insignificant variables, five factors were identified determining the market value of 1 sq. m. of housing: average actual cost of construction of 1 sq. m.; number of educational institutions of higher education; number of spectators in the theater; GRP per capita; investments in fixed assets. The regression statistics confirming the significance of these factors is presented in Table 2. Thus, as the result of the quantitative analysis, indicators related to construction activities, accessibility of educational institutions, accessibility of cultural and entertainment facilities, and the living standard were identified as significant.

Table 3 Comparison of the results obtained by quantitative and qualitative methods

Characteristics	Qualitative method	Quantitative method
Comfortable housing	■	
Transport accessibility	■	
Criminality of the region		
Environment		
Density of housing		
Accessibility of educational institutions		■
Access to health care	■	
Availability of shops	■	
Accessibility of cultural and entertainment facilities		■
Construction activity		■
Living standard		■

Source: Compiled by the authors

4.3 Comparison

The most significant factors having impact on the housing price, identified by survey and by the quantitative analysis, are shown in Table 3. It should be noted that there is no one position coinciding. In both cases, such factors as criminality, environment, and density of housing appeared to be insignificant.

5 Conclusions

The results of the study can be useful in the process of working out housing policy on both central and local levels. The conducted study enabled to formulate the following conclusions. The quantitative and qualitative approaches identified two absolutely different sets of factors determining the housing price. Comparison of the results obtained by qualitative and quantitative approaches leads to conclusion that they are contradictory and paradox. It is evident that according to survey people appreciate such properties of housing as comfortability, transport accessibility, access to health care and shops, while according to quantitative approach quite other properties are relevant and impact on the price the people pay. Hence, the image of the good housing people have in their thoughts significantly differs from the housing they purchase in the market.

To a certain extent, the housing market in Russia is a seller's market—when mass building is in progress, people buy the housing that is suggested, and the level of equipment as well as the shops and health care assumed by project is automatically obtained. The factors determining the housing price are construction costs, that is obvious, and the parameters mostly characterizing the general development of the region. It may be supposed that, answering the questions about the properties of

housing people do not try to make interregional comparison but take the existing level of development in their own region as something natural and of no need to mention. Thus, regional development becomes the compound factor of the housing price as well as the housing price in turn reflects the level of the regional development and it is impossible to control the housing price separately of the general economic and social situation.

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Toward a European Energy Union: Financial Ratio Analysis of the EU Energy Sector

Djula Borozan, Dubravka Pekanov Starcevic, and Mirjana Radman Funaric

Abstract In order to achieve the European Union energy objectives, namely cutting down greenhouse gas emissions, increasing energy consumption from renewables, and improving overall energy efficiency, the energy sector needs to be competitive, reliable, and keep track of changes in the world energy market. Particularly in the last decade, this sector has been facing significant changes, which have affected the development of the energy companies' profiles and their financial performance. This chapter aims to evaluate the financial performance of the EU energy sector in order to deepen our understanding of its risk and return, as well as to provide information useful for making investment, credit, policy or regulatory related decisions. This is achieved through ratio analysis of the EU energy companies with the largest market share in each country observed for the period 2005–2015. Financial ratios indicate that the EU energy sector has been affected adversely by turbulent changes in economic, political, and regulatory conditions. The obtained results point out that new energy reforms are needed in order to ensure new investments required for building a low-carbon economy, competitive facilities for energy production and distribution, as well as for achieving sustainable financial efficiency and effectiveness in companies' operation.

Keywords European Energy Union · Financial performance · Ratio analysis · Energy companies

D. Borozan
Department of National and International Economics, Faculty of Economics in Osijek, Josip Juraj Strossmayer University of Osijek, Osijek, Republic of Croatia
e-mail: borozan@efos.hr

D. Pekanov Starcevic (✉)
Department of Finance and Accounting, Faculty of Economics in Osijek, Josip Juraj Strossmayer University of Osijek, Osijek, Republic of Croatia
e-mail: dubravka.pekanov@efos.hr

M. Radman Funaric
Polytechnic in Pozega, Pozega, Republic of Croatia
e-mail: radmanfunaric@vup.hr

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1 Introduction

Over the last years, the European Union (EU) has been strongly dedicated to reducing greenhouse gas emissions and improving its overall energy efficiency. As from November 2015, when the first report on the State of the Energy Union was published (EC 2015b), significant effort has been made in order to achieve the Energy Union Framework Strategy objectives, i.e., an integrated energy market with a free energy flow, a low-carbon economy, and improved energy security.

In addition to the effort in meeting the energy objectives, according to the European Commission (EC 2017b), in 2014, the primary energy consumption level in the EU was only 1.6% above its 2020 target, while final energy consumption was 2.2% below its 2020 target. The 2030 Climate and Energy Package targets include even higher energy goals than the ones set up in the 2020 targets; a 40% cut in greenhouse gas emissions compared to the 1990 levels, a minimum 27% share of renewables, and at least 27% improvement in energy efficiency (EC 2013).

At the same time, the European Commission (EC 2016) estimates that around EUR 379 billion investments yearly are needed to reach the 2030 targets. There is a necessity to invest in low-carbon technologies, but at the same time to ensure security of energy supply as well as its affordability. A growing share of variable renewable energy sources (non-flexible energy producers along with nuclear power) which are highly dependent on weather conditions implies the necessity of the existence of flexible producers (particularly natural gas). However, this further calls for additional capacity investments in flexible low-carbon electricity plants, which energy producers are often not willing to make as they have become financially unattractive because of the negative trends from both the energy supply and the energy demand side. There is an obvious disagreement between the ongoing market liberalization and the state interventions through support given to renewables, while ensuring security of energy supply.

As EU energy markets have gone through major changes and shifted from highly regulated to more liberalized and competitive markets, investment decisions have become more complex, while, according to Hary et al. (2016), in regulated systems they were passed to the consumers through tariffs. Market opening represents a challenge as well as risk for companies since they need to manage their investment decisions by predicting their future plant profitability and their overall financial performance effectively in order to remain competitive.

The chapter aims to evaluate the financial performance of the EU energy sector in order to deepen our understanding of its risk and return, as well as to provide information useful for making primarily investment, credit, policy or regulatory related decisions. This is achieved through ratio analysis of the EU energy companies with the largest market share in each country observed in the period 2005–2015. Thereby, the selected liquidity, leverage, asset management, and profitability ratios were calculated and analyzed over the study period. Moreover, based on the given results, the chapter discusses the opportunities and threats facing the EU energy

companies that are important drivers of the transition toward the European Energy Union, i.e., a low-carbon, secure, and competitive European economy.

The remainder of the chapter is structured in the following way. Challenges facing the European Energy Union are discussed in Sect. 2. Section 3 explains the methodology used for describing the sample and the financial ratios used. Section 4 calculates, analyzes, and discusses the financial performance of the EU energy sector, while Sect. 5 concludes the chapter.

2 Challenges Facing the European Energy Union

The financial and economic crisis that started in the second half of 2007 together with deindustrialization, modernization of industrial plants, and fostering energy efficiency caused a significant decrease in energy consumption. Figure 1 shows gross inland energy consumption in the EU-28. According to Eurostat, it amounted to 1830.9 million tons of oil equivalent (Mtoe) and 1764.4 Mtoe in 2005 and 2010, respectively, with a further decreasing trend.

From the supply side, some processes occurred which influenced an excess of energy supply, i.e., overinvestment in generating capacities from fossil fuels and an increase in highly subsidized renewable energy sources. These adverse trends influenced a drop in the energy wholesale prices and at the same time increased prices for households. Additionally, fuel prices and CO_2 emission rights increased which altogether affected unfavorably the European energy security, affordability,

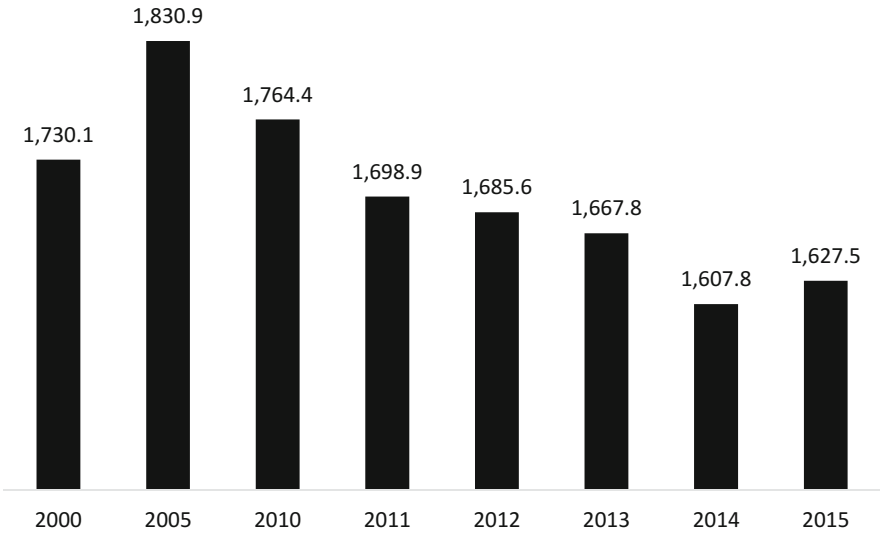

Fig. 1 Gross inland energy consumption in the EU-28 in the period 2000–2015 (in Mtoe). Source of data: Eurostat

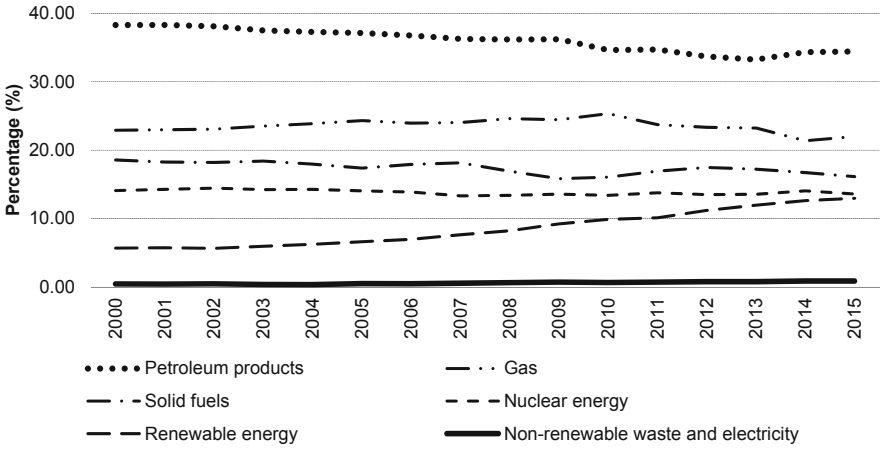

Fig. 2 Gross inland energy consumption by energy source in the EU-28 during the period 2000–2015 (in %). Source of data: Eurostat

and competitiveness (see Borozan and Pekanov Starcevic 2016). In addition to the aforementioned challenges caused by the crises and turbulent changes in the energy markets, the issue of energy security caused by the large EU dependence on energy import, and its sensitivity to the gas supply disruption has recently become a prime concern.

The EU is strongly dedicated to solving these challenges. Hence, "A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy" (EC 2015a) was adopted on February 25, 2015. This document presented significant progress toward secure and affordable energy and a low-carbon economy. Since then, two reports on the "state of the Energy Union" have been published—in November 2015 (EC 2015b), and in February 2017 (EC 2017a). Both reports showed progress made from February 2015, when the Energy Union Strategy was adopted.

According to the European Commission (EC 2017c), the Energy Union implies a free flow of energy across the EU. More precisely, it includes the following five dimensions: energy security, solidarity and trust, a fully integrated internal energy market, greater energy efficiency, a low-carbon economy, and research, innovation, and competitiveness (EC 2017a). However, it also brings the abundance of challenges to the EU Member States as it is crucial to reconcile priorities of different countries considering the Energy Union's objectives. One of the most crucial ones is that the 2030 renewables target is binding for the EU but not for the specific EU Member States.

If we look at the gross inland energy consumption by energy source in the EU-28 (Fig. 2) in 2015, petroleum products comprised 34.4% of energy consumption, gas 22.0%, solid fuels 16.1%, nuclear energy 13.6%, renewable energy 13.0%, and nonrenewable waste, and electricity 0.9%. It can be seen that the share of renewables shows a significant increase, which is not the case with any other energy source.

Renewables drive wholesale prices to zero, and at the same time renewables subsidized increase total system costs (Spiecker and Weber 2014). In addition to unfavorable trends from the energy demand and supply side, those challenges adversely affect operation and future of energy companies, particularly those that do not have or have a modest share of renewables in their energy mix (see Borozan and Pekanov Starcevic 2016), which, in turn, has an adverse effect on the security of energy supply as well as its affordability.

Many researchers have been dealing with renewable energy sources and renewable energy use in the EU (Klessmann et al. 2011; Kontogianni et al. 2013; Spiecker and Weber 2014; Proskurina et al. 2016), but the proposed measures on renewables lack to bring sustainability, security of supply, and competitiveness (Gaigalis et al. 2014). Energy policy targets (security of supply, sustainability, and economic efficiency) are often not balanced (Spiecker and Weber 2014). There is an additional problem when trying to integrate renewable capacities into the energy system, as they show fluctuating behavior. Furthermore, investment in renewable capacities differs from investment in conventional power plants; this implies higher initial capital costs (less installed capacity per initial dollar invested than conventional capacities), but lower fuel and operating costs (Beck and Martinot 2004). Generally speaking, investments in energy capacities are becoming riskier because of the changing energy market (Kiyak 2012). For the investor, the optimal energy portfolio maximizes the expected performance while minimizing the expected risk (Cucchiella et al. 2012).

As investments in flexible energy facilities such as natural gas and coal power plants are turning to be less profitable or even unprofitable, there are incentives to ensure a generation system adequacy in cases of peak load demand, such as capacity remuneration mechanisms (see Batlle and Rodilla 2010; Hary et al. 2016). These investments are necessary as they represent reserves when weather conditions are not favorable. On the other hand, adverse trends described above affect unfavorably the energy company's decision to invest in new facilities.

More liberalized and competitive market conditions in the energy market added business risk to the operation of energy companies. Free market conditions brought a new perspective to the operation and set up new challenges for company management. Ratio analysis has been used in previous research of energy companies (see Sueyoshi 2005; Hazarika 2015; Jurkowski and Daly 2015; Borozan and Pekanov Starcevic 2016). Their research results indicate a variety of financial ratios values depending on the country, region, and company investigated. However, there is a lack of studies that consider the EU energy sector from the financial performance point of view.

This chapter adds to the existing literature by analyzing the operation of the largest EU energy companies to get a broad picture of the EU energy system behavior, its challenges, as well as progress toward meeting the Energy Union strategy goals. The trends in financial performance of the EU energy sector that influence the energy landscape and put pressure on companies to adapt have been studied using ratio analysis. Namely, trends paint a broad picture and hence deepen our understanding of the current state and the future outlook of the EU energy sector.

3 Methodology

3.1 Sample Description

The sampling frame was represented by 28 EU energy companies with the largest market share in each country observed in the period 2005–2015. They are listed in Table 1.

However, the following companies were excluded from the final sample: Ignalinos atomine elektrine, Twinerg SA, and British Energy Group. For Ignalinos atomine elektrine, financial statements were not available to the public. Twinerg SA operates as a subsidiary of Electrabel SA, which further operates as a subsidiary of GDF SUEZ (from 2015 it changed its name into ENGIE SA), while British Energy

Table 1 EU energy companies included in the sample

	State	Energy company
1.	Austria	VERBUND Hydro Power GmbH
2.	Belgium	GDF SUEZ
3.	Bulgaria	Kozloduy NPP Plc
4.	Cyprus	Electricity Authority of Cyprus (EAC)
5.	Czech Republic	ČEZ Group
6.	Denmark	DONG Energy
7.	Estonia	Eesti Energia
8.	Finland	Fortum Power & Heat
9.	France	EDF France
10.	Germany	RWE Power AG
11.	Greece	PPC Public Power Corp SA
12.	Hungary	MVM Magyar Villamos Művek Zrt.
13.	Ireland	ESB Electricity Supply Board
14.	Italy	Enel SpA
15.	Latvia	Latvenergo
16.	*Lithuania*	*Ignalinos atomine elektrine*
17.	*Luxembourg*	*Twinerg SA*
18.	Malta	Enemalta Corp
19.	Netherlands	Essent Nederland B.V.
20.	Poland	PGE Polska Grupa energetyczna SA
21.	Portugal	EDP Producao
22.	Republic of Croatia	Hrvatska elektroprivreda d.d.
23.	Romania	Hidroelectrica
24.	Slovakia	Vodohospodarska Vystavba, s.p.
25.	Slovenia	HSE Holding Slovenske elektrarne
26.	Spain	Iberdrola, SA
27.	Sweden	Vattenfall
28.	*United Kingdom*	*British Energy Group*

Source: Table compiled by authors

Group was taken over by EDF France in 2008. Hence, our final sample was made up of 25 energy companies.

The time frame includes years 2005–2015, except for the following companies: Enemalta (2005–2011; as of 2012, financial statements are not available to the public), Essent Nederland B.V. (2005–2010; in 2010, RWE Power AG became a full owner of Essent), PGE Polska Grupa Energetyczna SA (2007–2015; financial reports for 2005 and 2006 are not available to the public).

3.2 Financial Ratios

The methodology used in this chapter is financial statement analysis, while the annual financial reports represent the data source for the analysis. The selected financial ratios were calculated, aggregated, and then analyzed using descriptive statistics and trend analysis.

There are four groups of ratios analyzed: *liquidity ratios* (current, quick, and cash ratio), *leverage ratios* (debt, debt-to-equity, and interest coverage ratio), *asset management ratios* (total assets turnover, noncurrent assets turnover, current assets turnover, accounts receivable turnover ratios, and average collection period), and *profitability ratios* (net profit margin, EBITDA margin, return on assets, and return on equity).

Considering deregulation of the power industry, it is of high importance for energy companies to achieve profitability and remain profitable in order to be competitive. Unlike liquidity ratios which are based on liquid assets and could, therefore, become outdated in a short period of time, profitability ratios can give an insight into a company's ability to generate profit in comparison to its costs. Profits are important for funding new investments and for this reason shareholders are particularly interested in these ratios.

For energy companies, it is important to efficiently use their assets as significant investments in power generation facilities are needed. Asset management ratios show how efficient companies use their resources; that is, how successful companies' management is in deploying assets in generating revenues.

Since significant investments are needed in order to build power generation facilities, it is expected that these facilities would be financed with a significant portion of debt. Thereby, capital structure would be highly leveraged. Leverage ratios assess a company's ability to meet its financial obligations and indicate its long-term solvency.

The financial statements used in this analysis are publicly available on the companies' websites.

To unveil the financial development pattern of the EU energy sector, trend analysis was also conducted. To that end, a trend in each financial ratio was identified and then combined for each financial indicator group to get a broad picture of the possible EU energy sector future. Knowing how the future might look like may be used for a variety of policy purposes aiming to direct it to the desired state.

4 Results and Discussion

4.1 The Financial Performance of the EU Energy Sector

Table 2 describes the EU energy sector in terms of the financial ratios mentioned above; it gives the data on the mean, standard deviation, the minimum and maximum value of each calculated ratio.

The mean current ratio is 1.45. It is desirable that the value of this ratio is greater than 2, and the value below 1 implies possible problems for a company to meet its short-term obligations. As its value is 1.45, this is considered good enough. In addition, the mean quick ratio equals 1.19, which indicates that the liquidity of an energy company is satisfactory as it is considered more reliable than the current ratio. The reason lies in the fact that it includes only strictly liquid assets. Finally, the mean cash ratio shows poorer values than the previous two liquidity ratios. It amounts to 0.35, which indicates that companies' cash is not enough to pay off current debt (only 35% of their current obligations can be paid with available cash and cash equivalents).

Considering leverage ratios, the mean value of the debt ratio is 0.51, which is almost in the acceptable range. The values above 0.5 indicate that most of the assets are financed through debt. The value of the mean debt-to-equity ratio equals 1.72 and it is considered acceptable for large companies. It is the ratio that is industry specific as it depends on the company's share of current and noncurrent assets. As energy companies require a high amount of investments in power generation facilities, more equity is needed to finance such investments. Considering the mean interest coverage ratio of 6.73, it is more than enough to meet interest expenses.

The higher the asset turnover ratios, the better the company's performance. Usually, if total asset turnover is below 1, this means that a company does not perform well. However, the value is compared to the industry in which the company operates. As the energy companies require many fixed assets to create sales, the value of the total asset turnover ratio of 0.37 is not as bad as it would seem at first. As expected, the high share of noncurrent assets in the total assets can be seen from the values of the noncurrent assets turnover ratio and the current assets turnover ratio. The accounts receivable turnover ratio recorded the mean value of 6.81, and the average collection period was 74 days.

Despite relatively high-profit margins, it is still relatively hard for competitors to enter the energy sector because of high initial capital investments needed to build energy facilities, as well as legislative restrictions which also are country specific. The mean net profit margin in the EU energy sector is as high as 25%. EBITDA margin is influenced neither by capital intensity of the company nor by the debt employed. Thereby, high values of the EBITDA margin are specific to capital-intensive industries and for the EU energy companies it is 26%.The mean return on equity (ROE), which indicates the company's profitability in utilizing shareholders' money, is 7%. At the same time, return on assets (ROA) is somewhat lower and amounts to 3%.

Table 2 The energy sector's financial performance ratios and categories

Ratio		Formula	Number of observations	Mean	Std. dev.	Min.	Max.
Liquidity ratios	Current ratio	Current assets/ current liabilities	262	1.45	1.08	0.16	10.22
	Quick ratio	(Current assets − inventories)/ current liabilities	253	1.19	0.93	0.12	9.39
	Cash ratio	(Cash + cash equivalents)/current liabilities	261	0.35	0.66	0.00	6.46
Leverage ratios	Debt ratio	Total debt/total assets	262	0.51	0.21	0.04	0.90
	Debt-to-equity ratio	Total debt/total equity	262	1.72	1.72	0.04	9.48
	Interest coverage ratio	Earnings before interest and taxes/interest expenses	255	6.73	13.48	−22.20	161.00
Asset management ratios	Total asset turnover ratio	Total revenue/ total assets	262	0.37	0.17	0.01	0.96
	Noncurrent assets turnover ratio	Total revenue/ total noncurrent assets	262	0.50	0.28	0.01	1.72
	Current assets turnover ratio	Total revenue/ total current assets	262	2.29	1.33	0.02	11.62
	Accounts receivable turnover ratio	Total sales revenue/accounts receivable	262	6.81	9.16	0.69	143.53
	Average collection period	360 days/ accounts receivable turnover	262	74.08	50.34	2.51	524.63
Profitability ratios	Net profit margin	Net profit/total revenues	262	0.25	0.93	−0.39	10.43
	EBITDA margin	EBITDA/total revenues	262	0.26	0.19	−0.30	1.40
	Return on assets	Net income/total assets	262	0.03	0.04	−0.21	0.36
	Return on equity	Net income/ shareholder equity	262	0.07	0.12	−0.68	0.70

Source: Research results

Furthermore, descriptive statistics indicates significant differences across the EU energy companies with respect to the financial performance. This calls for a more detailed analysis at the individual company level, what should be done in further research.

To find out how the EU energy sector has performed in financial terms over time and predict how it is likely to develop in the near future without significant changes, trend analysis was conducted. The trends in financial ratios may be observable from Fig. 3 that shows the evolution in energy companies' financial ratios over the period 2005–2015.

Considering liquidity ratios, current, quick, and cash ratios show similar trends during the observed period. From the initial growth in the period before the economic and financial crisis, a decline in the ratio values occurred and lasted until 2012. In 2013, companies recorded an increase in the liquidity ratios indicating thereby stronger liquidity and improved performance.

At the same time, the average collection period showed a decreasing trend as from 2013 indicating improved accounts receivable collection. The asset management ratios (total asset, noncurrent assets, and current assets turnover ratios) were at approximately the same levels in the observed period. Although total assets and noncurrent assets turnover ratios were below 1, they are acceptable for the energy companies having a high share of fixed assets.

The debt ratio was at approximately the same level in the observed period. In 2015, however, its value was at the lowest level and amounted to 0.50. Companies' debt-to-equity ratio (showing the relation between owner's and debtor's investments in companies) was at the highest level in 2008 and did not reach that value in the observed period any more. Finally, the interest coverage ratio was at the acceptable levels during the whole period observed. Although a general rule is that its value should be 1 and above, for the energy companies this value is set higher and amounts to 2. In 2015, it was as high as 11.86.

Finally, profitability ratios declined in 2008 because of the crisis, and the recovery has been evident since 2013. The net profit margin showed different behavior. In 2012, it amounted to more than 50% and then declined continuously until 2015. Since the EBITDA margin did not show this kind of behavior, it could be concluded that this decline was influenced by taxes, interests, depreciation, and amortization. Generally speaking, if a company has a high debt, then this ratio would not measure its profitability in a proper way because of high interest expenses which should be taken into account. ROE has shown a declining trend from 2009 indicating that shareholders' equity is used in a way that decreases profit (an exception is the year 2014 that showed a slight improvement compared to the previous year). As expected, due to high amounts of fixed assets, the ROA values were at somewhat lower levels.

Trend analysis showed that the EU energy companies are sensitive to changes in regulatory and market conditions, the financial and economic crisis in particular, over the observed period. Recovery started in 2012 and influenced improvement in financial ratios observed; more current assets have been used for covering short-term obligations, it has taken fewer days to collect accounts receivable, and debt ratios

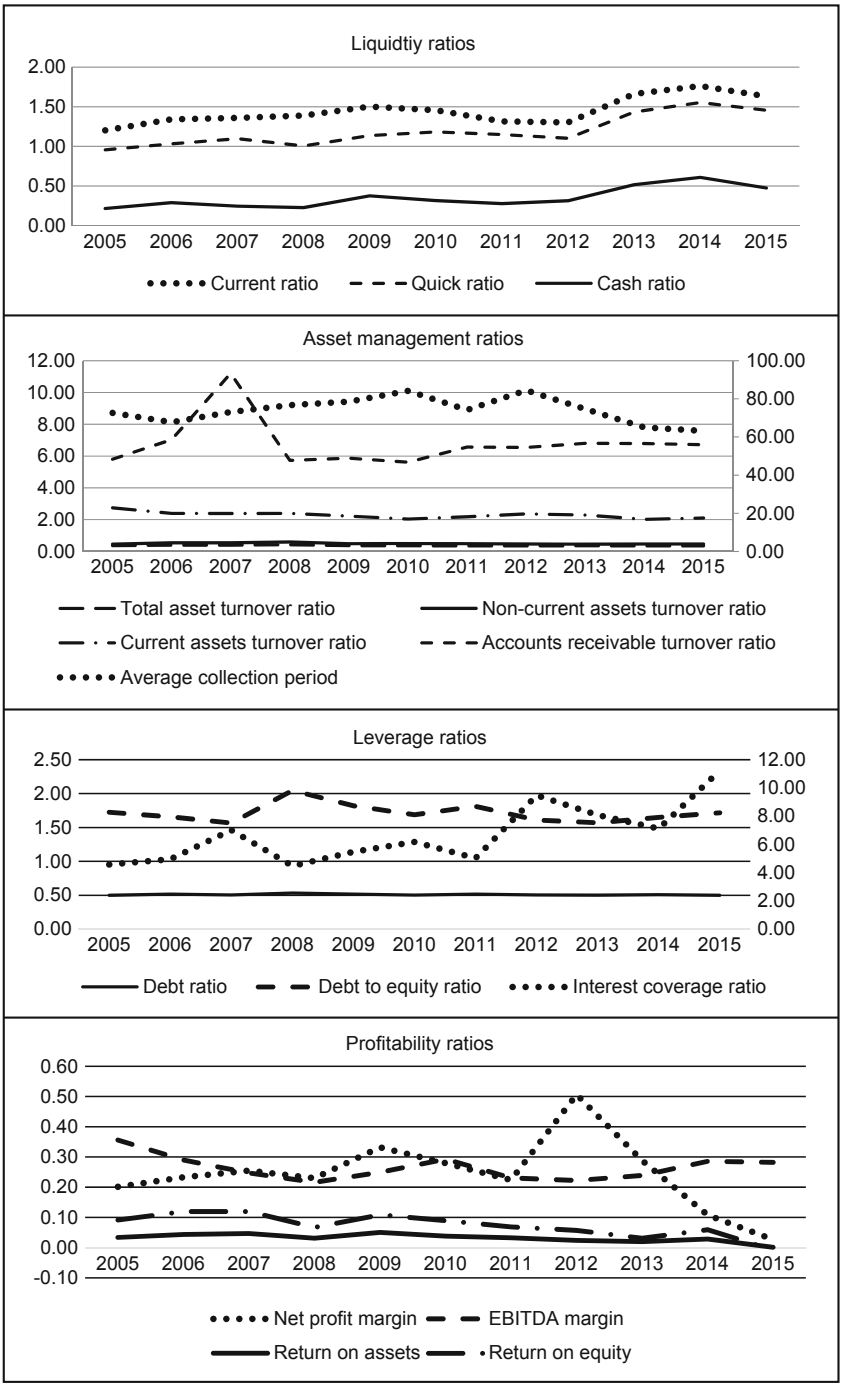

Fig. 3 Evolution of the financial ratios. Source: Research results

have been at the acceptable levels. However, profitability has been at lower levels, possibly because of growing competition due to a more liberalized market.

4.2 Discussion

The calculated financial ratios show how well the EU energy companies have adapted to the challenges caused by the changing regulatory and market conditions. As from 2012, the liquidity ratios have shown an improvement in their financial performance. The mean values of current, quick and cash ratios were at acceptable levels suggesting that the EU energy sector, in general, should not suffer from liquidity issues. This is important bearing in mind the need for new investment. Namely, in order to enable security of supply, affordability, and grid stability, investments in conventional, flexible power plants are of extreme importance. However, because of the market conditions, those investments have become unprofitable for energy companies. As demonstrated by Borozan and Pekanov Starcevic (2016), companies with a higher share of renewables mostly operate profitably, while those with a higher share of conventional as well as combined heat and power (CHP) plants operate with reduced profitability and losses. Furthermore, if the share of renewables continues to increase, disincentives for new investment in the base load and regulating power will strengthen, and grid stability as well as security of electricity supply, affordability of electricity and price competitiveness will be additionally jeopardized, as noted by the same authors.

The growing share of renewables comes with its price. In addition, with decreased energy prices and increased fuel prices, the challenge is even higher. Growing market liberalization adds to this challenge by increasing business risk to the operation of energy companies. Managerial capabilities are becoming important in ensuring operational and financial efficiency for energy companies. However, managerial skills are often not enough.

The asset turnover ratios indicate how well the management is utilizing the company's assets. Considering their values for the EU energy companies, which have been at lower levels than the reference values, new investment in human capital is desirable.

When looking at the leverage ratios, the mean value of the debt ratio of 0.51 and its lowest level in 2015 (0.50) shows an improvement in long-term solvency of the energy sector. The energy companies' mean debt-to-equity ratio of 1.72 means that they used 72% more debt than equity to finance investments in fixed assets. When having high debt levels, the interest coverage ratio shows whether the company has enough resources to service the debt. In economic downturns, high debt levels can cause a company to go bankrupt. Since the interest coverage ratio shows excellent values, it seems that this sector should not have problems in servicing its debt. Thereby, using high leverage within these companies can be a good way to expand business.

Profitability of the energy sector shows some fluctuations when looking at the trend in the observed period. Although the mean value of the net profit margin is 25%, the trend has shown a decline as of 2012. The oscillating profitability is evident when looking at other ratios within the same group. However, these values are still at relatively satisfactory levels indicating that management capabilities in earning profit are adequate.

5 Conclusions

The chapter explored the effects that changed regulatory and market conditions have on the leading EU energy companies' financial performance over the period 2005–2015 in order to deepen our understanding of their risk and return, as well as to provide information useful for making investment, credit, policy or regulatory related decisions. To that end, ratio analysis followed by trend analysis was employed. Considering ratio analysis, the selected liquidity, leverage, asset management and profitability ratios were calculated and analyzed. Therefore, the needed data was collected from the annual financial reports of energy companies published on their respective web sites.

Knowing the financial performance of this sector is very important bearing in mind the EU energy objectives set in its strategic documents, i.e., cutting down greenhouse gas emissions, increasing energy consumption from renewables, and improving overall energy efficiency in particular. Namely, to accomplish these objectives, the energy sector has to be competitive, reliable, and keep track of the changes in the global energy market. Moreover, in order to enable security of supply, affordability and grid stability, new investments in conventional, flexible power plants are of extreme importance. However, because of the changed market conditions and legal regulation, these investments have become unprofitable for the EU energy companies.

The European energy market has been characterized by its sensitivity to the changes in economic, political, and regulatory conditions. For instance, this chapter demonstrated that the recent financial and economic crisis has left a significant adverse mark on the financial performance of energy companies. Despite this, it seems that energy companies are adapting at a steady pace to new challenges. To accelerate the pace of adaptation and at the same time to make energy companies true drivers of the transition toward a low-carbon, secure and competitive European economy, comprehensive, consistent, and transparent energy policy reforms from national to the EU level are still needed. These reforms should create a stable, fair play, and attractive business environment for new investment, including in plants that generate base load and regulating power.

Although still at satisfactory levels, the values of analyzed ratios show deterioration in the financial performance of the EU energy companies. Thereby, because of country-specific legislative restrictions and entry barriers, its level of development, climate conditions, energy fuel and energy portfolio mix, and similar features, the

financial performance varies dramatically depending on the geographical location of energy companies. Further research should go into a more detailed analysis at the individual company level.

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Capacity of Industrial Structure: The Case of Eastern and Central Europe

Leon Olszewski, Pawel Dobrzanski, and Elie Chrysostome

Abstract Changes after 1989 enabled Central and Eastern European (CEE) countries to start processes of political and economic transformation. The Washington Consensus was adopted by post-communist economies in early 1990s. However, reforms were introduced by CEE countries with different speed. The chapter outlines the philosophy and foundation of transition, in which structural changes play an essential role. In the second part, the analysis focuses on structural changes in industrial sectors. The chapter also examines the capacity of industrial structure, as industry is one of the key sectors for CEE countries. Many studies emphasized a significant effect of industry changes on long-term economic growth. The chapter focuses on the relation between structural changes in industry and economic growth/competitiveness. Due to the complexity of the topic, the research requires usage of diverse methodological approaches. Main method is a comparative analysis using data collected from Eurostat Database, OECD Database, and Global Competitiveness Report. The analysis shows that Visegrad countries are doing quite well in the region; however, they are still behind other European Union countries. They need to explore ways to transition to a knowledge-based economy. To achieve it they should focus on high-tech production and improve the business sector's capacity for innovation, labor market efficiency, and strengthen business sophistication. This research can be used by the government agencies for industrial development policies.

L. Olszewski
Department of International Economic Relations, University of Wroclaw, Wroclaw, Poland

Department of Management, University of Business in Wroclaw, Wroclaw, Poland

P. Dobrzanski (✉)
Department of Mathematical Economics, University of Economics in Wroclaw, Wroclaw, Poland
e-mail: pawel.dobrzanski@ue.wroc.pl

E. Chrysostome
Department of Business Administration, State University of New York Campus of Plattsburgh, Plattsburgh, NY, USA
e-mail: chrysoev@plattsburgh.edu

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Keywords Economy of transition · Innovation · Industrial structure · Structural changes in economic growth · Competitiveness

1 Introduction

Economic growth is one of the most popular economic problems. Researchers are trying to explain why some countries are growing faster than others and indicate economic growth factors. In the twentieth century, this analysis focused on two types of economies: market and centrally planned. Nowadays, analysis of the economic growth focuses only on market economies, as those that are the most effective. It is important to identify the role of capabilities and competitiveness for economic growth (Fagerberg and Srholec 2015).

The unexpected dismantling of the Soviet system in 1989 opened a discussion between researchers about future of the post-communist systems. The research problem is the assessment of structural changes in national economic systems. Further analysis will cover four countries of the Visegrad Group: Poland, the Czech Republic, Hungary, and Slovakia. After the collapse of the Soviet Union transformation process started in V4 countries. Also, from geographical and socio-cultural perspective the Czech Republic, Hungary, Slovakia, and Poland are very similar. That is the main reason why these countries were chosen for analysis (Olszewski and Dobrzanski 2014).

After 1989, the Central and Eastern European countries started transforming their centrally planned economies, dominated by state ownership and heavy regulation, into market economies. Success of the transition was dependent on sequencing and speed of these reforms (Rodrik 1992; Williamson 1993). In the 1990s, the post-communist countries adopted the Washington Consensus. It was based on three key pillars: property rights and a healthy macroeconomic policy (low inflation, budget deficit reduced, and maintenance of a competitive exchange rate), commercial and financial liberalization, promotion of walking over to the state—in particular—through mass privatization (Serra and Stiglitz 2008).

Due to pressure of the catastrophic situation of the economy, political decisions were made very quickly. Countries of Central and Eastern Europe have agreed to follow rules of stabilization and restructuring introduced by the World Bank and the International Monetary Fund. In Poland, the government chose the shock therapy, as outlined by the Balcerowicz Plan (Cooper and Balcerowicz 1996). Hungary, the Czech Republic, and Slovakia have made gradual reforms (Roaf et al. 2014). The importance of formal institutional changes at the beginning of the transformation was emphasized by North (1997). The collapse of the intra-communist countries' trade and the abolition of Comecon in 1991 began the change of foreign trade structure.

The privatization of the state sector, that dominated in the post-communist economies, has radically changed the structure of the production sector. Trade liberalization has changed the geographical orientation of trade (Okon-Horodynska 1995; Dabrowski 1991). The accession of Central European countries to the European Union opened a new stage of structural changes in economies in transition.

The purpose of this research is to present the importance of structural changes in transitional economies. Analysis starts with comparison of main macroeconomic indicators, i.e., GDP per capita, expenditures on R&D, the Global Competitiveness Index, labor market efficiency, and productivity indicators. Then, structural decomposition of GDP in the Visegrad Group is discussed. Authors present total employment, gross value added, total hours worked, and average hours worked per employee for main economic sectors. Then importance of industry sector for V4 countries is emphasized. Industry is playing a very important role in improving the economic development of the studied countries. Manufacturing is a major section in the Visegrad Group industrial production; that is why further analysis focuses on industry sector. Based on European Union approach, manufacturing is divided by technological intensity: from high-tech to low tech production. Nowadays, the ability of the economy to move to a higher level of technology and produce better economic, social, and ecological effects is a key factor that determines long-term growth. For this purpose, more detailed analysis has been done for high-tech manufacturing in V4.

2 Macroeconomic Performance of the Visegrad Group

Poland is the biggest economy out of V4 with 38 million citizens, while the Czech Republic and Hungary are four times and Slovakia 8 times smaller. According to the Global Competitiveness Report, the Czech Republic is the most competitive economy from the Visegrad Group. In 2013, the Czech Republic obtained 37th position, Poland 43th, Hungary 60th, and Slovakia 75th. GDP per capita is the highest in the Czech Republic and the lowest in Poland. Expenditure on R&D are small in all Visegrad countries and are less than 2% in Czech Republic and Hungary and less than 1% in Poland and Slovakia, which is reflected by innovation rank in Global Competitiveness Report. Visegrad businesses—although doing comparatively well in a regional context—are less sophisticated and innovative than other economies in the European Union. Also, labor market efficiency is ranked poorly (Table 1).

Productivity is a key measure of economic performance and labor efficiency. Productivity is also the main determinant of living standards—it quantifies how the economy uses available resources. Table 2 presents that Poland has the highest number of average working hours per person—1929 per year. Hungary has average working hours at the level of 1886. The Czech Republic and Slovakia work 150 h less than Poland on average. On the other hand, countries that work less are more efficient and achieve better results on GDP per hour worked. The most effective is Slovakia that noted manufacturing production of US$34.7 per hour worked. For the Czech Republic it was US$31, while for Poland and Hungary approximately US$28. Comparing to the global leader, V4 economies produce only half of US GDP per hour worked. OECD countries are more efficient than V4 countries, achieving an average of 1769 h yearly and US$46.7 for 1 h worked.

Table 1 Performance of Visegrad countries in 2014

Variable/Country	Czech Republic	Hungary	Poland	Slovakia
GDP per capita (Euro)	11,300	9000	8700	9500
Gross domestic expenditure on R&D (% of GDP)	1.91	1.41	0.87	0.83
Global Competitiveness Index—Rank/Score (1–7)	37/4.5	60/4.3	43/4.5	75/4.1
Business sophistication—Rank/Score (1–7)	35/4.5	92/3.8	63/4.1	65/4.0
Innovation—Rank/Score (1–7)	39/3.7	50/3.5	72/3.3	78/3.2
Labor Market Efficiency—Rank/Score (1–7)	62/4.3	75/4.2	79/4.1	97/3.9

Source: Authors' own study based on Schwab et al. (2014) and Eurostat (2017)

Table 2 Productivity indicators for V4 countries in 2012

Country/ Variable	Average hours worked per person	Total employment (number of persons engaged) (in thousands)	Hours worked for total employment (in thousands)	GDP per hour worked, current prices (USD)	GDP per hour worked as % of USA (USA = 100)
Czech Republic	1784	5077	9056	31	48.3
Hungary	1886	4095	7724	28.3	44.1
Poland	1929	15,777	30,434	28.1	43.8
Slovak Republic	1785	2209	3944	34.7	54.1
OECD in total	1769	556,956	985,344	46.7	72.9

Source: Authors' own study based on OECD (2017)

3 Structural Decomposition of GDP in the Visegrad Group

The process of transition of the Visegrad economies is connected with large structural changes. The structure of the economy allows for an assessment of quality competitiveness today, as well as likely future opportunities. The Visegrad Group can be characterized as economies with the highest GDP decomposition of services sector (more than 60% of GDP in all countries) and small share of agriculture in GDP. The role of industry sector in The Visegrad Group is still significant—from 28% of GDP in Hungary to 37.3% in the Czech Republic (Fig. 1).

Table 3 presents percentage changes in total employment in V4 countries. In Poland and Slovakia, the total employment slightly increased (0.34 and 0.12, respectively). At the same time in the Czech Republic and Hungary, a decline could be observed by −0.03 and −0.61, respectively. In all V4 countries, a decline in Agriculture (A) and Industry (from B to E) sectors can be noted, but in Poland, the difference in employment in the Agriculture sector was the most noticeable and it was lower in 2013 by almost 3% comparing to 2007. In the whole Industry sector,

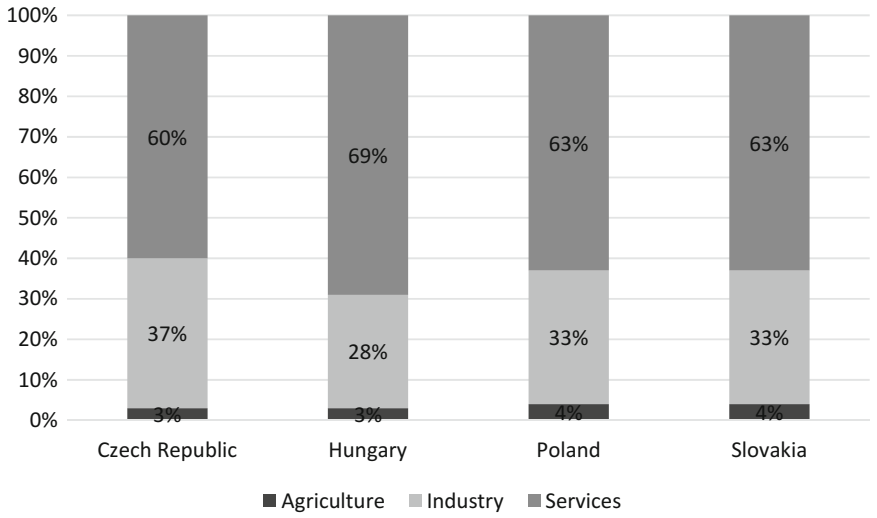

Fig. 1 Model GDP structure in the Visegrad countries 2012. Source: Authors' own study based on the Central Intelligence Agency (2017)

the most significant decrease can be observed in Hungary (−2.47), then in Slovakia (−1.67), the Czech Republic (−0.90), and Poland (−0.45). Positive effect is that countries are increasing their employment in the service sector. Also, in all four countries, employment in Business sector services increased. Employment in Slovakia increased by 1.29, and in Poland, Hungary, and the Czech Republic by 1.16, 0.68, and 0.55, respectively.

For Poland and Slovakia, the gross value added in almost all sectors is increasing. For instance, in Poland (Agriculture—3.09, Industry—5.96, and Services—2.49). In Slovakia, the most significant growth can be observed in the Agriculture sector and increase of almost 7%. Other two countries of the Visegrad Group received a positive score in Agriculture (the Czech Republic 1.32, Hungary 3.72) and Industry (the Czech Republic 1.50, Hungary 0.59) sectors, but in Services, they obtained negative results (the Czech Republic—0.14, Hungary—0.51). The total gross value per hour worked including constant prices was positive in all V4 countries and gained in Poland 3.15, Slovakia 1.93, Hungary 1.01, and the Czech Republic 0.46.

The overall number of hours worked decreased in the Visegrad Group countries, for instance, in Poland by −0.01% and in Hungary −1.46%. Mainly, this is a result of the decline of working hours in Agriculture and Industry sectors. Table 3 presents also average hours worked per person employed. In Poland, a decrease can be noted beyond Agriculture sector. In Slovakia, the same trend can be noticed. In Hungary and the Czech Republic, a downward trend in all sectors can be observed.

Table 3 Productivity factors by sectors in V4 countries, 2007–2013, average annual growth

Time	2007–2013											
		A_U: Total										
				BNEXCL: Non-agriculture business sector excluding real estate								
					B_E: Industry including energy				GNEXCL: Business sector services excluding real estate			
Activity	A_U: Total	A: Agriculture, forestry, and fishing	BNEXCL: Non-agriculture business sector excluding real estate	B_E: Industry including energy	BDE: Mining and utilities	C: Manufacturing	F: Construction	GNEXCL: Business sector services excluding real estate	G_I: Wholesale retail trade accommodation food services, transportation, and storage	J: Information and communication	K: Financial and insurance activities	MN: Professional, scientific and technical activities, Administrative and support service activities
Gross value added per hour worked, constant prices—Average annual growth/change												
CZ	0.46	1.32	0.48	1.5	−3.5	2.83	−1.05	−0.14	−1.55	−1.06	5.8	−0.11
HU	1.01	3.72	0.06	0.59	0.53	0.55	1.16	−0.51	−0.25	0.58	−2.07	−3.75
PL	3.15	3.09	3.81	5.96	2.07	7.13	3.34	2.49	2.8	3.89	−0.74	1.51
SK	1.93	6.93	1.49	2.3	−5.61	4.72	2.09	1.12	0.93	1.33	−0.42	1.51
Total employment (number of persons employed)—Average annual growth												
CZ	−0.03	−0.4	−0.13	−0.9	−0.77	−0.91	−0.36	0.55	0.54	1.44	0.93	0.24
HU	−0.61	−1.85	−0.8	−2.47	−2.49	−2.47	−3.1	0.68	−0.6	1.95	0.56	4.56
PL	0.34	−2.96	0.59	−0.45	0.88	−0.71	1.49	1.16	0.44	2.56	0.89	3.76
SK	0.12	−1.86	0.13	−1.67	−2.59	−1.58	0.09	1.29	0.56	2.83	1.82	2.99
Total hours worked—Average annual growth/change												
CZ	−0.23	−0.54	−0.31	−0.83	−0.57	−0.86	−0.83	0.22	0.2	1.21	0.98	−0.19
HU	−1.46	−2.31	−1.55	−3.19	−3.16	−3.2	−4.57	0.04	−1.6	2.03	−0.45	5.47
PL	−0.01	−2.4	−0.1	−1.01	0.35	−1.27	0.72	0.37	−0.4	1.65	0.52	3.21
SK	−0.07	−1.66	0.09	−1.7	−1.94	−1.68	−0.45	1.28	0.51	2.96	1.68	3.02
Average hours worked per person employed—Average annual growth/change												
CZ	−0.2	−0.14	−0.18	0.07	0.2	0.05	−0.47	−0.33	−0.34	−0.23	0.05	−0.44
HU	−0.85	−0.46	−0.76	−0.74	−0.69	−0.75	−1.53	−0.64	−1	0.08	−1	0.87
PL	−0.35	0.58	−0.69	−0.56	−0.53	−0.56	−0.76	−0.78	−0.83	−0.89	−0.36	−0.53
SK	−0.18	0.21	−0.05	−0.03	0.66	−0.1	−0.54	−0.01	−0.05	0.13	−0.14	0.03

Source: Author's own study based on OECD (2017)

4 Industry Sector in Visegrad Group

The Visegrad Group is emphasizing the role of industry. Nowadays, V4 countries should focus more on all chains of industry business, from raw material to after-sales services. It is necessary to increase productivity of the industrial sector and associated services to reinforce the sector growth and job creation. Supporting competitive and innovative small and medium enterprises is one of the goals of the V4 industrial policy (Ministry of Foreign Affairs of Poland 2013).

Further analysis in this chapter will focus on the industry sector which is playing a very important role in improving the economic development of studied countries. Manufacturing is the major section in the Visegrad Group industrial production. The value of industry production during the period 2009–2011 is presented in Fig. 2. Among the countries studied, Poland has the highest value of industry production, i.e., 238,603 million euros, with a growth rate between 2009 and 2011 33.6%. The second highest manufacturer is the Czech Republic with a value of 140,710 million euros. Hungary noted manufacturing production of 85,162 million euros in 2011. The lowest value of manufacturing production was recorded in Slovakia, but the growth rate between 2009 and 2011 was the highest—42%.

Innovativeness of the country is one of the key factors determining economic growth. Transformation of the economic system in the Visegrad Group caused restructuring processes in industry sectors. Nowadays, one of the main goals of V4 countries is to develop intellectually intensive industries. High-technology industries are a hybrid of science and industry and should produce sophisticated and innovative products. Table 4 presents the breakdown of manufacturing industry according to technological intensity, based on NACE classification.

Overall share of high technology divisions in Polish manufacturing in 2011 is only 6% and medium-high technology is 27%. Poland has the biggest share in medium-low technology, i.e., 32% and low technology, i.e., 36%, which is illustrated in Fig. 3. Hungary is the leader of high-tech production with a share of 23% in high technology and 33% in medium-high technology. The Czech Republic has a minor share in high-tech sector, but more than 43% production is medium-high tech. Slovakia produces 16% of high-tech goods and 33% of medium-high tech goods. Structure of the Polish manufacturing sector is not competitive compared to other countries. Only one-third of manufacturing production belongs to two most advanced sectors. Other countries produced more than half-high and medium-high products. The most competitive is Hungarian manufacturing.

Table 5 indicates the annual average growth of different industries in the Visegrad Group and EU for the years 2005–2011. Despite the financial and economic crisis, high-technology industries displayed positive average rates of growth for these years. For the EU-27, the average growth of 3.3% was reached, the highest average growth rate was noted in Poland—14.5%. For medium-high-technology industries, the overall growth was also positive, but much smaller than for technologically more sophisticated areas (1.0% for the EU-27). The highest rate of growth for medium-high tech was also recorded by Poland—8.4%. The production of medium-low technology

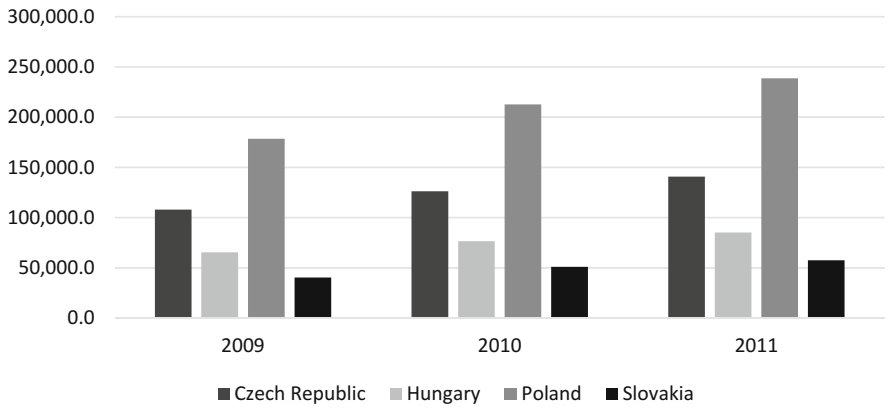

Fig. 2 Manufacturing—Total production value in million EUR. Source: Authors' own study based on Eurostat (2017)

Table 4 High-tech classification of manufacturing industries

High technology	Medium-high technology	Medium-low technology	Low technology
Aerospace	Electrical machinery	Coke, refined petroleum products, and nuclear fuel	Other manufacturing and recycling
Pharmaceuticals	Motor vehicles	Rubber and plastic products	Wood, pulp, paper products, printing, and publishing
Computers, office machinery	Chemicals, excluding pharmaceuticals	Nonmetallic mineral products	Food, beverages, and tobacco
Electronics-communications	Other transport equipment	Shipbuilding	Textile and clothing
Scientific instruments	Nonelectrical machinery	Basic metals	
		Fabricated metal products	

Source: Authors' own study based on Eurostat (2017)

industries has on average declined since 2005 by −0.4% for the EU, but in the Visegrad Group the growth rate was positive. The main exception to the general trend of the EU was Poland, which recorded a growth of 6.9%. In the area of low-technology manufacturing, only Poland achieved a positive growth rate. The average decline for the EU-27 was −0.7%, and for the Czech Republic and Hungary even more. Even though Poland has a less competitive structure of manufacturing production, its growth rate is one of the highest in technologically more sophisticated areas.

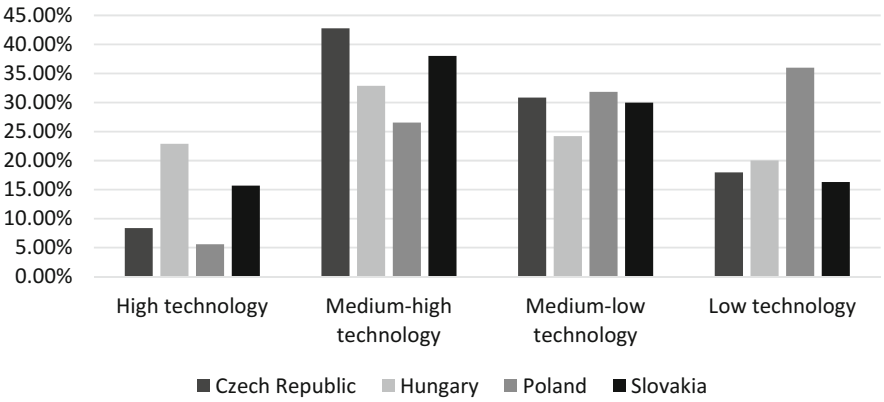

Fig. 3 Share of high-technology manufacturing in total manufacturing by level (2011). Source: Authors' own study based on Eurostat (2017)

Table 5 Industrial production according to the level of technology, annual average growth rates (%) 2005–2011 (working day adjusted)

	Technology level			
	High	Medium-high	Medium-low	Low
UE-27	3.3	1	−0.4	−0.7
Czech Republic	5.4	7.3	1.5	−1.4
Hungary	4.6	4	1	−1.1
Poland	14.5	8.4	6.9	3
Slovakia	–	–	–	–

Source: Authors' own study based on Eurostat (2017)

5 High-Tech Manufacturing in V4

Nowadays, innovation is one of the key factors allowing countries to achieve and remain long-term growth (Dobrzanski 2016). In V4, the Czech Republic is a leader in terms of number of high-tech enterprises with the amount of 3441, second is Poland, third Hungary, and last Slovakia. It may seem surprising that the highest turnover is made by Hungary, i.e., 16,338 million euros, which has half time less enterprises than the Czech Republic or Poland. Production value is also the highest in Hungary with 14,552 million euros. Second is the Czech Republic with 12,537 million euros, third is Poland with 11,092 €, and last Slovakia with 6188 €. A very important indicator is the value added—here, again, Hungry is the best with 2989 million euros. Then there is Poland with 2229 million euros, the Czech Republic with 1701 million euros, and Slovakia 830 million euros. Another important indicator is Gross investment in tangible goods—Hungary is the leader again (Table 6).

A huge increase in terms of R&D expenditures in business enterprises is also a positive aspect. Between 2005 and 2013, for EU28 it was 4%. For the Visegrad

Table 6 Economic statistics on high-tech sectors in 2012

	High-tech manufacturing				
	Number of enterprises	Turnover (EUR million)	Production value (EUR million)	Value added (EUR million)	Gross investment in tangible goods (EUR million)
EU-28	45,471	507,879	448,566	157,619	16,237
Czech Republic	3441	13,218	12,537	1701	316
Hungary	1604	16,338	14,552	2989	462
Poland	3033	12,374	11,092	2229	266
Slovakia	755	6403	6188	830	102

Source: Authors' own study based on Eurostat (2017)

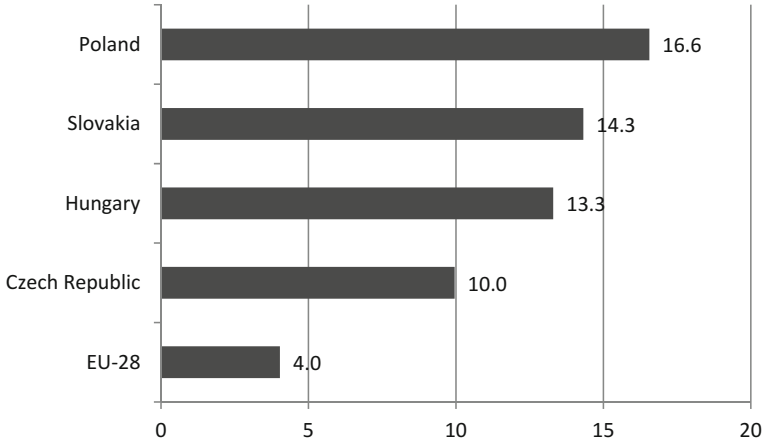

Fig. 4 Average annual growth rate of R&D expenditure in business enterprises, 2005–2013. Source: Authors' own study based on Eurostat (2017)

Group, this increase was much more intensive. Poland noted an increase of 16.6%, Slovakia 14.3%, Hungary 13.3%, and the Czech Republic 10% (Fig. 4).

One of the measures of international competitiveness is the value of export of high-tech products. Figure 5 presents a breakdown of the index of export in high-technology manufacturing into its components. The Czech Republic's high-tech export is represented mainly by computer and office machines and electronic and telecommunication industries. These industries increased their value by 150% during 2007–2013. In Hungary, the most important is the export of electronic and telecommunication products, which is 56% of total high-tech export. Polish high-tech export is mainly based on electronic and telecommunication and computer and office machines. Comparing to other countries, aerospace product export is also growing in Poland. Slovakia exports mainly electronic and telecommunication products, which is more than 76% of total high-tech export.

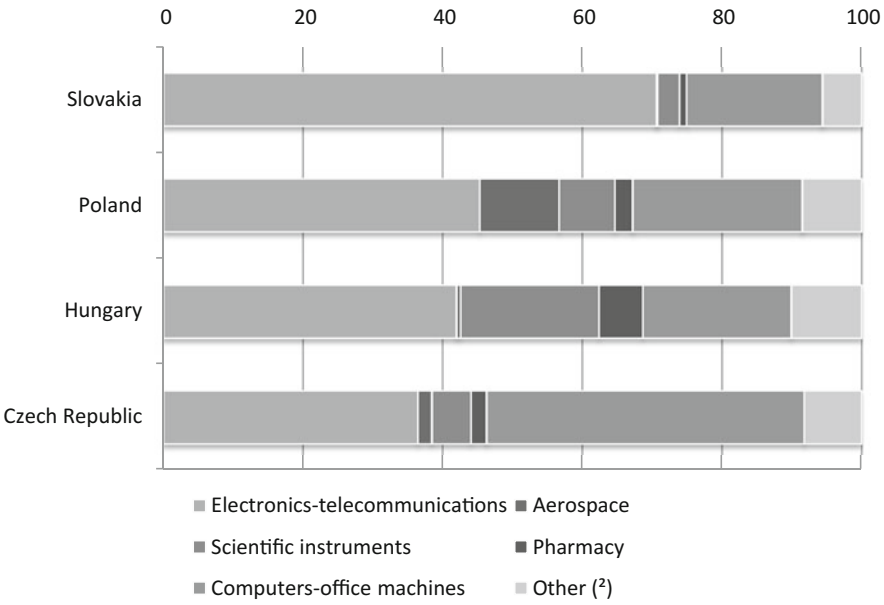

Fig. 5 High-tech exports by high-technology group of products, EU-28 and selected countries, 2014, in %. Source: Authors' own study based on Eurostat (2017)

6 Conclusion

The Visegrad Group countries represent similar economic systems, however, political and historical factors have caused important differences in growth and development. Among four countries of the Visegrad Group, the Czech Republic is the most competitive; it attains the highest place in the Global Competitiveness Ranking (37th out of 144). Business sophistication, innovation, and labor market efficiency were also scored the highest. Moreover, GDP per capita and spending on R&D are better rather than other presented countries.

The worst scores were noted by Slovakia, which was ranked in the 75th place in GCR. Hungary is ranked just in the 60th place, while Poland is in the 43rd place. Poland's results in business sophistication are better than those of Hungary and Slovakia. Hungary is ranked higher in Innovation thanks to high spending on R&D.

Productivity is a key measure of economic performance and labor efficiency. The average number of hours worked annually was the biggest in Poland and Hungary. The Czech Republic and Slovakia work 150 h less than Poland and 100 h less than Hungary. In this case, countries that work less are more efficient and achieve better results in GDP per hour worked. The most effective are Slovakia and the Czech Republic. However, compared to global leaders, V4 economies produce much less efficiently.

The process of transition of the Visegrad economies was related to huge structural changes. The Visegrad Group can be now characterized as economies with the

highest GDP decomposition of the services sector, a small share of agriculture in GDP, and still significant role of industry sector. The fact that gross value added in almost all sectors is increasing is positive. Also, all four countries are increasing their employment in the service sector. For the manufacturing sector, gross value added is growing in all V4 countries, while employment and total hours worked are decreasing.

Nowadays, the Visegrad Group is emphasizing the role of industry. It is essential for it to be more independent from global markets. That is why promoting entrepreneurship, competitiveness, and innovation are the core of the V4 industrial policy. Manufacturing is a major section in the Visegrad Group industrial production. Poland has the highest value of industry production; second is the Czech Republic, then there are Hungary and Slovakia. Slovakia has the highest growth rate and is trying to catch up with other countries in the region.

The ability of the economy to move to a higher level of technology is a key factor in determining its ability to achieve long-term growth. Taking into consideration high-tech production, Hungary is the leader. Also, the Czech Republic and Slovakia obtain more than half the share of its production in high tech and medium-high tech. It is advantageous that in all countries, high technology industries displayed positive average growth rate. In the area of low-technology manufacturing, only Poland achieved a positive growth rate. However, this is because Poland is one of the biggest European producers of food. Poland needs to catch up with other countries when it comes to technologically advanced production as its value is still low. The two most advanced sectors in Poland are computer and office machines sector and electronic and telecommunication sector.

Visegrad countries are doing quite well in the region thanks to the changes and modernization of industrial structures, but they are still behind other European Union countries. Although the average annual growth rate on R&D expenditures in business enterprises is few times higher than in the EU, high-tech sector is still very small. V4 countries need to explore ways to transition to a knowledge-based economy. To achieve this, they should focus on improving the business sector's capacity for innovation, labor market efficiency, and strengthening business sophistication.

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Part III
Finance

How Do Russian Construction Companies Use Debt Financing?

Liudmila A. Guzikova, Ekaterina V. Plotnikova, and Maria N. Zubareva

Abstract Construction industry largely determines the development of society and its productive forces. Significant part of construction works in Russia is carried out by small construction companies. The success of companies' economic activity is ensured by the effective use of capital formed by the use of own and debt sources with different costs. The capital structure is the ratio of the financing sources, which have different accessibility for different companies. The capital structure directly affects the company's operation indicators and financial effectiveness. Proper use of debt financing should allow increasing the effectiveness of using own capital. The objective of the study is to investigate how small Russian construction companies use leveraged capital and the opportunities to increase their effectiveness by its use. As a result, the strong debt dependence of small construction companies was identified. This fact promotes high level of financial risk for both the companies and their counterparties. Companies which use short-term sources are more at risk, as this type of financing is more sensitive to economic situation in the country.

Keywords Construction company · Small company · Financing · Capital structure · Debt capital · Operation effectiveness

1 Introduction

In Russia, the construction industry is one of the main branches of small business. However, small business mainly executes subcontract work, specializing in the installation of indoor networks, installation of heating and ventilation equipment, electrical installation, roofing, finishing, and other types of work that a large developer can entrust to small companies, if they provide the required terms and quality.

L. A. Guzikova (✉) · E. V. Plotnikova · M. N. Zubareva
Graduate School of Public Administration and Financial Management, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation

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Small companies performing a wider range of works, planning growth and evolution, have to compete with larger developers.

Any company, especially actively developing, constantly feels the need of financial resources. The formation of company's capital occurs both at the expense of its own (equity), and borrowed (debt) sources. Effective economic activity of the company is impossible without debt financing. The debt makes it possible to significantly expand the scale of activity, to ensure more efficient use of equity, to accelerate the formation of various target financial funds, and ultimately increase the market value of the enterprise. The issue of choosing the financial sources, as well as the formation of their optimal structure, plays a huge role both for a certain company, whose management, in the certain period, realizes the choice between debt and equity and their characteristics (urgency, cost, amount), but for the industry and the economy as a whole (van Binsbergen et al. 2011). The lack of financial infrastructure and legislative base makes it difficult to access financing channels and, as a result, depress the companies' activity and slow down economic development.

Theory of financial management approves that the capital structure of a company is determined by its financial policy and reflects its risk orientation. The extent to which a company finances its operations with debt rather than equity influences its effectiveness and risk. The debt ratio significantly impacts the company because it characterizes the degree of financial dependence on outside investors and, hence, determines the level of risk both for the company and for its creditors (Brealey et al. 2008; Shubita and Alsawalhah 2012; Kurshev and Strebulaev 2015).

Low financial leverage is not necessarily the best way of financing, but traditional focusing on long-term debt loses its significance because of the increasing difficulties in attracting, so companies should rely increasingly on short-term borrowings. It is supposed that the company should find permanent level of short-term debt, covering not only season working capital but also some portion of the capital asset base. Equity financing is usually more expensive than debt financing and so it is reasonable to balance the two forms of financing. To measure debt ratio several indicators are normally computed. The standard measures are ratios Total Debt/Assets and Total Debt/Equity. These measures can be further segmented by separating the components of long- and short-term debt (Gill et al. 2011).

In the literature, there are empirical studies aimed at assessing the capital structure of construction companies and its impact on the financial and economic performance of companies, for example, Baharuddin et al. (2011), Choi et al. (2014), Ibn-Homaid and Tijani (2015), Jayiddin et al. (2017), and Mahmood and Zakaria (2007). Studies are mostly devoted to large companies listed on the stock exchange. However, for small companies, issues related to the use of debt capital are equally important, and mistakes in choosing a capital structure can have more dramatic consequences.

The objective of investigation is to assess how small Russian construction companies use debt capital and the opportunities of increasing their effectiveness by its use. To achieve the objective, it is necessary to evaluate the extent of debt dependence, to trace the relations of the terms of debt financing and companies' operation indicators and to make recommendations regarding capital structure management in small construction companies.

2 Data and Methodology

To analyze debt financing used by Russian construction companies, information from the balance sheets and the financial results reports for 2015 of small construction companies registered in the Leningrad region was used. The data were obtained from the SPARK database. Leningrad region belongs to the North-West Federal District, directly adjacent to the second largest Russian metropolis—Saint Petersburg. The population of the region at the beginning of 2015 was more than 1.77 million people, 64.5% constitute urban population, population density exceeded 22 people per sq. km. At the end of 2015, the Leningrad region had the second place in the ranking of Russian regions for housing construction: commissioned area was equal to 2,323 thousand m^2 totally and 1.3055 m^2 per capita.

In accordance with Russian legislation, as of 2015, small companies are the companies that simultaneously meet the following conditions: (1) the number of employees is not more than 100 people, (2) the revenue is not more than 800 million rubles, (3) the share of state entities (Russian Federation, subjects of the Russian Federation, municipalities), public and religious organizations and foundations are not more than 25% in total, (4) the share of ordinary legal entities (including foreign entities) is not more than 49% in total. The list of companies under consideration includes 56 small enterprises (companies marked in the database as microenterprises were not included).

The study uses structural analysis, methods of descriptive statistics, and elements of correlation–dispersion analysis. Financial coefficients characterizing the debt ratio and the effectiveness of companies' activity are the following: Total Debt/Assets, Long-Term Debt/Assets, Short-Term Debt/Assets, Total Bank Loans/Total Debt, Long-Term Bank Loans/Long-Term Debt, Short-Term Bank Loans/Short-Term Debt, Gross Profit/Assets (ROA), Gross Profit/Revenue (ROS), Gross Profit/Costs, Profit before Taxes/Equity, and Net Profit/Equity (ROE).

The values of the indicators of separate companies and the aggregate values, calculated for groups of companies are analyzed. As an indirect object of verification, the manifestation of the financial leverage effect is considered. The effect of financial leverage is determined by the following formula:

$$\mathrm{EFL} = (1 - T) \times (\mathrm{ROA} - R) \times D/E,$$

where EFL is the effect of financial leverage manifested as an increase in the profitability of equity through the use of debt financing, T is the income tax rate, ROA is the return on assets by gross profit, R is the interest rate on borrowed funds, and D/E is the ratio of debt financing to equity (Brealey et al. 2008).

To analyze the effect of the companies' financial leverage, the actual values of the difference between Gross Profit/Assets (ROA) and Net Profit/Equity (ROE) were compared with the calculated values obtained by the formula:

$$\text{CEFL} = (1 - \text{CT}) * (\text{ROA} - \text{CR}) * D/E,$$

where CEFL is the calculated value of the financial leverage effect, CT is the calculated value of the tax burden on profit calculated as the ratio of the difference between profit before tax and net profit to the profit before tax, CR is the calculated interest rate on debt.

3 Basic Provisions and Results

General characteristic of the companies included in the sample is based on the descriptive statistics. In the SPARK database, small enterprises are divided into five groups according to the number of employees. In the analyzed sample, the companies with the number of employees from 1 to 5 people (1 group) made up 21%, from 6 to 10 people (2 group)—5%, from 11 to 16 people (3 group)—2%, from 16 to 50 people (group 4)—41%, from 51 to 100 people (group 5)—30%. Thus, relatively larger companies prevail in the sample, constituting more than 70% (Fig. 1a). The assets of most companies do not exceed 1 billion rubles with the wide dispersion within this range (Fig. 1b), excluding five companies, whose assets several times exceed the specified limit. Of these, three companies belong to the fourth group by the number of personnel, one to the fifth, but the company with the largest assets of more than 7 billion rubles is in the second group. It should be mentioned that in Russia there is no limitation for small businesses by the size of assets. The revenue of companies is at least 100 million rubles and for the majority does not exceed 500 million rubles (Fig. 1c). Within these limits, the companies of the fourth and fifth groups are distributed relatively evenly. There are only six companies having revenue over 500 million rubles and only one of them is approaching the upper limit for small businesses equal to 800 million rubles. The gross profit of most companies does not exceed 100 million rubles (Fig. 1d), three companies exceed this limit by no more than 50 million rubles, but two companies belonging to the fourth group of personnel have a gross profit of approximately 400 million rubles and 600 million rubles. The total assets of small enterprises operating in the industry amounted to 31,916.6 million rubles, the total revenue equaled to 16,433.9 million rubles, and the total operating profit was equal to 2583.8 million rubles.

Konkin and Ruzaeva (2016) list the sources of financing used by construction companies, analyzing their advantages and disadvantages. Table 1 shows these sources and determines the specifics of their use by small companies. It may be noted that financial leasing was not attributed by the mentioned authors to the sources of financing the construction companies. The total volume of leasing contracts in construction constituted 36.6 billion rubles, but there are no certain data about the leasing in small construction business in 2015 (Rosstat 2016).

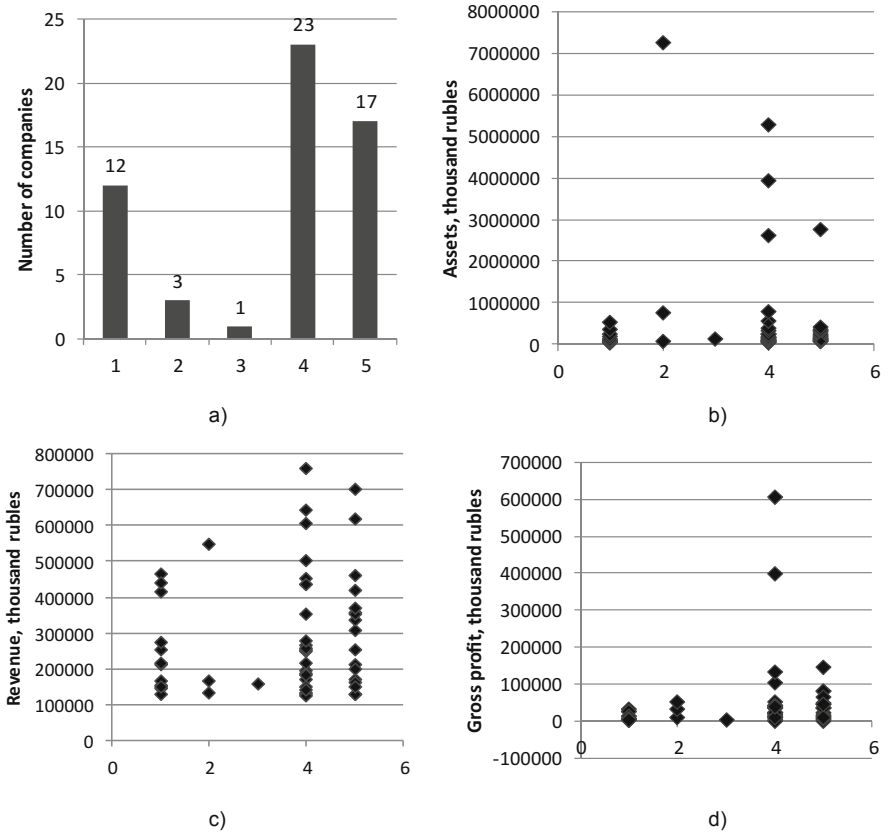

Fig. 1 Characteristics of the sample. (**a**) Distribution by number of employees. (**b**) Distribution by assets. (**c**) Distribution by revenue. (**d**) Distribution by gross profit. Source: Compiled by the authors

The total amount of debt capital of small enterprises in the construction industry is 28,294.628 million rubles, including long-term liabilities in the amount of 11,664.944 million rubles (including long-term loans of 4707.358 million rubles) and short-term liabilities in the amount of 16,629.684 million rubles (including short-term loans of 608.067 million rubles). Thus, debt financing of small construction companies makes up 88.65% of the total amount of financing, with long-term liabilities amounting to 36.55% and short-term—to 52.1% of total financing. Loans comprise 40.35% of long-term and 3.66% of short-term liabilities. In the total amount of liabilities, loans amount to 18.79%.

As the main characteristic of debt financing, the indicator Debt/Assets reflecting the share of liabilities in the total company's financing was used. Table 2 shows the distribution of companies by the value of this indicator. It can be seen that the vast majority of companies have a very high share of debt financing. The debt exceeds equity in 52 companies.

Table 1 Sources of financing for small construction companies

Source	Specifics of the use by small construction business
Equity	
Authorized capital	Limited opportunity for additional contributions from the founders. Impossibility of IPO
Net profit	Limited resources. Contradiction with the interests of founders
Debt	
Investors, partners, legal entities	Funds of the parent company, reallocation of funds within the group of companies
Beneficiaries	Projects with the participation of beneficiaries are unavailable for small companies
Credit institutions	High-interest rates due to the high level of risk reflected in the financial indicators of small companies
Securities issue	The lack of practice of issuing bonds to small enterprises, high time, and financial costs
Loan against property	Assets specificity of construction companies
Offsetting	Complexity of chain building and low reliability
State funding	
State funding	Obtained through in competitions. Rarely provided to small companies besides small business support programs

Source: Compiled by the authors

Table 2 Distribution of the companies by the ratio of debt financing

	Number of companies		
Debt/Assets	Whole sample	Companies with long-term debt	Companies without long-term debt
0–0.1	–	–	–
0.1–0.2	1	1	–
0.2–0.3	1	–	1
0.3–0.4	1	–	1
0.4–0.5	1	–	1
0.5–0.6	1	–	1
0.6–0.7	5	2	3
0.7–0.8	9	3	6
0.8–0.9	14	9	6
0.9–1.0	23	5	18
Total number	56	19	37

Source: Own calculations

The profitability indicators shown in Table 3 are used as the measures of companies' effectiveness. The Gross Profit/Assets ratio determines the upper limit of the interest rate on debt ensuring nonnegative effect of the financial leverage and the opportunity to increase the return on equity due to using the debt. It should be marked that one company from the general list has a negative operating result,

Table 3 Profitability indicators

Indicator	All companies (%)	Companies with long-term debt (%)	Companies without long-term debt (%)
Gross Profit/Assets (ROA)	8.66	7.08	10.56
Gross Profit/Revenue (ROS)	19.74	28.08	13.45
Gross Profit/Costs	24.60	39.04	15.54
Profit before Tax/Equity	44.58	43.98	25.27
Net Profit/Equity (ROE)	35.13	34.16	19.76

Source: Own calculations

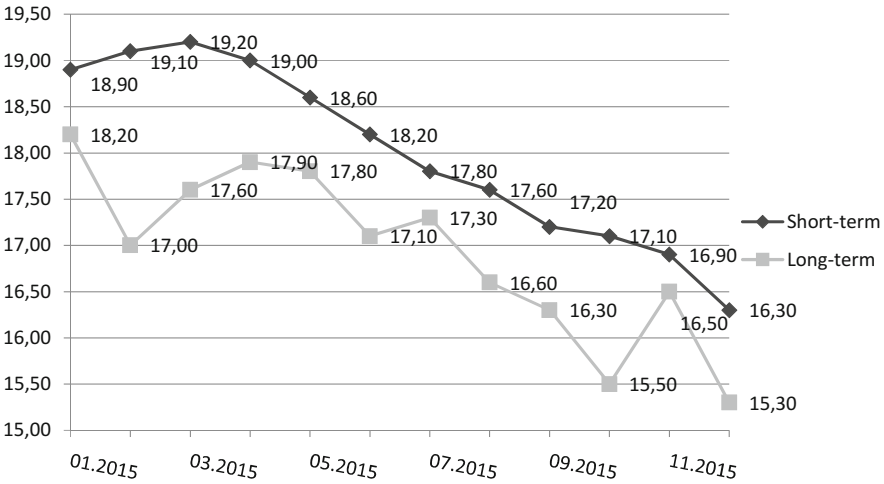

Fig. 2 Dynamics of interest rates on bank loans for small business in 2015. Source: Ionova et al. (2015)

which, however, is covered by profit from financial activities, which provides a positive value of net profit. Two companies have a net loss for the year. In one of them, it was formed by the sum of the results of operating and financial activity, and the other—after paying taxes with a positive overall operating and financial result. All mentioned companies do not use long-term debt financing.

In a sample survey conducted in 2016 to identify factors limiting the operation activity of construction companies, 24% of respondents indicated a lack of financing, and 19% noted a high-interest rate on commercial loans (Higher School of Economics 2017). The return on assets should be compared with the level of interest rates on bank loans. Figure 2 shows the change in interest rates on short- and long-term bank loans to small businesses in 2015. The general trend of rate changes was

their decline following a decrease in the Central Bank's key interest rate. The fact that long-term rates are less than short-term ones can be explained by expectations of further reduction of the key interest rate. The average values constituted 18.15% per annum for the short-term rate and 17.07% for the long-term rate. For 34 companies from the sample return on assets is lower than the average long-term interest rate, and for 30 companies it is lower than the short-term rate. Thus, for more than half of the companies, bank borrowing at current interest rates are impossible, since they would lead to a decrease in the return on equity, and, taking into account small share of equity in the financing of assets, to losses and bankruptcy. However, the high values of the indicator Net Profit/Equity show that small construction companies may use debt financing at rates lower than rates on bank loans.

Sixteen companies have a negative effect of financial leverage, that is, their return on equity is lower than the return on assets. For most companies, the return on equity is higher than the return on assets. However, the correlation ratio between the share of liabilities and the return on equity is equal to 0.1607, that is, there is no statistical relationship between these indicators.

For further analysis, the sample was divided into two groups. The first group includes 37 companies that do not use long-term debt financing. The second group comprised of 19 companies with long-term debt financing. The average assets of the companies belonging to the second group exceed the average value of the assets of the companies from the first group by 9 times, that is, long-term debt is used by larger companies.

Distribution of companies by Total Debt/Assets in both groups is shown in Table 1. In both groups, most companies have a value above 0.7. Wherein, for companies using long-term debt financing, long-term debt financing constitutes 50.89% of total and 80% of it is formed by loans. The share of short-term debt sources in the total amount of financing for these companies is 38.17%.

Profitability indicators for both groups are shown in Table 3. It may be seen that the return on assets in the group of companies that do not use debt financing is 1.5 times higher than in the other groups. In the first group, the range of the indicators varies from −0.08% to 123.73%, and for the second—from 0.52% to 63.4%. Companies that do not use long-term debt financing have a higher asset turnover ratio (Revenue/Assets) of 1.08 versus 0.79 for the other groups. However, the Gross Profit/Cost indicator in the group of companies using long-term debt financing is 2.5 times higher. It should be noted that this indicator is usually set by the company when pricing, by including in the price calculation a fixed percentage of the premium to the cost that covers the risk of prices growth on construction materials and ensures profit. The tax burden on profits for the group of companies using long-term debt financing is slightly higher. It equals to 21.81% of profit before tax, while companies that do not use long-term debt financing have 18.55%. Return on equity by net profit equals to 34.16% for companies with long-term debt financing versus 19.75% for companies of another group.

To analyze the financial leverage effect, the indicators of the financial activities balance as the difference between the profit before taxation and gross profit, and the calculated interest rate as the ratio of the balance of financial activities to the total

Table 4 Indicators of financial activities

Indicators	Companies with long-term debt (%)	Companies without long-term debt (%)
Number/share of companies with a positive balance of financial activities	3/15.79	5/13.51
Number/share of companies with a negative balance of financial activities	16/84.21	32/86.49
Minimum value of the calculated interest rate for companies with a negative balance of financial activities	1.21	0.10
Maximum value of the calculated interest rate for companies with a negative balance of financial activities	60.06	190.71
Calculated interest rate for the group as a whole	2.55	4.66
Number/share of companies with a positive financial leverage effect	13/68.42	28/75.48
Number/share of companies with negative financial leverage effect	6/31.58	9/24.52
Minimum value of the financial leverage effect	−11.13	−98.79
Maximum value of the financial leverage effect	47.94	817.96

Source: Compiled by the authors

debt financing were calculated (Table 4). It may be seen that a small proportion of companies have a positive balance of financial activities, that is, the receipts from the financial activities of these companies exceed the payments for the use of debt financing and other financial expenses. Dispersion of interest rates for companies with a negative balance of financial activities is very large. This reflects the individuality of the borrowing terms and the practical lack of connection between these terms and the interest rate of the bank loan market. The actual value of the financial leverage effect was calculated as the difference between the return on assets and the return on equity. The share of companies with negative financial leverage is higher among companies using long-term debt financing.

Figure 3 presents the graphs of actual and calculated financial leverage effect for groups of companies that use and do not use long-term debt financing. Companies in the groups were pre-ordered by assets decrease.

For companies using long-term debt financing, coincidence of actual and calculated values is significantly lower than for companies of the other group, and the calculated values of financial leverage effect are higher than those actually observed. This is seen in Fig. 3, where the darker line corresponds to the actual values. The discrepancy can be explained by the fact that the financial activities of the companies of this group are not limited to only paying interest. It should be also noted that for a group of companies using long-term debt financing, there is a more pronounced relationship between the value of assets and the effect of financial leverage. The correlation coefficient between the specified values is 0.4018, while for the other group it is −0.835.

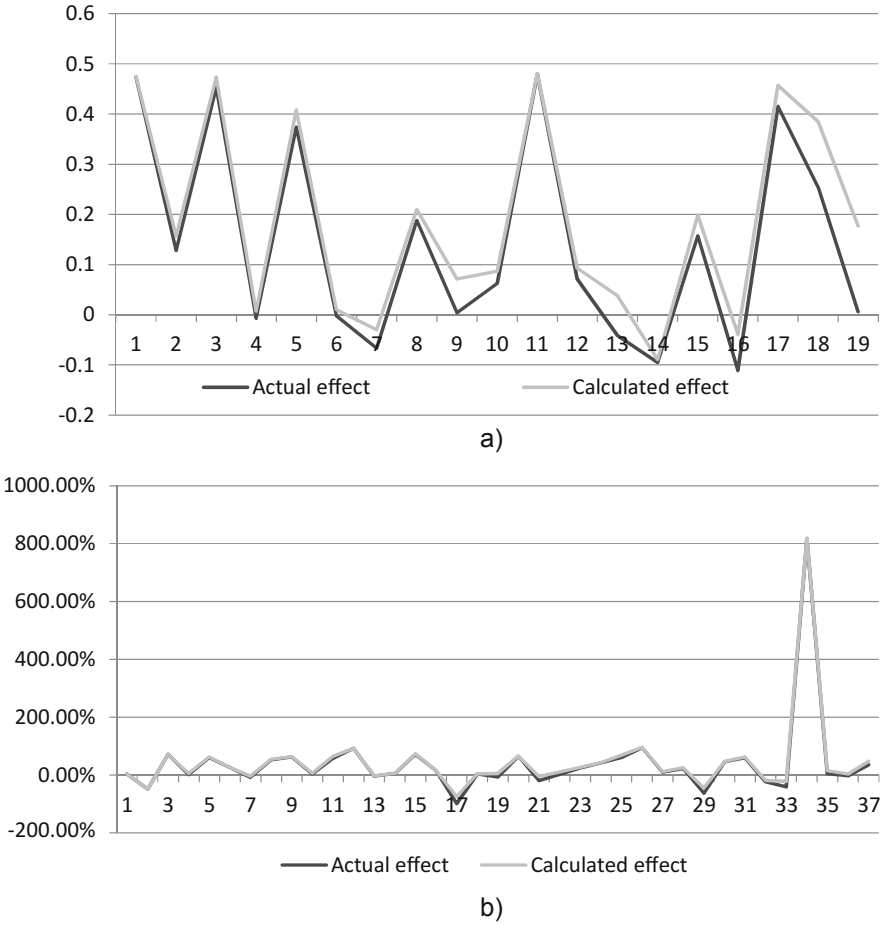

Fig. 3 Actual and calculated effect of financial leverage. (**a**) Companies with long-term debt financing. (**b**) Companies without debt financing. Source: Compiled by the authors

4 Conclusions

The analysis made it possible to draw a number of conclusions on the use of debt financing by Russian small construction companies.

The vast majority of small construction companies have a high level of debt financing, which makes their activity dependent on borrowed sources and, therefore, makes the financial position of companies unsustainable. Thus, there is a high level of financial risk for both the companies and their counterparties. The risk of companies may be manifested in the violation of production schedule, the decrease in profitability, the occurrence of losses and, ultimately, in the loss of financial and

economic independence, that is, bankruptcy. Counterparties may collide with nonfulfillment or delay in obligations serving.

The level of return on assets does not allow the majority of analyzed companies using bank loans. However, other available sources of debt financing, including funds of parent companies and accounts payable, fare cheaper, which makes it possible to ensure the receipt of net profit even with a low level of return on assets. Individuality of the terms of financing leads to a wide dispersion of return on equity and effect of the financial leverage.

Companies with long-term debt financing are larger both in terms of the number of employees and in terms of assets compared to companies that do not use long-term debt financing. Group of companies, not using long-term debt financing has a higher return on assets, but their return on equity is much lower than the aggregate indicator of the other group. Group of companies using long-term debt financing is more homogeneous in terms of the calculated costs of the debt and the effect of the financial leverage. Use of long-term debt, on the one hand, ensures greater stability of companies, and, on the other hand, reflects their better financial position proved by the fact of getting long-term loans, which can take place only after preliminary peer analysis.

The state of small business in the construction branch is unstable. Companies that do not currently use long-term debt financing are more at risk, as short-term sources of financing are most sensitive to the general economic situation. Consolidation of companies, ordering and streamlining of pricing in the construction industry, reducing the cost of debt financing, development and provision the variety of forms and methods for bank lending and direct lending by nonbank investors may be considered as stabilizing factors.

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Estimation of "Dark Matter" in the External Sector of the United States After the Outbreak of the World Economic Crisis in 2009

Konrad Sobanski

Abstract The aim of this chapter is to estimate the "dark matter" assets in the external sector of the United States after the outbreak of the world economic crisis in 2009. The author conducts a statistical analysis using a time series on the balance of payments (BoP) and international investment position (IIP) data for the United States and a group of 19 developed economies. The study reveals that the United States is a privileged economy with respect to foreign income on international investments. The rates of return on its foreign assets are relatively higher, and the costs incurred on its foreign liabilities relatively lower, as compared with the benchmark group of developed countries. Based on prevailing income differentials substantial "dark matter" net assets in the external sector of the US economy are estimated. Consequently, the actual net IIP deviates significantly from that officially reported. Recognizing such "dark matter" leads to the conclusion that the United States is a foreign creditor, not a debtor.

Keywords Income account · International investment position · "Dark matter" hypothesis · The United States

1 Introduction[1]

In the US balance of payments (BoP), there is a surplus in the income account despite a deeply negative net international investment position (IIP). In other words, for the United States, relatively smaller foreign assets generate a higher income as

[1]Portions of this chapter were published previously in Sobanski (2019) [Sobański, K., 2019. 'Dark matter' in the external sector of the United States. *Economics and Business Review*, Vol. 5(19), No. 2, pp. 86–108]. This chapter is a conference paper presented at the 23rd Eurasia Business

K. Sobanski (✉)
International Finance Department, Poznan University of Economics and Business, Poznan, Poland
e-mail: konrad.sobanski@ue.poznan.pl

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compared with the servicing costs incurred on relatively larger foreign liabilities. Hausmann and Sturzenegger (2005, 2006) try to explain this phenomenon using a concept of "dark matter" in the external sector. The concept assumes that US net foreign assets are underestimated in official BoP statistics. This underestimation results from the inadequacy of the methods applied to evaluate foreign investments as they do not take into account all the elements of the attractiveness of an investment.

The aim of this chapter is to estimate "dark matter" assets in the external sector of the United States after the outbreak of the international economic crisis in 2009. We conduct a statistical analysis using a time series on BoP (foreign income flows) and IIP data for the United States and other developed economies for the years 2009–2016. The data are from the International Monetary Fund (International Financial Statistics—IFS, Balance of Payments Statistics—BoPS) and the US Bureau of Economic Analysis (BEA). The research method applied is based on the concept of "dark matter" by Hausmann and Sturzenegger (2005, 2006). Based on a comparison of the rates of return between the United States and a group of 19 developed countries, hypothetical income streams on US foreign assets and liabilities are calculated. Then "dark matter" net assets and an economic net IIP (as opposed to an official net IIP) for the United States are estimated. The study contributes to the literature in three ways. Firstly, it extends Hausmann and Sturzenegger's concept of "dark matter" by analyzing it separately for each type of investment (foreign direct investment, portfolio debt, portfolio equity, and other investments). Secondly, unlike Hausmann and Sturzenegger (HS), the author does not use an arbitrary assumed capitalization rate but applies empirical rates of return and implements a concept of hypothetical income. Thirdly, the HS analysis of "dark matter" is also extended by covering the postcrisis period.

The structure of the chapter is as follows. In the second section, the methodology of our research is presented. In the third section, the returns on foreign investments in the United States and the benchmark group of developed countries are compared and a hypothetical income on US foreign assets and liabilities is calculated. In this section, an estimate of "dark matter" in the US external sector is also presented. Conclusions from the analysis are presented in the final section.

2 Methodology of the Research

The fundamental framework for this research is the concept of "dark matter" by Hausmann and Sturzenegger (2005, 2006). Stressing that official statistics do not fully reflect the actual economic position they argue that the current account deficit

and Economics Society Conference, Madrid, Spain, September 27–29, 2017. Sobanski (2019) is an extended and revised version of the conference paper.

and the negative net IIP of the US economy are purely of a statistical nature and the phenomenon of so called "global imbalances" is illusory.[2]

Hausmann and Sturzenegger (2005, 2006) assume that measuring the stocks of foreign assets and liabilities is more problematic than measuring the income flows on these assets and liabilities. Therefore, the researchers propose an alternative method of estimating net foreign assets based on the capitalization of foreign income streams. The valuation of net foreign assets is based on total net foreign investment income (NI_t) and capitalization rate (r):

$$NFA_t^{DM} = \frac{NI_t}{r} \tag{1}$$

where

NFA_t^{DM} net foreign asset position adjusted for the valuation of the "dark matter" (actual net IIP).

The difference between the official net IIP and the position estimated by capitalizing the net income (the actual net IIP) is called "dark matter" (DM), as shown in the following formula:

$$DM = NFA_t^{DM} - NFA_t \tag{2}$$

where

NFA_t net foreign asset position (net IIP) according to official statistics, with the rest of the notation as presented above.

The major issue of the approach applied by Hausmann and Sturzenegger (2005, 2006) is that it estimates the "missing wealth" based on total net income and does not recognize any valuation differences among equity investments, bonds, and bank loans on both (asset and liability) sides of the international balance sheet (see Economist 2006).

This chapter extends the concept of "dark matter" by estimating it separately for FDIs, portfolio debt, portfolio equity, and other investments rather than on an aggregate level. Additionally, "dark matter" is estimated on a gross basis, i.e., separately for foreign assets and foreign liabilities. Unlike Hausmann and Sturzenegger, this chapter does not apply an arbitrary assumed capitalization rate but employs empirical rates of return. Such an approach is based on the presumption that assets exposed to different risks should generate different returns. The rates of return (income yields) are estimated as a ratio of income to asset stock or liability stock measured at the end of the previous year:

[2]For discussion on "global imbalances" see Obstfeld and Rogoff (2004, 2005), and Sobanski (2010).

$$r_t = \frac{\mathrm{INC}_t}{A_{t-1}} \tag{3}$$

where

r_t rate of return on a given investment (asset or liability) in the period t
INC_t foreign income (earnings, interest, or dividends) on assets or liabilities in the period t
A_{t-1} stock of assets or liabilities at the end of the preceding period

The HS analysis of "dark matter" is also extended by implementing a concept of hypothetical income (see below) and by covering the postcrisis period. The time span of the analysis covers the years 2009–2016.

This chapter compares the rates of return generated on US foreign assets and liabilities with returns generated on the international investment positions among a group of 19 developed economies (benchmark group).[3] The benchmark group is formed of countries at a level of development comparable to the US economy. Selection for the sample was based on gross domestic product (total GDP and GDP per capita). The analyzed group consists of economies with a GDP in 2016 of at least 100 billion USD, whose GDP per capita in 2016 was no less than 35,000 USD.[4] The data are from the International Monetary Fund and the US Bureau of Economic Analysis.

The rates of return on FDIs, portfolio equity, portfolio debt, and other investments for the benchmark group $\left(r_t^B\right)$ are calculated as the weighted averages of returns for the respective countries (with stocks of assets or liabilities as weights):

$$r_t^{\mathrm{B}} = r_t^i \times \frac{A^i{}_{t-1}}{\sum_{i=1}^{n} A^i{}_{t-1}} \tag{4}$$

where

r_t^i rate of return on a given investment (asset or liability) in country i in the period t, where $i = 1, \ldots, n$ ($n = 19$)
$A^i{}_{t-1}$ stock of assets or liabilities in country i at the end of the preceding period

Any difference between rates of return on a given asset or liability in the United States and the benchmark group is evaluated with regard to its persistency and its statistical significance in the period analyzed. The statistical significance is evaluated based on t-tests or Mann–Whitney U-tests depending on characteristics of the

[3]The benchmark group consists of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong SAR, Ireland, Israel, Japan, the Netherlands, New Zealand, Norway, Singapore, Sweden, Switzerland, and United Kingdom.

[4]These GDP criteria are met by 21 economies. However, Qatar and the United Arab Emirates are not included in the analysis due to lack of data.

sample distribution. In the case of persistent differences (either positive for assets or negative for liabilities)[5] that proved to be statistically significant, a hypothetical income on a given asset or liability is then calculated.

The hypothetical income is estimated by applying the benchmark returns to actual stocks of US foreign assets and liabilities ($A^{US}{}_{t-1}$):

$$INC_t^{hUS} = r_t^B \times A^{US}{}_{t-1} \tag{5}$$

This chapter assumes that positive/negative differences between the actual and the hypothetical incomes for a given asset/liability are attributable to unrecognized assets/liabilities and constitute "dark matter" income. The valuation of "dark matter" for a given type of asset or liability is based on the capitalization of the "dark matter" income using empirical yields for this type of asset or liability in the benchmark group.

Finally, the actual net IIP for the United States is estimated by adjusting the official position with an estimate of "dark matter" net assets:

$$NFA_t^{DM} = NFA_t + DM_t \tag{6}$$

3 "Dark Matter" Estimates

An informal analysis of rates of return proves that in the postcrisis period the United States was able to generate higher rates of return on equity assets and incur lower cost of capital on equity liabilities (both FDI and portfolio) as compared with the benchmark group (see Fig. 1). Whereas the average yearly rate of return on FDI assets in the benchmark group was 5.0%, the return generated by the United States was higher by 2.9 percentage points (p.p.). At the same time, the rate of return (cost of capital) on FDI liabilities for the United States amounted to 3.8%, which was lower by 0.9 p.p. than for the benchmark group. For portfolio equity investments, the average yearly return generated on US assets amounted to 3.3%, which exceeded that for the benchmark group by 0.7 p.p.; likewise, the average costs incurred on US liabilities amounted to 2.3%, which was lower by 0.5 p.p. compared with the benchmark group. What is more, the differentials were persistent, i.e., they were observed in all years of the analyzed period. The statistical analysis confirmed that the return differences between the United States and the benchmark group are significant at a low p level (below 0.01).[6]

[5] Occurring in all years of the analyzed time span.

[6] As returns on equity investments proved to be normally distributed (see Table 1) t-tests were applied to evaluate the difference between the means of returns in the United States and the

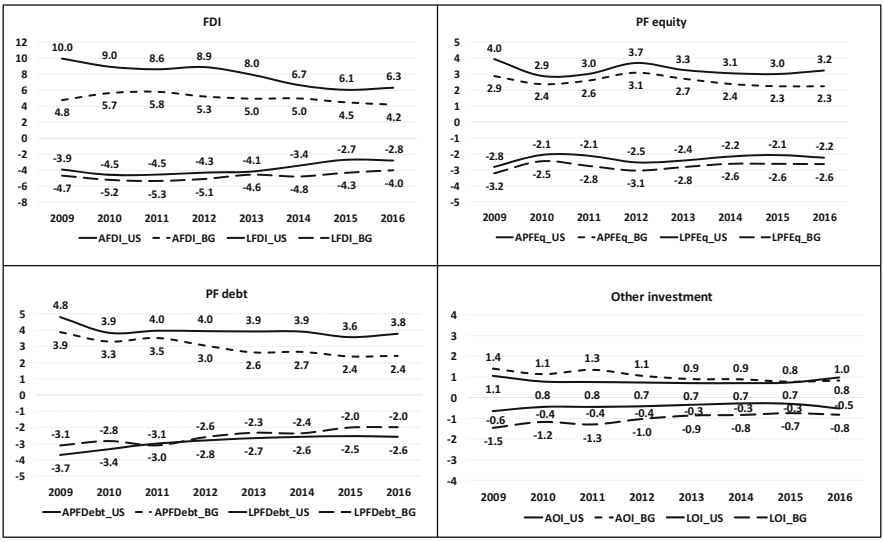

Fig. 1 Rates of return on foreign assets and liabilities of the United States and the benchmark group for the years 2009–2016 (in %). Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis. Other remarks: Charts depict rates of return on respective foreign assets or liabilities of the United States and the benchmark group, i.e.: AFDI_US/AFDI_BG—on foreign direct investment assets of the United States/the benchmark group countries, LFDI_US/LFDI_BG—on foreign direct investment liabilities of the United States/the benchmark group countries, APFEq_US/APFEq_BG—on portfolio equity investment assets of the United States/the benchmark group countries, LPFEq_US/LPFEq_BG—on portfolio equity investment liabilities of the United States/the benchmark group countries, APFDebt_US/APFDebt_BG—on portfolio debt investment assets of the United States/the benchmark group countries, LPFDebt_US/LPFDebt_BG—on portfolio debt investment liabilities of the United States/the benchmark group countries, AOI_US/AOI_BG—on other investment assets of the United States/the benchmark group countries, LOI_US/LOI_BG—on other investment liabilities of the United States/the benchmark group countries. In order to differentiate between rates of return on assets (inflow returns) and rates of return on liabilities (outflow returns) the former are presented in charts as positive numbers and the latter as negative ones

The aforementioned results support the findings of other economists that US companies generate higher returns on their direct investments abroad than foreign entities generate on their FDI assets in the United States (Gros 2006a; Bosworth et al. 2007; Kitchen 2007; McGrattan and Prescott 2008; Curcuru and Thomas 2015; Ali 2016). However, it is worth stressing that the results go beyond this finding by additionally proving that US companies are able to generate higher FDI and portfolio equity returns than companies from other developed countries earn on their equity investments abroad (not just in the United States), and that the US economy incurs lower costs on equity capital provided by foreign investors as compared with the

benchmark group (see Table 3), with the Cochran–Cox adjustment if the assumption of homogeneity of variance is not met (see Table 2).

Table 1 Normality tests for the distribution of the rates of return

Variable	Shapiro–Wilk W test	Jarque–Bera test	Conclusions regarding the null hypothesis (NH)
AFDI_US	0.41	0.71	Accept NH
AFDI_BG	0.90	0.84	Accept NH
APFEq_US	0.12	0.54	Accept NH
APFEq_BG	0.42	0.70	Accept NH
APFDebt_US	0.01	0.09	Reject NH
APFDebt_BG	0.45	0.70	Accept NH
AOI_US	0.01	0.42	Reject NH
AOI_BG	0.34	0.67	Accept NH
LFDI_US	0.19	0.64	Accept NH
LFDI_BG	0.89	0.81	Accept NH
LPFEq_US	0.14	0.56	Accept NH
LPFEq_BG	0.46	0.69	Accept NH
LPFDebt_US	0.09	0.53	Accept NH
LPFDebt_BG	0.37	0.72	Accept NH
LOI_US	0.64	0.79	Accept NH
LOI_BG	0.34	0.67	Accept NH

Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis
Null hypothesis: The population is normally distributed
Other remarks: *P*-values for two normality tests are presented. Assumed significance level for accepting/rejecting the null hypothesis 5%. Variables represent rates of return on respective foreign assets or liabilities of a given economy. For description see other remarks under Fig. 1

Table 2 Homogeneity of variance (homoscedasticity) test for the rates of return

Paired variables	Two-tailed *p*-value (*F* test)	Conclusions regarding the null hypothesis (NH)
AFDI_US vs. AFDI_BG	0.02	Reject NH
APFEq_US vs. APFEq_BG	0.63	Accept NH
APFDebt_US vs. APFDebt_BG	0.30	Accept NH
AOI_US vs. AOI_BG	0.17	Accept NH
LFDI_US vs. LFDI_BG	0.20	Accept NH
LPFEq_US vs. LPFEq_BG	0.87	Accept NH
LPFDebt_US vs. LPFDebt_BG	0.85	Accept NH
LOI_US vs. LOI_BG	0.07	Accept NH

Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis
Null hypothesis: The population variances are equal
Other remarks: Assumed significance level for accepting/rejecting the null hypothesis 5%. Variables represent rates of return on respective foreign assets or liabilities of a given economy. For description see other remarks under Fig. 1

Table 3 Test for equality of the mean rates of return

Paired variables	*t*-test/*U*-test results	Conclusions regarding the null hypothesis (NH)
AFDI_US vs. AFDI_BG	$t = 5.39$ (0.00)	Reject NH
APFEq_US vs. APFEq_BG	$t = 3.96$ (0.00)	Reject NH
APFDebt_US vs. APFDebt_BG	$U = 61$	Accept NH
AOI_US vs. AOI_BG	$U = 54$	Accept NH
LFDI_US vs. LFDI_BG	$t = -3.14$ (0.01)	Reject NH
LPFEq_US vs. LPFEq_BG	$t = -3.80$ (0.00)	Reject NH
LPFDebt_US vs. LPFDebt_BG	$t = 1.65$ (0.12)	Accept NH
LOI_US vs. LOI_BG	$t = -5.94$ (0.00)	Reject NH

Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis

Null hypothesis: Difference of means = 0

Other remarks: The table presents *t*-test statistics accompanied by two-tailed *p*-values (in parentheses) or *U*-test statistics. Assumed significance level for accepting/rejecting the null hypothesis 5%

The independent-samples *t*-test evaluates the difference between the means of two independent or unrelated groups. For pairs of variables for which the assumption of homogeneity of variance is not met (i.e., for rates of return on FDI assets), the author used the *t*-test with the Cochran–Cox adjustment for the standard error of the estimate. When the normality condition is not met (i.e., for rates of return on portfolio debt assets and other investment assets) the nonparametric U Mann–Whitney test was applied for the difference in the distribution of two independent groups

Variables represent rates of return on respective foreign assets or liabilities of a given economy. For description see other remarks under Fig. 1

costs incurred by other developed economies. Among the factors responsible for the United States return advantage the abovementioned economists indicate the following: unique US know-how, the different risk characteristics of US and foreign projects, and transfer pricing (reporting extra income in low tax jurisdictions of US affiliates and reduced income by foreign affiliates in the United States).

For portfolio debt investments the return differential proved to be statistically insignificant (see Table 3). As returns on portfolio debt assets did not prove to be normally distributed (see Table 1), the nonparametric Mann–Whitney *U*-test was applied for the difference in the distribution of two independent groups. Although the sample data suggest a difference in mean rates of return, the sample sizes are too small to reach a conclusion that there is a statistically significant difference. In the case of portfolio debt liabilities, the differentials were not persistent and based on the *t*-test the author was not able to reject the null hypothesis that the means are the same.

For other investments only returns on liabilities turned out to be persistent and statistically different between the two groups (at a *p*-value close to 0.00). In the postcrisis period, the United States incurred a cost of 0.4% annually, which was 0.6 p.p. lower than in the benchmark countries.

Next, we compared the actual income and the hypothetical income on US foreign assets and liabilities for which we observed rates of return that were persistently and significantly different than for the benchmark group (see Fig. 2). In the years 2009–2016, actual average income on FDI assets of the United States amounted to

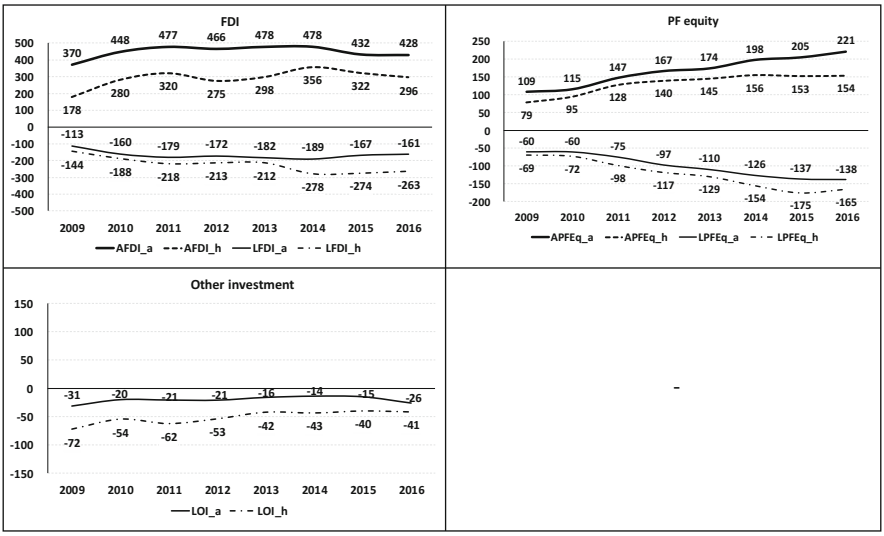

Fig. 2 Actual versus hypothetical incomes on foreign assets and liabilities of the United States for the years 2009–2016 (in billion USD). Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis. Other remarks: AFDI_a/LFDI_a—actual income on foreign direct investment assets/liabilities of the United States. AFDI_h/LFDI_h—hypothetical income on foreign direct investment assets/liabilities of the United States. APFEq_a/LPFEq_a—actual foreign income on portfolio equity assets/liabilities of the United States. APFEq_h/LPFEq_h—hypothetical foreign income on portfolio equity assets/liabilities of the United States. LOI_a/LOI_h—actual/hypothetical income on other investment liabilities of the United States

447.3 billion USD per annum, whereas the hypothetical amount was 290.8 billion USD. In the case of FDI liabilities, the actual costs incurred by the United States amounted to 165.3 billion USD, i.e., 58.5 billion less than expected based on the benchmark group experience. For portfolio equity investments the differences were much lower. Actual income on US portfolio equity assets amounted to 167.0 billion USD (35.7 billion USD more than the hypothetical income) and the costs on US portfolio equity liabilities were 100.2 billion USD (22.1 billion USD less than the hypothetical costs). Annual savings on the servicing costs related to other investment liabilities for the US economy amounted to 30.3 billion USD on average (the actual costs incurred were 20.5 billion USD, whereas the hypothetical income was 50.8 billion USD).

We calculated "dark matter" in the external sector of the United States by capitalizing the income differential using the empirical rates of return (see Table 4). The estimate of "dark matter" amounts to 11.5 trillion USD at the end of 2016 (and ranging from 5.9 to 11.9 trillion USD in the period analyzed). The largest part of "dark matter" relates to FDIs as the largest relative income benefits for the US economy are attributable to this type of foreign investment. At the end of 2016, the "dark matter" on FDIs is estimated to be at a level of 5.6 trillion USD (of which 3.1

Table 4 "Dark matter" estimate for the United States for the years 2009–2016 (in billion USD)

Type of investment	2009	2010	2011	2012	2013	2014	2015	2016
FDI assets	4004	2949	2687	3632	3622	2435	2440	3113
FDI liabilities	678	539	740	812	673	1849	2482	2535
FDI net	4681	3488	3428	4444	4295	4283	4922	5648
PF equity assets	1006	844	746	873	1038	1748	2302	2983
PF equity liabilities	279	485	845	672	681	1063	1445	997
PF equity net	1285	1328	1591	1545	1720	2811	3747	3980
OI liabilities	1601	1543	912	1618	1998	2668	3203	1858
Total "dark matter"	7568	6360	5931	7607	8012	9762	11,872	11,485

Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis

Table 5 Official versus actual net international investment position of the United States for the years 2009–2016 (in billion USD)

Net international investment position	2009	2010	2011	2012	2013	2014	2015	2016
Official net IIP	−2628	−2512	−4455	−4518	−5373	−7046	−7281	−8110
"Dark matter"	7568	6360	5931	7607	8012	9762	11,872	11,485
Actual net IIP	4940	3848	1476	3089	2640	2716	4592	3375

Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis

trillion USD relates to assets and 2.5 trillion USD relates to liabilities). "Dark matter" stemming from the valuation of portfolio equity investments amounts to 4.0 trillion USD (of which 75% relates to assets and the rest to liabilities). Based on cost savings on other investment liabilities we estimate an additional "dark matter" amount of 1.9 trillion USD.[7]

The official net IIP indicates that the US economy is an international debtor. In the postcrisis period, the net IIP of the United States was negative and increasing, going from −2.6 trillion USD in 2009 (−18.2% of GDP) to −8.1 trillion USD in 2016 (−43.7% of GDP). However, after adjustment using the estimate of "dark matter" it becomes positive. The "dark matter" in the external balance sheet seems significant (exceeding 5.9 trillion USD in the postcrisis period). Recognizing these "dark matter" net assets leads to the conclusion that the United States is a foreign creditor, not a debtor (see Table 5). The economic net IIP (official net IIP adjusted by the "dark matter") ranges from 1.5 to 4.9 trillion USD, or in relative terms from 9.5% to 34.3% of GDP (see Fig. 3).

[7]As unfavorable income differentials for other investment assets of the United States can be observed, the author calculated the "dark matter" relating to other investment liabilities based on the net income differential, i.e., the cost savings on other investment liabilities reduced by the unfavorable income differential on other investment assets.

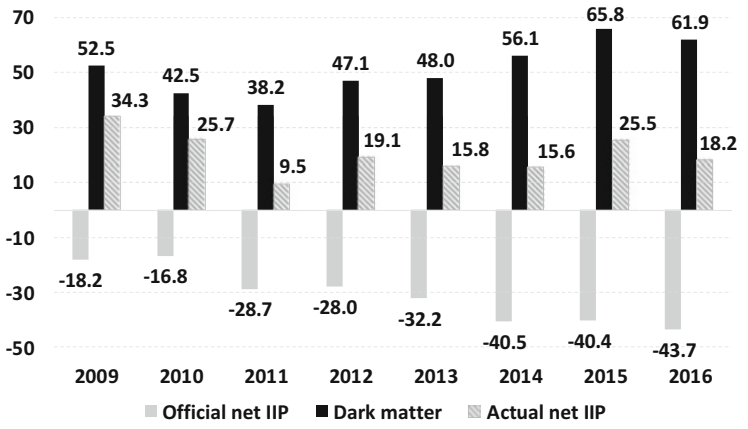

Fig. 3 Official versus actual net international investment position of the United States for the years 2009–2016 (as % of GDP). Source: Own compilation based on data provided by the International Monetary Fund (IFS, BoPS) and the US Bureau of Economic Analysis

4 Conclusion

This research indicates that the United States is a privileged economy with respect to foreign income on international investment. Rates of return on its foreign assets are relatively higher, and the costs incurred on its foreign liabilities relatively lower, as compared with the benchmark group of developed countries. The exorbitant privilege of the United States relates mainly to equity investments. The major excess return and income streams are generated on FDIs abroad. At the same time major cost savings are realized on FDI liabilities. Relative benefits are also observable in the case of portfolio equity assets and liabilities. Among debt instruments, the statistically significant advantage of the United States was only seen for other investment liabilities.

Based on prevailing income differentials, the chapter estimates substantial "dark matter" net assets in the external sector of the United States. Consequently, the actual net IIP deviates significantly from that officially reported. Recognizing such "dark matter" leads to the conclusion that the United States is a foreign creditor, not a debtor.

The findings of the study shed some light on the puzzle as to why the United States has a continuing ability to keep servicing costs below the income generated abroad and to sustain its external position despite mounting foreign liabilities. This might also explain why the severe external adjustment forecast by many economists (Obstfeld and Rogoff 2005; Gros 2006b; Roubini 2006) did not occur in the United States.[8] The fact that the US income privilege has not evaporated so far, despite the

[8]The economists expected a sudden reversal in capital flows and depreciation of the US dollar. Such balance of payments crisis is characteristic for emerging markets (see Aysan et al. 2014). It worth to

world economic crisis, supports the "dark matter" hypothesis. The external equilibrium of the US economy is more sustainable than might be expected based on the officially reported data.

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be noted that such fluctuations would increase the probability of shifting from the US dollar to the euro in international reserves of central banks (see Komijani and Tavakolian 2011). Other types of financial crisis are also widely discussed in the literature. For instance, for a discussion of banking crises see Diemer and Vollmer (2015).

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Part IV
Economics of Innovation

Innovation Theory: Where Is It Going?

Elżbieta Szymańska

Abstract The aim of this study was to describe the innovation processes in the theory of management sciences and to find the main direction of their development. Methods of critical and comparative analyses were used. The research diagnosed a large number (9) of innovation models that had been created since the beginning of innovation theory. The theory started with simple models and later developed the most complicated ideas. The models can be divided into two main groups: linear and nonlinear ones. The conjugated innovation concept showed that the innovation process could be more complicated than a simple cause-and-effect relationship. The new concept started discussions on a new open innovation model. The ideas of user-driven innovation (UDI) and diffusion of innovations were the consequences of this proposal. A description and classification of the innovation models is a novelty in the theory of the management sciences. Another result is the idea of combining some innovation process models. The expected results will have an effect on the development of economic sciences, especially the management sciences. The present research shows that innovation processes are more and more complicated. One can see the increasing role of clients (customers) and wider cooperation in the modern models of innovation processes.

Keywords Innovation · Open innovation · Model · User · Cooperation

1 Introduction

Innovation is the driver of economic development for each country and individual companies. Therefore, innovative processes fall within the area of interest in science and business practice. The concept of innovation was adopted in 1911. The name

E. Szymańska (✉)
Bialystok University of Technology, Białystok, Poland
e-mail: e.szymanska@pb.edu.pl

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derives from the Latin word "innovatio," meaning "rebirth" or "innovare," with the same meaning as the verb "renew" (Szymańska 2009).

Schumpeter (1960) was the creator of innovation theory. The concept of this theory provided the basis for the interpretation applied by the Organization for Economic Cooperation and Development (OECD) in Oslo Manuals, including their most important third edition (OECD 2005), according to which innovation involves the transformation of an idea into a saleable product or service, a new or improved production or distribution process, or a new method of social service. In accordance with this nomenclature, innovation can be related to a product, process, organization, or marketing.

Schumpeter (1960, p. 45) proposed a definition of innovation:

- The introduction of new products in production or an improvement in the existing ones.
- The introduction of a new or improved production technology.
- The application of a new method of sales or purchase.
- The opening of a new market for both sales, distribution of production and procurement.
- The application of new raw materials or half-manufactured goods.
- The introduction of changes in the organization of production.

Schumpeter's thought was continued, among others, by Rosenberg (1994), Drucker (2004), Gomułka (1998), Fiedor (1979), Gault (2010), and Grudzewski and Hejduk (2008). With their publication (2007), Janasz and Kozioł made a contribution to innovation theory by launching research on factors affecting the innovativeness of enterprises. In the economic literature, there are many descriptions of innovations in manufacturing companies (Aw et al. 2011; Ejdys and Krawczyk-Dembicka 2012). Many studies have been carried out on the issues of SME innovations, including scientific works and statistical reports (Szymańska 2013). Chesbrough's concept of "open innovation" has been widely accepted by economists, resulting in many publications, among which it is interesting to refer to those that address the SME sector. The issues of continuous learning in innovation processes in this sector were explored by Csath (2012). With his publication on open innovation (2003), Chesbrough, an eminent economist, initiated significant progress in the research on innovation processes and factors driving innovation. The effects of his theory included the concepts of user-driven innovation (UDI) described by Szymańska (2016), and the Three Horizons model proposed by Hobcraft (2013). The authors have frequently emphasized the importance of investments in research and development (R&D)—this can be clearly seen in the book by Ciborowski (2004).

The innovativeness of enterprises depends on R&D outlays and the application of modern technologies (Garcia and Calantone 2002; Aw et al. 2011). Wide research on the factors affecting service enterprises was carried out by Gallouj and Windrum (2009), Gault (2010, 2015), and Szymańska (2009, 2013). The European Commission addressed these issues as early as 1995 (European Commission). The direction of the research was set out by the publications of the OECD and Eurostat, which

appeared in the series called the *Frascati Family*. The *Oslo Manual* (third common edition, 2005) should be considered a milestone in research on service innovation. Attempts to build models of the innovativeness of enterprises were undertaken, among others, by Świtalski (2005), Szymańska (2015), and Panfiluk and Szymańska (2017).

The aim of this study was to describe the innovation processes in the theory of management sciences and to find the main direction of their development.

The following research hypotheses have been verified:

H1 As the innovation theory develops, more and more complex (extended) innovation models are built.

H2 The participation of customers (users) in the innovation process is a factor, which plays an increasingly important role.

A description and classification of the innovation models is a novelty in the theory of the management sciences. Another result is the idea of combining some innovation process models. The expected results will have an effect on the development of economic sciences, especially the management sciences.

2 Beginning of Innovation Research: The Linear Models

The research on innovation led by Schumpeter (1960) soon brought new ideas. The initial reflections on innovation focused on technological innovations. This kind of innovation was considered to provide the greatest support for economic development. The R&D idea remained the main means of support in the countries involved in World War II. During the war and after it—at the beginning of the 1950s, innovative processes seemed relatively simple and linear, as shown in Figs. 1 and 2.

As Fig. 2 shows, R&D is an innovation driver. Available knowledge flows to a company and is used in the innovation process. A slightly different process takes place during the implementation of the model of innovation (Fig. 1) pulled by demand (market), which in this case is the main driver force of the innovation

Fig. 1 The market pull model of innovation. Source: Rothwell (1994)

Fig. 2 The linear model of knowledge push innovation process. Source: Ahmed (2000)

process. The result of the innovation process is commercialization, which means (in Latin "commercialis") the support of some business on a commercial basis.

The linear processes are very simple. The research by Stawarz (1999) demonstrated that such models of the innovation process were commonly used until the mid-1960s. However, it should be borne in mind that the research done by Szymańska (2017) on the current innovation process showed that linear models were commonly applied. Although the research covered a specific group of entities, i.e., enterprises providing health tourism services in Poland's territory, still it turned out that these simple solutions (models)—the implementation of which was declared by 33% of the 461 entities covered by the research—continued to be commonly applied.

3 Second Phase of Innovation Theory

The 1970s brought new research and ideas. First of all, the hypothesis of a linear character of the relationship between the rate of innovation growth and the level of public expenditure on science and research was questioned. Later on, researchers began to investigate it in greater detail, in the extended systems, not as a simple cause–effect result of the type: discovery—invention—innovation. This idea was the starting point for the design of the coupled (conjugated) model, as illustrated in Fig. 3.

Kline and Rosenberg (1986) noted that the innovation process could be more complicated than a simple cause-and-effect relationship. The conjugated model

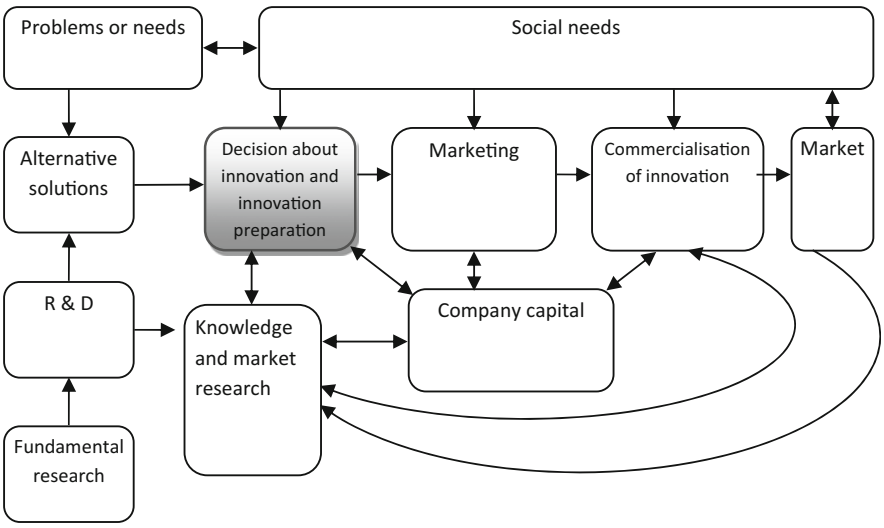

Fig. 3 Conjugated model of the innovation process. Source: Kline and Rosenberg (1986)

which they proposed was not a linear but an interactive one where the relationships between the different elements resulted from the linkages between the science, the market, and the enterprise. The basic innovation process should be interactive and based on the cooperation of consumers and marketing, sales, design, supply, and production teams. In consequence of this cooperation, the result (innovation) should meet the expectations of consumers (Grudzewski and Hejduk 2008).

In addition to the three innovation models described above, integrated models were also built. An integrated management system is a system in which two or more subsystems are coherent (Niedzielski and Rychlik 2006). Integrated systems aim to optimize processes both internally and immediate environment by offering ready-made tools that can be more effective at achieving goals than approaches based on separate systems (BSI 2000).

The next step of the innovation theory development was the popularization of the computers and the Internet. New models, called IT systems, were related to the electronic business operations of enterprises. An IT system is a collection of interrelated components whose function is to process data using computer technology. An IT system is an inherent part of the operations of a business, including not only those that are directly related to modern technologies (Rutkowski 2007). Information systems can be very simple or complex. At the beginning of the twenty-first century, the so-called "self-learning" systems, focusing on the management of knowledge and learning, emerged.

4 New Models and Systems of Innovation Theory

Drucker (2004) launched a new trend, regarding innovation as a purposeful task that was carried out by means of systematic and organized work and was mainly done at enterprises. Moreover, innovation was a clearly objective-oriented process and the implementation of the innovation process should be conceived in terms of verbs rather than nouns (Kelley 2003). The new open innovation model created by Chesbrough (2003), shown in Fig. 4, started discussions on the innovation process. It was a new opening in innovation theory.

The concept of open innovation entailed the form of a screen where new ideas emerging at companies or in their environment not only enabled the creation of innovations on the present market, but also made it possible to create new markets. Firm boundaries were open and flexible. The ideas flowed to the enterprise and poured outwards during the innovation process. The concept of open innovation was based on the conviction that companies could, and even should, seek ideas and ways of winning the market not only within their structures, but also in the business environment.

The UDI concept (Oliveira and von Hippel 2011) shown in Fig. 5 and the diffusion of innovations (Three Horizons) proposed by Hobcraft (2013) were the consequence of Chesbrough's proposals.

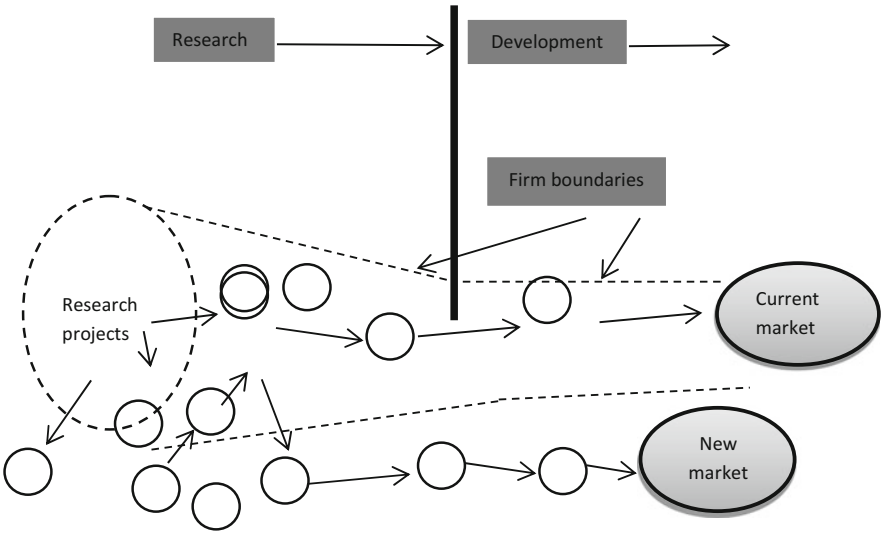

Fig. 4 The open innovation model based on Chesbrough. Source: Own elaboration based on Chesbrough (2003)

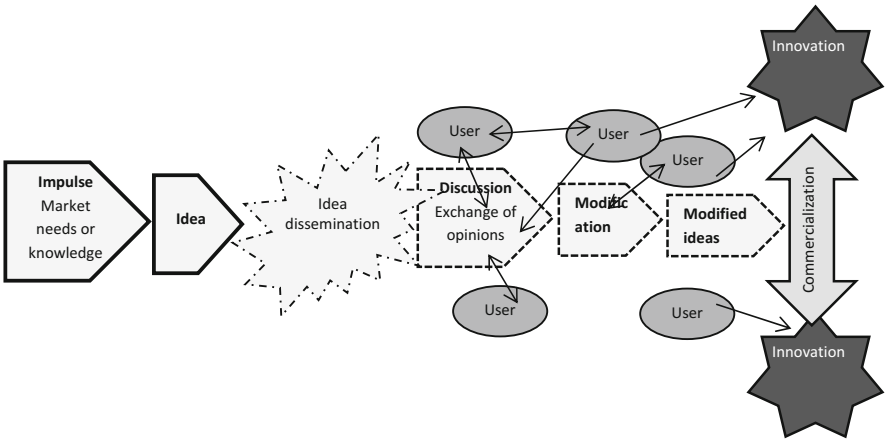

Fig. 5 User-driven innovation (UDI) process. Source: Own elaboration

The UDI process as shown in Fig. 5 is based on customers by involving them in the creation of new ideas. The process is initiated by an impulse generated by the market needs or knowledge. The idea of innovation is disseminated among the future users. The main part of the process is a discussion between company and customers. The idea is modified during this discussion, enabling better satisfaction of the needs of customers. The results of the process are two different innovations. One of them enters the current market, while the other appears on the new market, just as in the

open innovation concept. The innovation improves during the next steps, because this is a continuous process.

The last idea is the Three Horizons innovation model (Hobcraft 2013) which focuses on open innovations inside and outside the organization within three levels. An innovation is created (a higher value is generated) by establishing an efficient knowledge flow system (inside and outside). The Three Horizons innovation model created by Hobcraft (2013) is a simple idea: where Horizon One is the current business focus, Horizon Two is the related emerging business opportunities and Horizon Three involves those that move toward a completely new business with the potential to disrupt the existing one.

Contemporary studies indicate that innovation can be found not only in manufacturing enterprises but also in services. In general terms and in accordance with the OECD nomenclature, represented in the Oslo Manual (OECD 2005), innovation can be related to a product, process (including technology), organization, or marketing. The first type mainly relates to the core business operation of an enterprise, i.e., to the structure of the offer. The market expansion should be the result of product innovation and this, in turn, should lead to the development or diversification of offered products. The process innovation relates to changes in the creation processes, including technology innovations. Organizational innovations are related to the internal organization, they are non-physical in character and mostly aim at changing the methods of operation. Marketing innovations have a similar nonphysical character. They focus on the course of action and interaction between a company and its clients. However, there have been few studies on social and eco innovations (Gault 2015). The Horizon 2020 Program popularized a new idea of the innovation, mainly the social innovations as ones which are very important for the development of EU citizens' welfare.

5 Limitations and Discussion

In the course of the research certain limitations occurred. They were caused by the need to formulate the models of innovation processes and their order. It can be clearly seen that increasingly large and complicated theoretical models have been designed.

An important question emerges as to the actual application of the models of economic practices in business practice. Are these complex and complicated models really applied or do they instead mostly fill the pages of economic books on the management sciences? It is difficult to find comprehensive research on this issue in the literature. The example is the research carried out by Szymańska (2017) on enterprises providing health tourism services presented nine models of the innovation process. The respondents were offered a choice from the two most important (most often applied) models of innovation processes. The proposals did not include the "Three Horizons" model. 461 respondents took part in the research and the largest number of them (33%) indicated a linear, market-pulled innovation process. Many

entities (22%) declared that they did not use any innovation system or model. A dozen or so percent of respondents indicated the conjugated model (15%) and the science-pushed model (14%). Only a few enterprises (7%) indicated the use of the open innovation model. It should be noted that the *diffuse innovation* model took the last position (3%). The research showed that the linear model dominated, with almost a quarter of the respondents not using any model.

It should be noted that the application of the models of innovation processes is just beginning. But there is no doubt that the models applied by the most innovative enterprises entail cooperation with numerous entities from outside these enterprises, including other companies (Chesbrough 2010) and the future users (Hobcraft 2013).

The main question is how to increase the R&D activity of companies, e.g., in cooperation within clusters (Borkowska-Niszczota 2015). As nongovernmental organizations associating enterprises from one sector, clusters are obliged to support their innovations. Therefore, it should be considered whether the actions supporting innovation, e.g., by disseminating the knowledge of the modern models of innovation processes, fall within the governmental innovation policy. Or perhaps consideration should be given to new financial support instruments under the European Union perspective for 2020–2027. These questions suggest that further research is needed. Given that this research is at the beginning, action should be taken to assess business representatives' opinions on the models of innovation processes.

6 Conclusion

The aim of this study was to describe the innovation processes in the theory of management sciences and to find the main direction of their development. The changes in the innovation processes in the economic literature have consisted in the transition from technology-driven innovation processes to those driven by customers, local authorities, and other entities outside of the enterprise, including other firms. The research is developing very quickly now.

The concept started with Schumpeter's publication in 1932. The first concepts of the innovation processes were born in the late 1950s and the first half of the 1960s. The innovation processes unfolded linearly up to that moment. Then more complicated systems were created, such as conjugated- and IT-based ones. The introduction of IT gave new opportunities and new ideas started to develop very quickly, especially after 2000, when the open innovation model was created, followed by the contemporary processes, such as UDI, diffuse innovation and Three Horizons. The current ideas are characterized by a large focus on knowledge.

Another direction of the research on the models of innovation processes consists in including non-technological innovation. On the basis of analysis of documents, particularly those of OECD (2005, 2008), it can be expected that, in addition to the classification into product, process, organizational, and marketing innovations, new concepts—such as social innovation or eco-innovation—will increasingly gain in importance.

It has been positively verified because as innovation theory develops more and more complex (extended) innovation models are built, from the linear ones to the Three Horizons. It is difficult to say that the participation of customers (users) in the innovation process is a factor that plays an increasingly important role because some of the new ideas, such as the open model and, primarily, UDI suggest that cooperation with customers is very important. On the other hand, the empirical research (Szymańska 2017) shows the slight role of the new concepts (models) in practice. Summarizing as regards the theory, there is no doubt than users play an increasing role in the innovation processes but not all of the new ideas (Hobcraft 2013) give a key role to nongovernmental organizations and innovation policy. In this case, the hypothesis has been negatively verified.

The results of this research should be subjected to a deep discussion. It should be considered why enterprises do not follow their customers' opinions in the innovation process and why they are still more "closed" than "open." Given the dynamic development of the global economy, it should be assumed that innovation theory will continue to develop in response to the arising needs of the customers. The above review allowed us to organize research on innovative process models and to formulate predictions as to the further directions of development of research on innovation and innovation theory. Due to the openness of the processes, research should continue and seek greater involvement of all groups of beneficiaries: entrepreneurs, scientists, and government representatives who shape innovation policy.

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Regional Aspects of Digital Economic Development

Nataliya Kravchenko, Svetlana Kuznetsova, Anastasia Ivanova, and Arkady Shemyakin

Abstract Development of digital economy has become a strategic priority in the majority of developed and developing countries. Today, the creation and dissemination of digital technologies are becoming a key factor for competitive success of the countries and regions, which changes national and regional socioeconomic environment. This chapter's goal is to reveal and assess the factors contributing to the development of information and communication technologies in the regions of the Russian Federation. The study uses regression analysis to estimate the dependence between several indicators of dissemination and use of digital technologies in the main sectors of economy—business sector, households, public services—and the characteristics of regional development. It is demonstrated that in Russia digital divide between the regions remains rather high, with more than a quarter of the employed population and nearly a half of information and communication technology spending being concentrated in metropolitan centers. The richer and more educated regions have distinct long-term advantages in digital economic development. If these trends are confirmed, the accelerated development of digital technologies will be concentrated mainly in the largest regions; high differentiation in the level of digital economic development will persist or even be amplified.

Keywords Information and communication technologies · Regional development · Business sector · Households · Public services

N. Kravchenko (✉) · S. Kuznetsova · A. Ivanova
Institute of Economics and Industrial Engineering SB RAS, Novosibirsk State University, Novosibirsk, Russia
e-mail: nkrav@ieie.nsc.ru; ksa@ieie.nsc.ru

A. Shemyakin
University of St. Thomas, St. Paul, MN, USA
e-mail: A9SHEMYAKIN@stthomas.edu

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1 Introduction

Information and communication technologies (ICT) seem to be the most dynamically developing economic sector in Russia as well as in other countries. ICTs facilitate the development of various branches of the world economy, changing not only production technologies of goods and services but also transforming the ways of social communication between the people. Development of ICT forms the foundation of growth and competitiveness in the modern economy. This concept is reflected in strategic documents of the majority of the developed and developing countries. The creation of the Digital Single Market has become a priority for the European Commission for the period of 2014–2019. The ICT sector remains the main driver of innovations in OECD economic zone and forms the most part of research and development spending; more than one-third of all patent applications in the world are registered in ICT sector. The use of ICTs tends to grow. At the same time, there is still a profound technology gap between the countries, regions, and social groups: small- and medium-sized enterprises lag behind the large ones in the use of more advanced information and communication technologies (OECD 2017; Boston Consulting Group 2016).

Information and communication technologies are among the key innovations of the last century representing a new technological paradigm relating to general-purpose technologies (GPT), which are widely applied and can be adapted to different economic sectors, significantly changing the existing technologies and products. There are two main characteristics of GPT—common applications and complementary innovations, leading to the increase in labor productivity due to GPT innovations. ICT includes a wide range of products and services performing a variety of telecommunication functions (e.g., hardware, software, wired and wireless devices for data transfer, satellite products, and services). Fast ICT diffusion has led to significant changes in the nature of the products and services provided by economic sectors as well as the processes of production and distribution. As a result, ICT affects not only the structure of regional economy but also the industrial location and market structure.

In the studies of regional dynamics and economic transformation resulting from ICT dissemination, two contradictory tendencies can be distinguished: an increase in the spatial distribution of industries at a global scale (stage dispersion) and an increase in the concentration of ICT intensive industries. The reason for spatial concentration of such industries lies in the fact that human capital accumulated in the regions and the opportunity for intensive exchange of knowledge and experience seems to be a crucial factor for both the development and the effective use of ICTs (Karlsson and Johansson 2006). As a result, there is a considerable difference between the countries and the regions regarding their role in the development of ICTs and their ability to adopt ICT products. Consequently, one can observe various ICT effects on productivity and economic growth in different countries and regions.

The Russian Federation is one of the largest countries in the world, whereas it is the sixth in the world in GDP. Russia comprises 85 regions—territorial subjects of

the Federation. Today, the country is experiencing a sustained period of slow recovery from recession, which is in many respects related to a heavily resource-based economy. Though the dependence of economic development on the export of raw materials has reduced over the last 3 years, it still remains very high. The development of a new economy based on high-tech and knowledge-intensive production is considered a national long-term strategic priority, which will allow the country to overcome the protracted period of weak economic growth. The possibility to overcome the crisis and achieve high economic growth rates is based on the creation of digital economy and development of hi-tech businesses. At the present time, Russia ranks significantly lower by the proportion of established hi-tech businesses (15% of the newly created companies) than such leading countries as Luxembourg (52%), Austria (49%), Sweden (45), etc. (Van Roy and Nepelski 2017); however, it slightly outstrips other large developing economies such as Brazil (14%), India (12%), and China (9%). According to Mas et al. (2017), in 2014 value addition of ICT sector in Russia amounted to EUR 52 billion in PPS which is more than ten times less than that in the United States (683) and China (640) and five times less than in India (252). In relation to GDP, the share of ICT sector is estimated at about 2%.

Creation of digital economy has been declared one of the main strategic goals of the country's economic development. In 2017, the Russian government adopted the Strategy for Development of Information society in the Russian Federation for the period of 2017–2030 and the Program for the Development of Digital Economy in the Russian Federation. The implementation of these strategies is aimed to create the conditions for the construction of a knowledge society, improve welfare and quality of life by increasing the availability and the quality of goods and services provided by digital economy with the use of modern digital technologies, increase the degree of knowledge and digital literacy, improve availability and quality of public services for the citizens as well as ensure safety within the country and abroad. The development of digital economy, with digital data being a key factor of production in all spheres of social and economic activities, is considered a necessary condition for the increase in competitiveness of the country, improvement of living standards of its citizens, and sustainable economic growth and national sovereignty. The latest world information technology development rankings showed that the Russian Federation stays at a medium position among 193 countries. Table 1 shows the ranking of the Russian Federation in the development of digital technologies and electronic government published by the United Nations and other international organizations (ITU 2014, 2016).

The Networked Readiness Index (Bilbao-Osorio et al. 2014; Baller et al. 2016) measures the propensity for countries to exploit the opportunities offered by information and communications technology. The E-Participation Index evaluates conditions for civic engagement and opens participatory governance through ICTs. The E-Government Readiness Index measures the capacity and willingness of the countries to use e-government. The indices are updated annually by the United Nations Public Administration Program (UN 2010, 2012, 2014; UN DESA 2017).

Table 1 Russian Federation ranking according to the world ICT indices

Year	2016	2014	2012	2010
ICT Development Index				
Rank	43	45	–	46
Networked Readiness Index				
Rank	41	54	–	–
E-Participation Index				
Rank	32	30	19	86
E-Government Development Index				
Rank	35	27	27	59

Source: ITU (2014, 2016)

In general, data in Table 1 hide a high level of differentiation of dissemination and the development of information and digital technologies in the regions of Russia. Russia is known for its huge natural, social, economic, and cultural diversity, which results in unbalanced regional development. Formation of digital economy is expected to facilitate connectivity and reduction of social and economic inequality of the regions. Although the government makes considerable efforts in development of information infrastructure and digital technologies, the results often lag behind the stated goals. In particular, there is a considerable five- to sevenfold gap between the leading and lagging regions in the use of public services and a two- to threefold gap in the use of digital technologies by businesses. In the cities, 95% of the population have broadband Internet access, whereas in the villages—no more than 20%. The 15 advanced regions (from all 85 regions of Russia) represent 60% of ICT employees and almost 80% of total ICT spending. In fact, four regions alone (Moscow, Saint Petersburg, Tyumen, and Moscow oblast) accounted for 33% of those employed in ICT and 60% of total ICT spending. According to these indicators, the differences between the leading regions and the outsider regions seem to be enormous. High levels of digital inequality constitute a significant challenge to spatial development and create a special need for scientific research of regional aspects of digital economic development.

The goal of this study is to identify and assess the factors contributing to the development of digital economy at a regional level. The main objectives are:

- To provide a comprehensive overview of ICT development and the use of information and communication technologies in economy (public services, businesses, households) by the regions.
- To identify and estimate development factors of digital economy in the regions.

2 Literature Review

Relationship between ICT and the factors of economic and social development was the topic of numerous publications on the developed and developing countries and regions, including classical studies of digital inequality (DiMaggio et al. 2004). The

factors influencing the development of digital technologies were studied by Spooner (2003), Weerakkody et al. (2012), Billon et al. (2016), OECD (2017), Rahayu and Day (2017), Hawash and Lang (2019) and others. Considerable differentiation of the impact of ICT use on the regional growth is clearly connected to uneven development of the main ICT channels and their effect on the transformation of business conditions in the regions by creation and production of ICTs, and the ability of the companies in other industries to quickly perceive new technologies. The importance of territorial proximity for the efficient transfer of knowledge and experience gives an opportunity for large and developed regions to maximize the benefit from the advantages of ICT use (Karlsson et al. 2010). Progress in digital economy causes rapid dissemination of ICT applications in various sectors—households, industries, services—which creates favorable conditions for both individuals and businesses to acquire certain competencies and allows them to enjoy the results of ICT dissemination. Numerous empirical works are devoted to the characteristics of ICT users at different levels, e.g., companies (Martin and Omrani 2015), industries (Domenech et al. 2014) and countries (Pick and Nishida 2015), but the most publications' concern, first and foremost, the companies. The number of published papers dedicated to the study of factors affecting the adoption and diffusion of ICTs at the regional level is very limited.

Detailed research on Internet use in the United States reveals that *Internet* penetration is not evenly spread over the *regions of the country*. It shows that the main drivers of regional differentiation are the traditional factors stimulating the use of the Internet, i.e., education and income of the population. As a rule, regions with high-income households and high education levels of the population are more likely to have a higher proportion of experienced and advanced Internet users. Such regions as California, New England, and Washington DC with high percentage of wealthy and highly educated population are characterized not only by higher level of Internet penetration but also by a wider range of Internet applications (e.g., e-mail, online entertainments, display of news, financial information, and other video items, search for healthcare information, online shopping, etc.). At the same time, the southern regions with the *lowest* per capita or median household *income* and low education level experience the lowest level of Internet use. However, there are some exceptions to the general rule (Spooner 2003).

The studies on Europe focus on the use of ICT by households. Their research shows the relevance of such regional indicators as GDP per capita, unemployment rate, population density, and human capital for understanding of the regional distribution of the Internet users in 76 regions from EU-15 (Billon et al. 2008). Another study of 164 European regions demonstrates that GDP per capita and proportion of those employed in science and technologies are the key factors that positively impact the level of the Internet use by households, whereas unemployment rate and the proportion of the people over 65 years negatively affect the spread and the use of the Internet (Vicente and López 2011).

However, relatively few studies analyze the factors determining the scale of business use of ICT in the regions of Europe. Milicevic and Gareis (2003), analyzing ICT dissemination in a number of European regions, revealed higher levels of use of

digital technologies in densely populated regions with a higher level of service sectors. In general, relevance of population density for understanding the level of ICT use by businesses is emphasized by many scholars. For example, Billon et al. (2009) in their study based on a random sampling method of 239 European regions show that GDP per capita, population density, education level, and industry specialization positively affect the creation of business websites. The importance of R&D investments and skilled ICT personnel for the development of digital technologies is specially emphasized by Biagi et al. (2016). A comprehensive study of ICT dissemination by businesses and households of the European regions revealed a number of interesting facts (Billon et al. 2016). Moreover, it was established that the levels of business and household use of ICT at the regional level are interconnected, and the proportion of population employed in knowledge-intensive services and quality of public administration are drivers of ICT diffusion for both sectors. At the same time, a number of factors have differential effects, e.g., the proportion of population employed in high-tech industries, as well as the degree of decentralization of management, can impact only the business use of ICT. Besides, a significant difference in the levels of development of the digital economy in various European countries is also reflected in this study. The existence of general factors associated with ICT dissemination in households and companies stresses the potential synergy arising from the digitalization of these sectors, which should be taken into consideration by regional and state governments when adopting the stimulus packages. The recent studies also focus on the impact of ICT development on employment in general and the threats of substitution/replacement of human labor by ICT technologies, in particular. Biagi and Falk (2017) using unique data of ten European countries show that dissemination of such advanced technologies as enterprise resource planning, mobile Internet, and e-commerce can hardly result in the decrease of demand for labor both in industry and in service sector.

In Russia, the studies on the factors influencing the degree of ICT readiness at sectoral, business, and regional levels lack; mainly, data accumulation processes take place. Thus, Popov and Semyachkov (2017) show that in Russia, as well as in other countries, the businesses related to knowledge-intensive services demonstrate the highest degree of ICT readiness. The rankings of development of information society in the regions provided by the Ministry of Telecom and Mass Communications of the Russian Federation are the most widely used in Russia. They are based on composite indexes comprising a wide set of indicators (55 indicators), which, in fact, impedes the assessment of ICT development. Recognizing the value and importance of these information sources, we consider that the approach to assessing the factors of ICT development suggested in this work seems to be rather useful for determining both the current state and the prospects of creation, development, and dissemination of digital technologies as the drivers of regional development.

3 Data and Methodology

Based on the analysis of the previous studies (Spooner 2003; Billon et al. 2008; Biagi et al. 2016) and availability of statistical data, the following regional characteristics determining the development of information technologies can be distinguished:

- Human capital as the summary measure of accumulated and acquired knowledge and skills necessary for the development and the use of new digital technologies.
- The level of regional economic development which impacts both the possibilities for the population and the companies to get access to digital technologies, goods and services, and the results of their productive use.
- Investments into digital economy.
- Manufacturing output in regional economic structure.
- State policy aimed at stimulating social and economic processes of ICT formation and dissemination.

The authors consider the provision of the regions with government subsidies/grants not only as a source of ICT financing but also as an implementation of long-term government priorities. As a part of the study, we estimate the correlation between separate ICT development indices in the regions of the Russian Federation—public services, business, households—and the following indicators reflecting the aforesaid regional characteristics:

- Proportion of population with the higher education employed in economy and proportion of population employed in research and development (R&D) as proxies for human capital.
- Gross regional product (GRP) per capita as an indicator for the level of regional economic development.
- Total ICT spending as a proxy for investments.
- Amount of government subsidies for digital economy development as a proxy for state policy.
- Total manufacturing output (total value of manufacturing production) as an indicator for regional economy specialization.

The data provided by Goskomstat of the Russian Federation and the Ministry for Telecom and Mass Communications of the Russian Federation for the period of 2015–2016 (Laykam et al. 2017) was used as the empirical database of the study. Further calculations were based on the data of 85 Russian regions. Table 2 shows statistical indicators, which were viewed as the factors of ICT dissemination and usage by three main sectors of the Russian economy.

Table 3 shows the descriptive analysis of explanatory and dependent variables, calculated by the authors based on statistical data (Laykam et al. 2017).

Regression analysis was employed to determine the relationships. Logarithmic transform of both predictor and response variables makes normality assumptions for the error term feasible.

Table 2 Indicators on ICT dissemination and usage

ICT dissemination	ICT usage
Households	
Proportion of households with broadband Internet access (%)	Proportion of households using Internet within the last 3 months prior to the survey (%)
Businesses	
Proportion of companies with websites (%)	Proportion of companies using industrial automation software (%)
Proportion of people using Internet within the last 3 months at work (%)	
Government services	
Proportion of individuals aged from 15 to 72 years interacting with public authorities and local governments via the Internet (official sites and portals of public and municipal services, mobile devices (phone, tablet, etc.), e-mail, self-service terminals) (%)	Level of public satisfaction with the quality of provided government and municipal e-services (%) of the total number of the population using the Internet to receive public and municipal services

Source: Developed by the authors

Table 3 Descriptive analysis of variables

Variable	Mean	Median	Stand. deviation	Min	Max
Explanatory variables					
GRP per capita	468,380.3	323,572	662,825	92,899.6	4,990,259.7
ICT spending	13,931.6	3902.6	50,628.4	520.4	455,041.8
Subsidies	31.2	30	23.3	0	110
Proportion of the employees with higher education	32	30.3	4.9	22.6	49.1
Proportion of the employees engaged in R&D	8.7	1.7	28.7	0	239.5
Manufacturing output	389.3	178.3	635.6	0.73	4789.6
Dependent variables					
Households with broadband Internet	67.8	68	8.5	36.2	86.1
Households using Internet within the last 3 months	71.5	71	5.8	61	89.1
People using Internet within the last 3 months at work	32.5	31	7.4	18.1	59.1
Companies with websites	41.7	40.9	8	28.7	72.8
Companies using industrial automation software	14.2	13.7	4	4.5	25.8
Population interacting with governments via the Internet	24	21.7	13.4	4.4	68.3
Satisfaction with the quality of government e-services	64.6	66.2	14.5	23	90.2

Source: Own calculations

Regression equation:

$$\ln(\nu_1) = \alpha + \beta_1 \ln(\nu_2) + \beta_2 \ln(\nu_3) + \beta_3 \ln(\nu_4) + \beta_4 \ln(\nu_5) + \beta_5 \ln(\nu_6) + \beta_6 \ln(\nu_7) + \varepsilon \quad (1)$$

where

v_1—dependent/response variable which changes depending on the sector
v_2—per capita GRP
v_3—ICT spending
v_4—government subsidies over the period from 2012 to 2016
v_5—proportion of population with higher education employed in economy
v_6—population employed in research and development
v_7—manufacturing output

As mentioned above, for households two indices were used as dependent variables (v_1): ICT dissemination index in the regions—Proportion of households with broadband Internet access (see Model 1), and index of ICT usage—Proportion of households using the Internet within the last 3 months prior to the survey (Model 2).

4 Results

The results of regression analysis of the dependencies of ICT dissemination and ICT usage indices for households on regional variations are shown in Table 4. The parenthesized numbers next to the values of coefficients indicate their respective *p*-values.

In general, Model 1 where availability of broadband Internet access to the Internet is a dependent variable is significant. In this model, such variables as Proportion of employed population with higher education and manufacturing output are viewed as significant factors. Model 2 with dependent variable Proportion of population using the Internet in the 3 months prior to the survey has a high quality which is indicated by the values of F-statistics and R^2. GRP, ICT spending, and Proportion of the employed with higher education are significant factors in this model. In a similar manner, for business sector ICT dissemination indices—Proportion of businesses with websites and Proportion of individuals using Internet at work, (Models 1, 2)—and ICT usage index—Proportion of enterprises using industrial automation software (Model 3) were used as dependent variables (v_1). The estimates of dependences ICT dissemination and ICT usage indices in the business sector by regions are shown in Table 5. The parenthesized numbers next to the values of coefficients indicate their respective *p*-values.

All Models are rather significant, but Model 1 seems to be the best in terms of the number of significant factors with dependent variable Employees using Internet at work. This Model uses such significant factors as GRP, Proportion of the employees with higher education, Total value of manufactured goods, works and services (at 5% significance level), and Proportion of employed engaged in research (at 10% significance level). Model 2 does not employ variables significant at 5%

Table 4 The results of regression analysis for households

Factors (p-values)	Model 1 Availability of broadband Internet access	Model № 2 Proportion of population using the Internet within the last 3 months prior to the survey
GRP	−0.012 (0.617)	0.03 (0.017)**
ICT spending	0.004 (0.843)	0.044 (0.000)***
Subsidies	−0.014 (0.150)	0.001 (0.835)
Proportion of the employees with higher education	0.238 (0.010)***	0.01 (0.043)**
Proportion of the employees engaged in R&D	−0.011 (0.435)	−0.009 (0.221)
Manufacturing output	0.05 (0.000)***	−0.008 (0.202)
F-statistic (p-value)	9.04 (0.000)	14.23 (0.000)
R^2 (Adj R^2)	0.41 (0.37)	0.52 (0.49)

***, **, *Significance of factor at 1%, 5%, and 10% significance levels, respectively
Source: Own calculations

Table 5 The results of regression analysis for business sector

Factors (p-values)	Model 1 Employees using Internet at work	Model 2 Businesses with websites	Model 3 The use of special software
GRP	0.15 (0.000)***	−0.023 (0.505)	0.183 (0.000)***
ICT spending	0.011 (0.705)	0.047 (0.112)	0.07 (0.069)*
Subsidies	0.011 (0.439)	−0.009 (0.538)	−0.001 (0.952)
Proportion of the employees with higher education	0.43 (0.003)***	0.193 (0.163)	0.159 (0.372)
Proportion of the employees engaged in R&D	0.036 (0.088)*	−0.009 (0.649)	−0.007 (0.805)
Manufacturing output	−0.05 (0.005)***	0.029 (0.097)*	0.031 (0.160)
F-statistic (p-value)	9.05 (0.000)	4.65 (0.000)	14.24 (0.000)
R^2 (Adj R^2)	0.41 (0.37)	0.26 (0.21)	0.52 (0.49)

***, **, *Significance of factor at 1%, 5%, and 10% significance levels, respectively
Source: Own calculations

significance level. Total value of manufactured goods, works, and services is the only significant factor at 10% significance level. It is also noteworthy that p-value of ICT spending is equal to 0.11, which demonstrates the importance of this factor at about a 10% level. In Model 3, GRP and ICT spending are used as significant factors at 5% significance level and at 10% significance level, respectively. For public services, such indices as Proportion of population receiving public e-services via the Internet (ICT dissemination, see Model 1), as well as the level of public satisfaction with the quality of provided government and municipal services in electronic form (ICT use, see Model 2), were used as dependent variables (v_1). The regression estimates of dependency of the selected indices on regional variations

Table 6 The results of regression analysis for government

Factors (p-values)	Model 1 Public e-services (via Internet)	Model 2 Satisfaction with received public e-services
GRP	−0.031 (0.781)	0.009 (0.869)
ICT spending	−0.044 (0.637)	−0.08 (0.075)*
Subsidies	0.066 (0.142)	−0.007 (0.760)
Proportion of the employees with higher education	0.034 (0.938)	−0.09 (0.667)
Proportion of the employees engaged in R&D	0.021 (0.752)	−0.001 (0.985)
Manufacturing output	0.173 (0.002)***	0.09 (0.001)***
F-statistic (p-value)	5.31 (0.000)	2.98 (0.011)
R^2 (Adj R^2)	0.29 (0.24)	0.19 (0.12)

***, **, *Significance of factor at 1%, 5%, and 10% significance levels, respectively
Source: Own calculations

are shown in Table 6. The parenthesized numbers next to the values of coefficients indicate their respective p-values.

Both Models are significant (p-value for F-statistics are less than 5%); however, the models developed for "Government" seem to be lacking in terms of quality in comparison to the models built for "Households" and "Businesses." In both Models, Total value of manufactured goods (works and services) is used as a significant variable. In Model 2 at a 10% significance level, ICT spending is a significant factor, whereas in Model 1 Subsidies are significant at a 15% significance level. All models were tested with Breusch–Pagan and Durbin–Watson tests, and Variance *Inflation Factors* were calculated, which revealed the lack of *heteroscedasticity*, autocorrelations and multicollinearity, respectively, see also (Billon et al. 2009, 2016).

5 Conclusions

The main conclusion confirms the overall trends typical of the developed countries: the richer and more educated the regions, the more advantages they have for the development of their digital economies. Though the proportion of ICT spending in a manufacturing output is relatively small (1.9%), ICT spending in the regions is connected with the level of ICT dissemination in a business sector. The proportion of the population engaged in research and development in the regions impact only the proportion of the population who use the Internet at work. One of the plausible explanations is that the Russian people in their daily lives use a limited number of IT services and ICT applications, which do not require special research competencies, whereas in their professional activities such skills seem more relevant. The government subsidies are rather small, and could hardly make a noticeable impact on digitalization.

One of the unexpected results of the study is the observed negative correlation between satisfaction with the quality of public e-services and the amount of ICT

spending. It might be connected with the lack of efficiency of ICT investments in public sector and the divergence between the expected quality of public e-services and their actual quality, which requires additional research as new empirical data become available. The presence of manufacturing industries in the region positively affects the majority of the ICT development indices, except for the use of the Internet by the population and the use of special software by the organizations, which are not related to this characteristic of the structure of regional economy. Besides, a negative correlation between the use of the Internet in workplaces and manufacturing production was revealed. Perhaps, it could be explained by the specific structure of the Russian manufacturing industry in which medium- and low-technology industries prevail, with the share of hi-tech industries, which acquire, produce ICT equipment and create the demand for ICT decisions, being relatively small. Low demand for IT products and services among regional businesses, lack of qualified labor, and insufficient government support constitute barriers for the development of digital economy. There are fewer opportunities for the regional IT companies to service public sector—the major customer segment for IT decisions. Leading companies are oriented to the global market, taking up niche positions in it. The development of digital economy is one of the strategic objectives and long-term priorities of majority of regions of Russia. If current trends continue, the accelerated ICT development will be concentrated mainly in the largest regions; consequently, high differentiation in the development of digital economy will persist or even be amplified.

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Part V
Risk Management

What Do We Know About Data Breaches? Empirical Evidence from the United States

Grzegorz Strupczewski

Abstract The aim of the chapter is to assess data breach risk. In particular, severity of the risk is quantified and factors determining its severity are identified. We take a number of records compromised in one data breach incident as a proxy for severity of the data breach risk. This chapter helps to learn from the experience of almost 15 years of data protection and data breach notification regulations in the United States. It offers an interesting insight into the state of cybersecurity that can be indicated by a number of data breaches. Based on the Privacy Rights Clearinghouse database, we examine the statistical properties of data on data breaches disclosed in the United States from 2005 to 2016. The size of our dataset is 5102. The Kruskal–Wallis test is applied to verify our hypotheses. The severity of data breach is modeled by the Pareto distribution. The chapter concludes with several interesting results. Negligent data breaches appear twice more frequently than malicious ones. The dominant causes of data breaches vary by organization type. It suggests that cyber risk management strategies should be tailored to the individual profile of an entity. Surprisingly, implementation of the data breach notification state laws in the United States has not affected the number of breach incidents reported in particular states. Cause of data breach, type of organization, and geographical region are statistically significant factors that diversify the population of affected organizations in terms of severity of the loss.

Keywords Cyber risk · Data breach · Data protection · Risk modeling

G. Strupczewski (✉)
Department of Risk Management and Insurance, The Cracow University of Economics, Cracow, Poland
e-mail: Grzegorz.Strupczewski@uek.krakow.pl

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1 Introduction

As digital technology innovations, such as the sharing economy, blockchain, or the Internet of Things, are increasing at an unprecedented pace and connect strictly with the physical world, cyber threats are more likely to rise (ENISA 2019). According to the World Economic Forum, massive incident of data loss has been among the Top Five Global Risks in terms of likelihood (WEF 2017). No wonder that the protection of sensitive data is the main driver of IT security spending (SANS Institute 2016). Global IT security spending in 2016 is estimated at $74 billion and $90 billion in 2017 (Gartner 2017). Compared to that, the total cost of data breaches estimated at $445 billion seems to be disastrous, because it is as high as GDP of Belgium (Marsh 2017). As Ponemon Institute (2017) calculated, the average total cost of data breach in a company was $3.62 million. It is also worth to mention that the average cost for each lost or stolen record containing sensitive and confidential information was $141 (Ponemon Institute 2017).

In the modern economy, digitization of enterprises is becoming more and more widespread, and data assets are becoming the most valuable assets of an enterprise (Rahayu and Day 2017). Growing dependence on electronic communication, implementation of transactional payments over the Internet, cloud computing, and above all—collection and processing of huge data sets (often confidential), create a new kind of threat for the organization—the cyber risk. The cyber risk is most accurately defined by Cebula and Young (2010, p. 1) as "operational risk to information and technology assets that has consequences affecting the confidentiality, availability, or integrity of information or information systems." They place the cyber risk in the operational risk area that is associated with the current functioning of the organization. Because cyber risk is pure risk, it can become a target for the insurance industry. While certain cyber risk characteristics raise some doubts about its insurability, the insurance market is developing innovative insurance products that offer comprehensive coverage of financial losses due to the various forms of cyber threats. Today, the total value of the global cyber-insurance market is about $3 billion, with the vast majority of premium coming from the US market (Marsh 2017). Despite optimistic forecasts, the market is still in its infancy.

Comprehensive cyber insurance has different sections that allow you to configure coverage conditions individually tailored to the individual needs of policyholders. Insurance coverage includes both first- and third-party losses resulting in legal liability. First-party coverage protects against direct losses and out of pocket expenses suffered by an insured. In particular, the coverage includes:

- Data restoration costs
- Cybercrime direct losses
- Business interruption
- Cyber extortion
- Legal expenses
- Public relations expenses to manage reputational damage
- Forensic costs to determine the cause and extent of a breach or network event

On the other hand, third-party coverage is dedicated to protect against privacy liability, network security liability, media or web content liability, and privacy regulatory defense costs. So it may be concluded that one of the most serious insurable events can be a data breach. The definition of a data breach incident has been given in the EU General Data Protection Regulation. It explains that data breach is a breach of security leading to the accidental and unlawful destruction, loss, alteration, unauthorized disclosure of, or access to, data transmitted, stored, or otherwise processed (GDPR 2016, c.1(4)(12)).

Personal data breaches are not only the insurable events, but also represent important subject of legal regulations regarding protection of privacy. The European and North American personal data protection laws concentrate mostly on data breach notification obligations. Data breach notification laws are typically justified with two objectives. The first is that customers have the right to know when their personal information has been stolen or compromised. Informing customers about a data breach allows them to protect themselves—by changing their passwords or by monitoring their credit card statements for signs of abuse. The second objective is to create incentives (risk of reputation damage resulting from a data breach) for organizations to take adequate steps to secure the personal information they have stored. More than a decade has passed since the enactment of data breach notification laws in most US states (47) and on the federal level. These laws mandate companies that have suffered a data breach to inform the customers whose data might have been exposed. The European Union has recently introduced its own data protection law—General Data Protection Regulation—that will apply from May 25, 2018.

The aim of the chapter is to explore the risk of data breach, to quantify its severity and to identify factors determining its severity. The creation of this study was motivated by the new data protection law—the EU General Data Protection Regulation (GDPR)—that will apply since May 2018. The new law mandates organizations that have suffered a data breach to inform all the people whose personal data might have been exposed. It is hard to believe, but so far most of the data breach incidents have never been reported to the public! Similar data breach notification laws have been passed in most US states more than 10 years ago. This chapter helps to learn from the results of almost 15 years of the data breach notification regulations in the United States. It offers an interesting insight into the state of cybersecurity that can be indicated by a number of data breaches. We examine the statistical properties of data on data breaches disclosed in the United States from 2005 to 2017. The analysis is based on the Privacy Rights Clearinghouse database that collects a record of all disclosed data breaches in the United States from 2005 till now.

2 Research Sample and Methodology

The study is based on the dataset of 5102 data breach incidents publicly reported in the United States between 2005 and 2017. The dataset was provided by Privacy Rights Clearinghouse (PRC)—a nonprofit consumer advocacy organization, particularly engaged in privacy rights. PRC publishes its database as a source of information on reported data breaches from 2005 to the present. The database includes breaches reported through either government agencies or verifiable media sources. When calculating some statistics, we omitted data for 2017 which is incomplete. Moreover, in order to improve numerical properties of the dataset, the outliers have been erased (5 cases). The final dataset used for statistical analysis counts 4959 cases reported in the United States in 2005–2016.

The dataset allowed us to extract the following variables:

- *BREACH_TYPE*—cause (type) of data breach
- *NO_BREACHES*—Number of records compromised in one data breach incident
- *ORG_TYPE*—Type of organization affected by a data breach incident
- *STATE*—Name of US state where a data breach occurred
- *YEAR*—Year of occurrence of a data breach incident.

In this chapter, we make assumption that the number of records compromised in one data breach incident can be a good measure of severity of the data breach risk. The research methods used in this study include analysis of descriptive statistics, fitting distribution to empirical data, and Kruskal–Wallis test (nonparametric ANOVA) for verification of hypotheses.

3 Number of Data Breach Incidents

The number of data breach incidents bounces around a bit, but there is a slight rising tendency over the last 12 years. On the basis of the data shown in Fig. 1, two subperiods were addressed that differ in the annual number of incidents. In the first subperiod from 2005 to 2009, the average number of recorded cases was 257. It was clearly lower than the average for the second subperiod from 2010 to 2016, which reached 525—twice as high as the first period. Such a large increase of average results from a one-time jump in the number of reported incidents in 2010. It happened largely due to the implementation of the data breach notification laws in subsequent states and tightening of regulations on the obligation to notify the data breach in the healthcare sector (so called HiTECH Act). Starting in 2010, the number of incidents reported during the year has stabilized at around 600, with the exception of 2014 and 2015, when number of events has not exceeded 400. The highest number of privacy violations of 626 occurred in 2012. Year 2017 is expected to be average, as after 3Q of 2017 the number of incidents is 417 (PRC 2017).

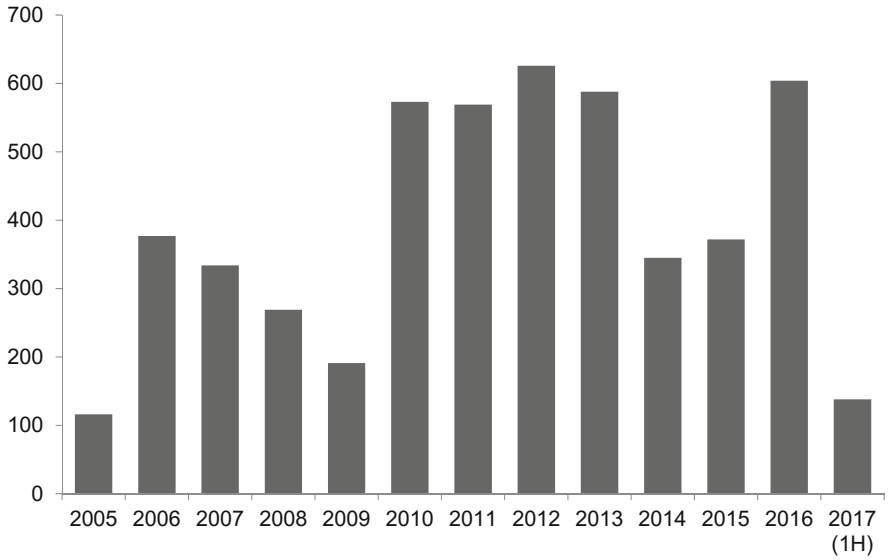

Fig. 1 Number of data breach incidents per year. Source: Author's own study based on PRC dataset (PRC 2017). Note: 1H—First half of 2017

4 Types of Data Breach and Severity

The occurrence of data breaches can be due to various reasons, both internal, related to the interruptions in the safe processing of personal data in the organization, and external ones—for example, the attempt to steal data from cybercriminals. Privacy Rights Clearinghouse, which collects information about data breaches in the United States, uses a classification of causes of these events that distinguish eight basic categories (see Table 1).

Based on the dataset of compromised data reported within the period 2005–2016, we analyzed the causes of data breaches. There is not one major cause of data breach, as Fig. 2 shows. Instead of this, there are for main reasons of personal data leaks that are responsible for 86% of unauthorized disclosure of confidential data. They are physical loss, unintended disclosure, hacking or malware, and lost or stolen portable device.

As a result of the risk of data breach, a number of confidential records are exposed. They could hit the wrong hands and contribute to further losses. The severity of the breach risk is not homogeneous. Most incidents (73%) lead to leakage of maximum 10,000 records, and in 92% cases the number of records compromised does not exceed 100,000. However, there can happen massive data breaches that may result in more than one million records compromised. It raises an important research question if the cause of data breach affects the extent of data breach (severity of data breach risk). We examine descriptive statistics (Table 2) and a box plot (Fig. 3) to verify this issue.

Table 1 Classification of data breaches

CARD	Payment card fraud	Fraud involving debit and credit cards that are not accomplished via hacking, for example, skimming devices at point-of-service terminals
DISC	Unintended disclosure	Sensitive information posted publicly on a website, mishandled or sent to the wrong party via email, fax, or mail
HACK	Hacking or malware	Electronic entry by an outside party, malware, and spyware
INSD	Insider	Someone with legitimate access intentionally breaches information such as an employee or contractor
PHYS	Physical loss	Lost, discarded or stolen nonelectronic records, such as paper documents
PORT	Portable device	Lost, discarded, or stolen laptop, PDA, smartphone, portable memory device, CD, hard drive, etc.
STAT	Stationary device	Lost, discarded, or stolen stationary electronic device such as a computer or server not designed for mobility
UNKN	Unknown	Unknown or other

Source: PRC (2017)

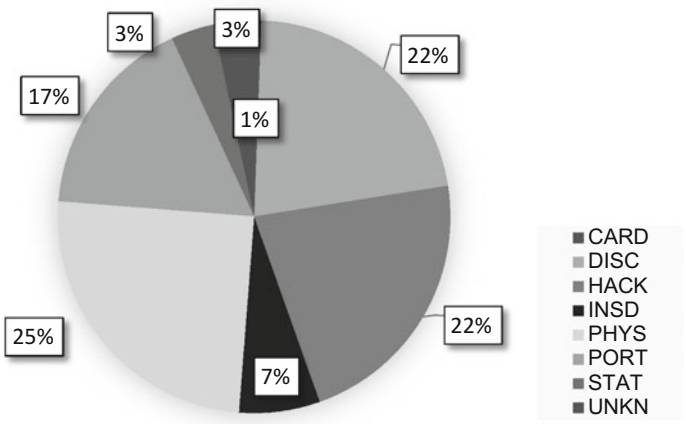

Fig. 2 Causes of data breach incidents in the United States. Source: Author's own study based on data from PRC (2017)

We observe large differences in values of medians that depend on the cause of a leak. The lowest median occurs in events caused by card payment fraud (300) and by insiders (754), while the median for breaches due to hacker attacks or malware is many times higher and amounts to 5376. A significant difference also exists in terms of distribution parameters. Skewness coefficients take values from 5 to 32. From the box plot, one can also read the values of minima and maxima for individual groups, as well as the quantile distances. The smallest differentiation of severity characterizes data breaches caused by payment card fraud or physical losses. Events triggered by hacker attacks, by an insider, or by loss of portable device can cause consequences that are very dispersed.

Table 2 Causes of data breaches—descriptive statistics

Statistics	CARD	DISC	HACK	INSD	PHYS	PORT	STAT	UNKN
Number	30	1085	1094	336	1234	837	179	164
Mean	240,101.17	123,501.23	1,550,687.67	197,315.21	29,616.39	213,005.95	90,838.77	1,231,499.01
Median	300	1625	5376	754	1688	3560	3623	1901
Std. Dev.	1,276,882	2,457,113	11,195,501	1,859,612	246,762	2,830,775	456,498	9,515,902
Variation Coef.	531.81%	1989.55%	721.97%	942.46%	833.20%	1328.97%	502.54%	772.71%
Skewness	5.48	31.80	9.99	12.75	15.56	24.08	8.03	9.12
Kurtosis	29.99	1033.08	111.94	174.71	271.11	625.36	68.36	86.30

Source: Author's own study based on data from PRC (2017)

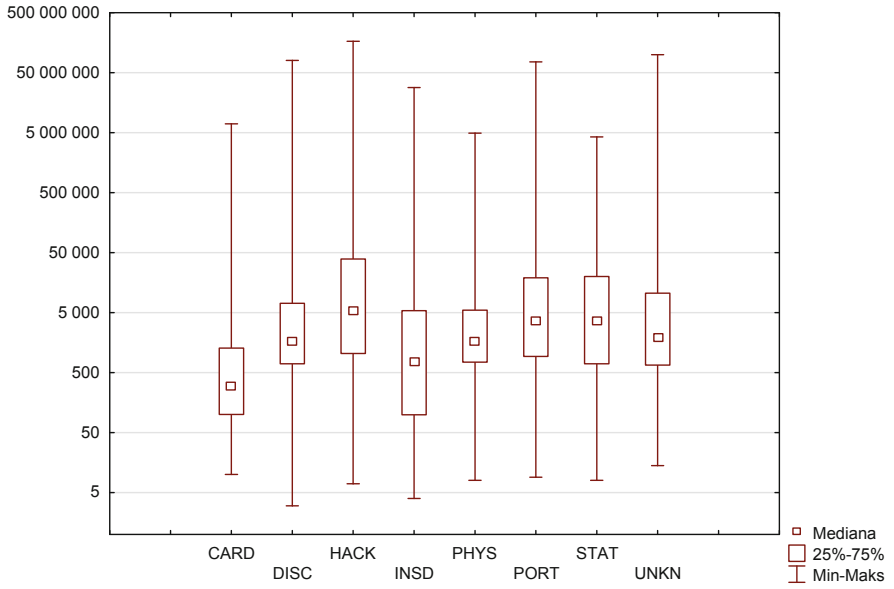

Fig. 3 Causes of data breaches and their severities. Source: Author's own work based on data from PRC (2017)

Moreover, we used the Kruskal–Wallis test to test this hypothesis. The H statistic of the Kruskal–Wallis test equals 267.90 and the p-value is less than 0.0001, which means that we can reject the null hypothesis saying that all causes of data breach come from the same population. In other words, we can conclude that cause of data breach statistically significantly impacts the severity of a data breach incident.

5 Malicious and Negligent Data Breaches

Alternative way of classification of data breaches was proposed by Edwards et al. (2015). By assuming as a division criterion, the intent of the data leakage perpetrator, they distinguish two categories of incidents. Firstly, incidents arising from human negligent behavior. This category includes unintended disclosure, physical loss, lost stationery and portable devices. The second category consists of malicious activities such as hacking, malware, insider, or payment card fraud. The last category is created of data breaches of unknown origin.

Contrary to the common belief that cyberattacks represent the major threat for data protection, the most frequent reason for data breach is negligence. The share of negligent incidents is 67% of all cases. This is a clear signal that the weakest link in data protection policy is the human factor. Malicious incidents count only for 29% of data breaches.

Table 3 Malicious versus negligent data breaches—descriptive statistic

Statistics	Malicious	Negligent	Unknown
Number	1460	3335	164
Mean	1,212,297	109,473	1,231,499
Median	3364	2000	1901
Std. Dev.	9,750,180	2,002,768	9,515,902
Variation Coef.	804.27%	1829.47%	772.71%
Skewness	11.45	36.19	9.12
Kurtosis	148.10	1386.94	86.30

Source: Author's own study based on data from PRC (2017)

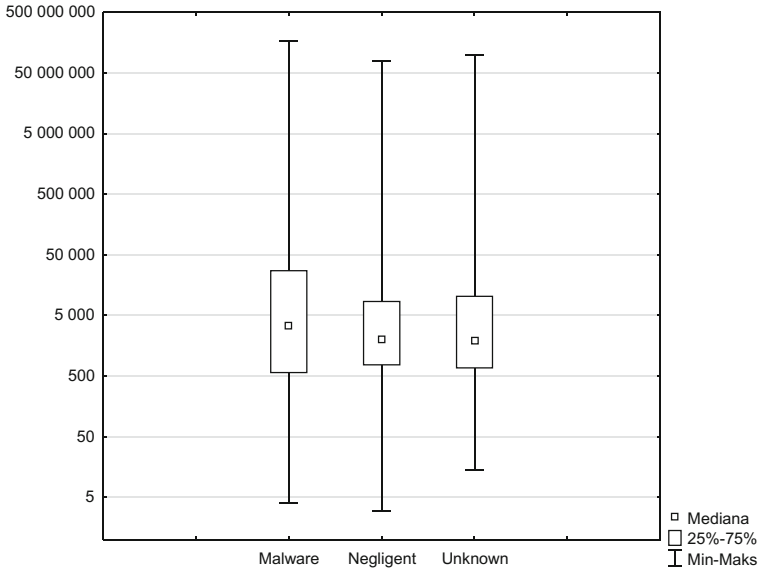

Fig. 4 Malware versus negligent data breaches and their severities. Source: Author's own study based on data from PRC (2017)

The data shown in Table 3 and on the box plot (Fig. 4) leads to the conclusion that negligent data breaches, although more frequent, are less severe than malware ones. The median of negligent incidents is 2000 compared to 3364, and 75% of all cases do not exceed 10,000 compromised records per one negligent incident. The same quantile for malware breaches is ca. four times higher. On the other hand, the severity distribution of negligent breaches is more heavy tailed than malware ones, which is indicated by substantially higher skewness coefficient and kurtosis.

Another important fact regarding malware and negligent data breaches is their distribution among different types of organizations where they appeared. Negligence in data protection is the biggest problem in healthcare (MED) and government (GOV) where negligent data breaches represent more than 70% of all events

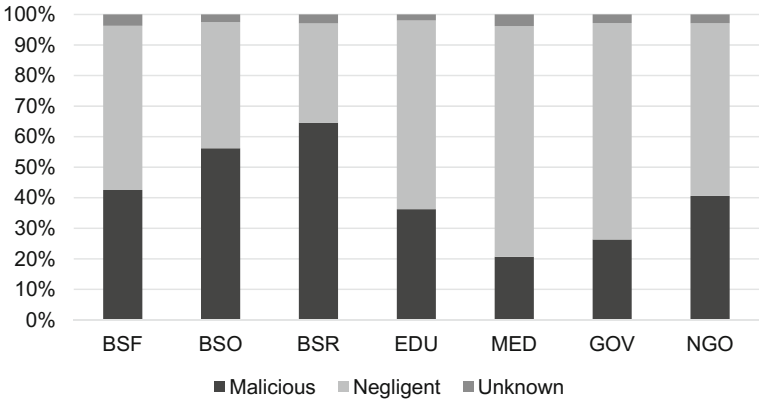

Fig. 5 Malware versus negligent data breaches in different types of organizations. Source: Author's own study based on data from PRC (2017)

(Fig. 5). Unsurprisingly, malicious data breaches are a serious threat in the business sector, particularly in retail (65%).

Generally, we can say that cybersecurity policy of business entities should concentrate on protection against malicious cyber events, whereas the main concern of nonbusinesses (in particular public institutions) should be its own staff and management that need more education and training on cybersecurity issues.

6 Type of Organization and Severity

The next paragraph examines a relation between the type of organization and the severity of data breaches. As can be seen in Fig. 6 more than half of the reported incidents happened in healthcare industry (58%). This is probably due to strict notification obligations under the privacy regulations in medical institutions. The second most affected group is business (18% in total). The remaining places were taken by Education sector (12%) and Government sector (11%).

When it comes to evaluating the severity of data breaches among different types of organizations, we can see (Table 4 and Fig. 7) that medians, maximum values, skewness, and kurtosis coefficients vary substantially. Data breaches in education sector seem to be the least severe in terms of maximum value (little more than five million records exposed per one incident) and the mean (41,082). Although data breaches in retail business represent the lowest median (874), skewness (6.82), and kurtosis (49.73), the maximum reported severity of an incident was as high as ca. 100 million records. The box plot shows that severity of data breaches in medical sector is most concentrated around median. It is also worth to mention that the most severe incidents happened in business sector (other than financial institutions and

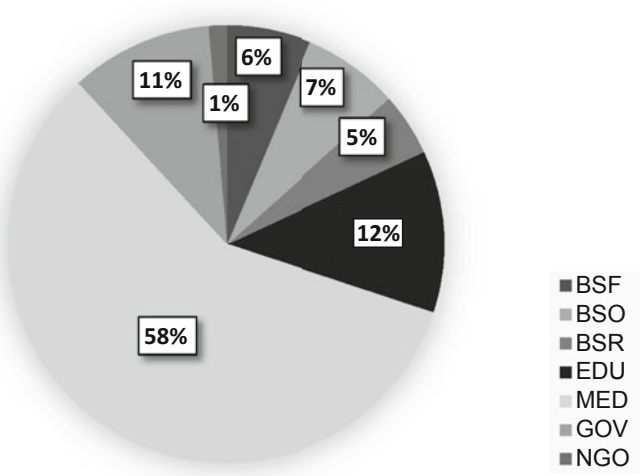

Fig. 6 Breakdown of data breaches by the type of organization. Abbreviations: *BSF* Financial institutions, *BSO* Other businesses, *BSR* Retail business, *EDU* Education, *MED* Healthcare industry, *GOV* Government and Military, *NGO* Nonprofit organizations. Source: Author's own study based on data from PRC (2017)

retail), which translates into relatively high values of median (4400), and Q1 and Q3 quartiles.

The relationship between type of organization affected and severity of data breach has been confirmed by the Kruskal–Wallis test. The value of test statistic $H = 42.63$ ($p\text{-value} < 0.0001$) supports the conclusion that type of organization statistically significantly impacts the severity of a data breach incident.

Following the above conclusion, we can also observe different compositions of data breach causes depending on the type of organization (Fig. 8). For example, when it comes to businesses most privacy violations are the result of hacking and malware, although in financial institutions loss of portable devices is an equally serious threat. Loss of electronic devices as well as unintended disclosure gain importance as the main reason for data breaches in governmental, NGO, and educational sectors.

Location of the organization affected is another factor affecting the severity of data breaches. We compared the data breach data for 47 US states and it appeared that there is statistically significant difference in the distribution of a number of records compromised in one incident (result of Kruskal–Wallis test: $H = 85.61$; p-value $= 0.0017$).

Table 4 Severity of data breaches in different types of organizations—descriptive statistic

Statistics	BSF	BSO	BSR	EDU	MED	GOV	NGO
Number	316	346	232	594	2877	525	69
Mean	1,512,597	2,632,232	2,064,402	41,082	75,601	423,279	75,475
Median	2044	4400	874	2408	2203	3000	1871
Std. Dev.	9,989,999	15,922,735	11,689,737	330,641	1,520,603	3,870,749	379,427
Variation Coef.	6.60	6.05	5.66	8.05	20.11	9.14	5.03
Skewness	9.90	7.70	6.82	20.17	48.59	15.89	7.15
Kurtosis	108.62	64.04	49.73	443.41	2501.95	288.36	54.13

Source: Author's own study based on data from PRC (2017)

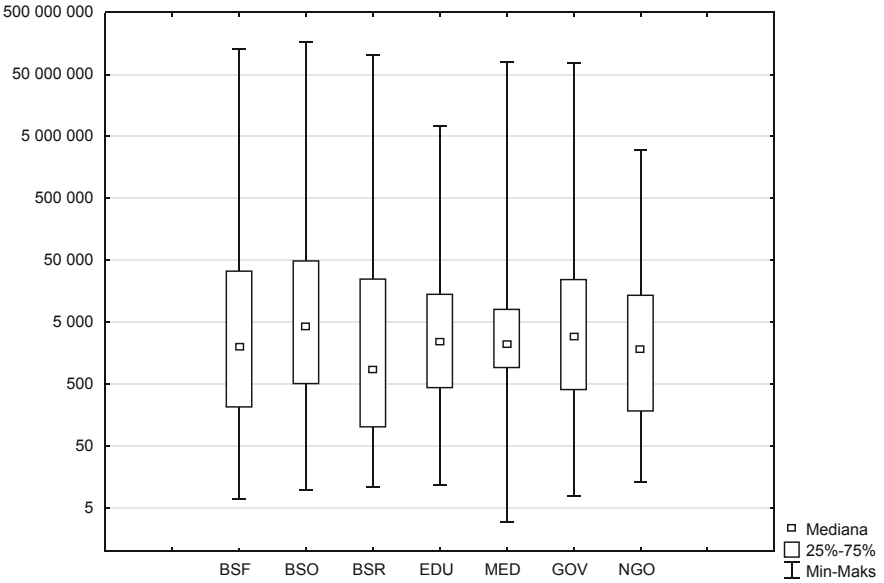

Fig. 7 Severity distribution of data breaches by the type of organization. Source: Author's own study based on data from PRC (2017)

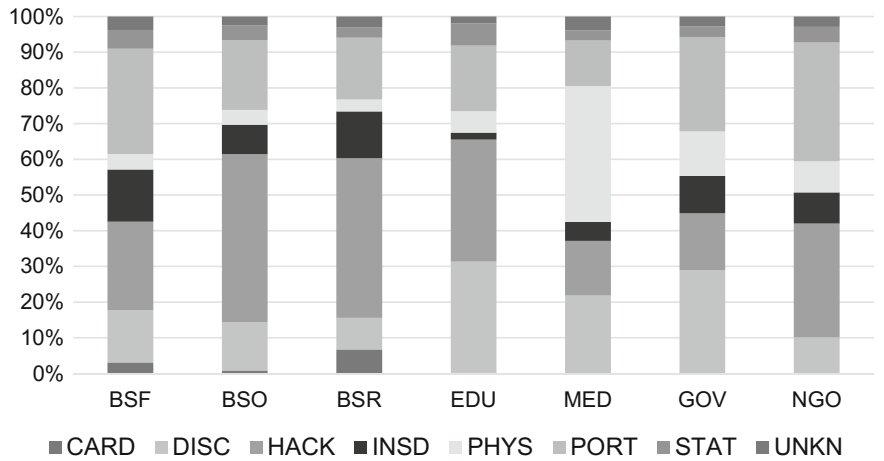

Fig. 8 Type of organization versus causes of data breaches. Source: Author's own study based on data from PRC (2017)

7 Federal Data Breach Notification Law and the Number of Data Breaches

In this paragraph, we will ask the question: Does the data breach notification law really matter? Is there a visible impact of the law on the count of reported incidents? Privacy protection laws, that provide for mandatory notification of data breach incidents, are endorsed by the United States legal system at the state level. It is up to each state to decide whether to adopt such regulations and what specific solutions should be adopted. The first state that introduced the obligation to notify data breach incidents was California, which already in 2002 adopted the relevant provisions. This is also the state with the highest number of reported incidents (630). Subsequent states began to implement similar provisions successively from 2005. By 2008, most states had done so, while few states (4) joined during the period 2009–2015. So now the data breach notification law is not present only in four states (Alaska, District of Columbia, New Mexico, South Dakota).

The number of reported breaches per state compared with the year of implementation of data breach notification law reveals a lack of correlation (Fig. 9). Assumption that the amount of data breach incidents should be higher in those states that have a longer history of data protection regulations has not been confirmed. Total number of events in the District of Columbia (95) or Alaska (51) is higher than in 29 and 21 states with notification laws respectively. It proves that implementation of privacy protection regulations do not affect the magnitude of data breach risk. It can be partially explained by the fact that, in parallel with the state laws, there are federal data breach notification regulations for particular industries such as financial institutions (Gramm-Leach-Bliley Act of 1999) and healthcare (HIPAA Act of 1996, amended by the HiTECH Act of 2009).

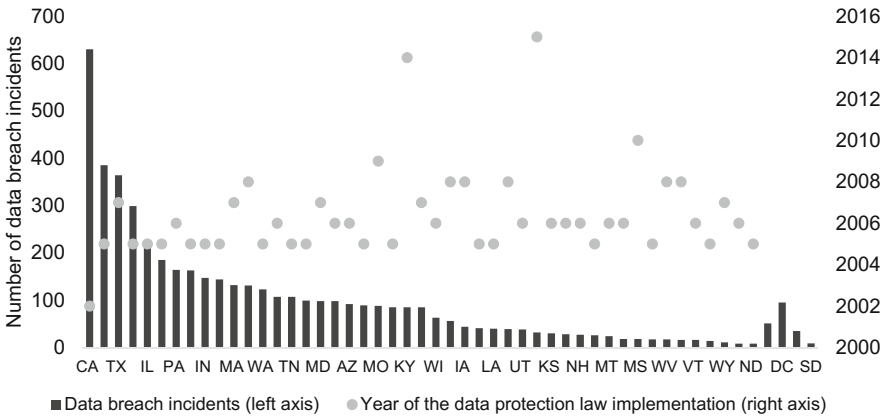

Fig. 9 Number of data breach incidents per state versus year of the data protection law implementation. Source: Author's own work

8 Modeling Severity

Modeling severity helps to make a prediction about the potential extent of a single data breach. It also allows many organizations in better cyber risk management. In particular, issues like cyber loss reserving, cyber risk retention strategy, and cyber policy limits can be supported by the results of our study. Our dataset consists of 4964 data breach incidents reported in 2005–2016 in the United States. The number of records compromised has been assigned to each incident. We assume that the number of records compromised in one incident is a measure of the severity of data breaches.

At first, the empirical distribution of observed data breaches has been analyzed from a statistical point of view. We removed five outliers to improve the statistical properties of the dataset (Table 5).

In order to choose good candidates among theoretical distributions, a histogram and an empirical cumulative distribution function (CDF) have been plotted (Fig. 10). High positive value of the skewness coefficient (18.41) reveals a lack of symmetry of the empirical distribution. The distribution is right skewed (right-tailed), which means that the mass of the distribution is concentrated on the left. The value of the kurtosis quantifies the weight of tails in comparison to the normal distribution, where kurtosis equals 3. The kurtosis in our dataset is extremely high (390.14), which indicates fatter tails or so called leptokurtic distribution. Taking all of this into consideration, we decided to take four types of classic actuarial distribution functions that are used for loss modeling: lognormal, loglogistic, Pareto, and Weibull. For some distributions (Pareto, loglogistic), it is necessary to specify initial values for the distribution parameters. Based on Delignette-Muller and Dutang (2015), we set the following values of the parameters: Shape = 1 and Scale = 500.

When fitting continuous distributions, as in our case, Kolmogorov–Smirnov, Cramer–von Mises, and Anderson–Darling statistics should be computed in order to check the goodness-of-fit (D'Agostino and Stephens 1986). According to Cullen and Frey (1999), the Anderson–Darling statistic should be of special interest when it is intended to equally emphasize the tails and the main body of a distribution, which is important in our case. A goodness-of-fit plot will be also provided as a

Table 5 Number of records exposed per data breach incident—descriptive statistics

Name of the parameter	Full dataset	Dataset with deleted outliers
Number of observations	4964	4959
Range of values (min–max)	3 (min) 1,370,000,000 (max)	3 (min) 167,000,000 (max)
Median	2250	2250
Mean	1,333,403	471,266
Standard deviation	29,967,700	5,823,949
Skewness	35.70	18.41
Kurtosis	1398.44	390.14

Source: Author's own study based on data from PRC (2017)

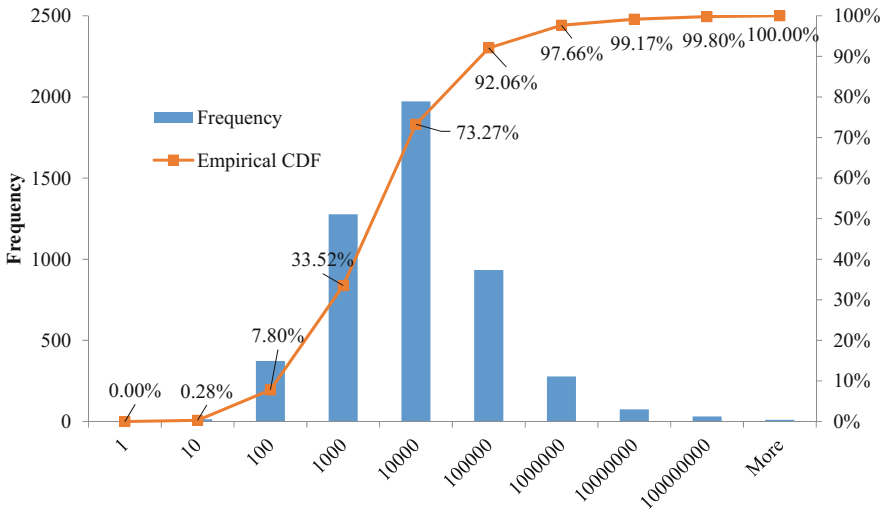

Fig. 10 Histogram and empirical CDF of our dataset. Source: Author's own work based on data from Privacy Rights Clearinghouse

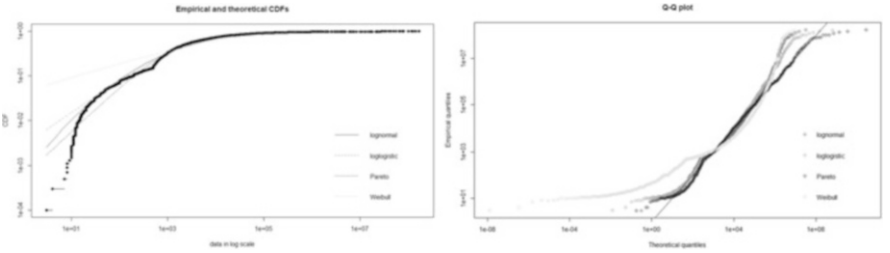

Fig. 11 Goodness-of-fit plots. Source: Author's own study

supplementary goodness-of-fit measure. The procedure of fitting distribution was based on the maximum likelihood method (MLE) and exercised in the "fitdistplus" R package. The results of fitting distribution are shown in Fig. 11. Additionally, Table 6 contains goodness-of-fit statistics.

Figure 11 containing a CDF plot of both the empirical distribution and the fitted distributions, and a Q–Q plot representing the empirical quantiles (y-axis) against the theoretical quantiles (x-axis), confirms that Pareto distribution fits the best to our dataset. The Q–Q plot indicates lack of perfect fit at the distribution tails, particularly at the left tail.

All goodness-of-fit statistics show that Pareto distribution is best fitted to empirical data. Although AIC and BIC criteria and the loglikelihood value show that log-normal and log-logistic distributions could be also considered, the Anderson–Darling test is decisive for the choice of Pareto distribution. Pareto distribution gives more weight to the right-tail of the distribution. The parameters of the fitted

Table 6 Goodness-of-fit statistics

Goodness-of-fit statistics	Log-normal distribution	Log-logistic distribution	Pareto distribution	Weibull distribution
Kolmogorov–Smirnov	0.0811	0.0702	0.0563	0.1487
Cramer–von Mises	7.7171	3.1707	1.1997	36.5479
Anderson–Darling	41.7033	20.7556	9.2266	218.3372
AIC	102,768.3	102,526.1	102,373.7	104,800.5
BIC	102,781.3	102,539.2	102,386.7	104,813.5
Loglikelihood	−51,382.13	−51,261.07	−51,184.86	−52,398.26

Source: Author's own work

Table 7 Parameters of the fitted Pareto distribution

Parameters of the Pareto distribution	Estimate	Std. error
Shape	0.536	0.012
Scale	927.777	43.453

Source: Author's own study

distribution are as presented in the Table 7. We can also present it in the analytical form.

Knowledge of theoretical distribution allows us to predict the severity of future data breach incidents. Using Value-at-Risk, which is a statistical measure of downside risk, we can tell how big can be the "big event" depending on the assumed quantile. For example, an organization might be 95% sure that the maximum amount of records compromised in a data breach incident will not exceed 246,962. If we increase the quantile to 99%, the severity of the incident should not exceed five million records. So the difference is substantial (twenty times higher!). These estimations can be compared with risk appetite of an organization or its risk retention limits. Knowledge of risk exposure can facilitate making a decision regarding risk mitigation and the purchase of cyber insurance.

9 Conclusions

Main findings of the chapter can be summarized as follows:

- The problem of personal data security and data breaches has been rapidly growing in the last decade, but in the last 7 years the average number of incidents has stabilized at 600.
- The study was based on the assumption that a number of records exposed in one data breach incident can be a measure of severity of data breach risk.
- Cause of data breach, type of affected organization, and geographical region are statistically significant factors that diversify the population in terms of severity of the loss.

- Physical loss, unintended disclosure, and hacking (malware) are the major (69%) causes of data breaches.
- More than half of all incidents happened in healthcare industry.
- Each type of organization has its own specifics regarding the causes of breaches that happen most frequently.
- Negligent data breaches appear twice more frequently than malicious ones.
- Severity of data breach risk can be modeled by Pareto distribution.
- The values of VaR 95% and VaR 99% vary considerably.
- Implementation of the data breach notification law does not affect the number of breach incidents reported in particular states.

The results of the chapter can serve as support for businesses in cyber risk management, insurance industry in cyber risk underwriting, or policymakers in creating the cybersecurity strategy.

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Human Risk in Agriculture: Problems and Perspectives

Laura Girdžiūtė

Abstract Agriculture is an economic sector facing large risk, mainly from natural factors and despite of relatively low price responsiveness to supply and demand causes output volatility in general. It is a risky business, and risk assessment and management tools have become increasingly important in recent years. Risk assessment and management is a complex process, since the risk arises from different sources. Typically, literature analyzes financial, business, credit, or currency risk. There is lack of research of human risk, especially in agriculture sector. It is important to identify knowledge, attitudes, behaviors, and priorities among farmers regarding safety, health, and risk management. This research focuses on identifying main human risk factors, identifying vulnerable populations in agriculture, including immigrants, migrants, refugees, young and older persons, women, persons with disabilities, and minority workers. The research explores human risk assessment and management problems in agriculture. Only then is it possible to increase safety and health for agriculture workers and decrease human risk manifestation in agriculture and to make the agriculture sector socially beneficial for its nation.

Keywords Agriculture risk · Human risk · Vulnerable populations

1 Introduction

Agriculture is an economic sector facing large risk, mainly from natural factors and despite of relatively low price responsiveness to supply and demand causes output volatility in general. It is a risky business, and risk assessment and management tools have become increasingly important in recent years. Risk assessment and management is a complex process, since the risk arises from different sources. Due to different risk sources, it is important to consider such factors: seasonality, agricultural products are perishable; variability in prices of raw materials and a long production

L. Girdžiūtė (✉)
Faculty of Economics and Management, Aleksandras Stulginskis University, Kaunas, Lithuania

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cycle; climate changes; impacts of environmental protection restrictions; fluctuations in agricultural produce demand, supply and prices; high transportation prices lead to an increase in product prices, which entails higher economic risk; climatic conditions; animals and plant welfare, etc. Typically, the literature analyzes financial, business, credit, or currency risk. There is lack of research of human risk, especially in agriculture sector. It is important to identify knowledge, attitudes, behaviors, and priorities among farmers regarding safety, health, and risk management.

The aim of this chapter is: (1) to identify main human risk factors in agriculture; (2) to analyze workers' structure in agriculture farms; (3) to identify human risk in agriculture problems and perspectives. The following methods were used to achieve the above aims: (1) generalization and comparative analysis were used for theoretical research; (2) generalization, deduction, induction, and ranking methods were used for statistical analysis of workers' structure in agriculture.

2 Human Risk Factors

The United States Department of Agriculture (1999) defines human risk like factors such as problems with human health or personal relationships that can affect the farm business. For example, accidents, illness, death, and divorce are examples of personal crises that can threaten a farm business. This human risk conception is also widely used by researchers (Dao and Peduzzi 2004; Hardaker et al. 2004a; Harwood et al. 1999; Dillon 2003; OECD 2011; Meuwissen et al. 2001).

Stoner et al. (2006) identify some problems in the agriculture sector and specifies that the modern human resource management system cannot be adapted to farms because of the following reasons:

- Work at farmers' farms is not prestigious
- Shortage of qualified human resources in rural areas
- Inclination to migrate to urban areas or foreign countries among young and perspective employees
- Farmers usually do not hire; they are both the sole decision-makers in farm management and the farm workers

So in order to manage human risk in agriculture sector, it is necessary to find new methods that would be adaptable to this sector's specifics. In order to identify main human risk factors ranking method was used (Table 1). Analysis presents that the most significant human resource risk factors are: approach to risk, social status, i.e., honor, popularity, image, expectations, and education. The researchers consider such factors as experience, person's mood, health condition, and psychological state to be less significant.

Factors with lowest rating (health condition, psychological state, mood) reflect a person's inner state. The better a person's physical and psychological state, the higher are the chances of more risky decisions being made by him/her in order to receive greater reward/profit. Meanwhile, people who are in bad moods, ill,

Table 1 Human risk factors

Human risk factors	Researchers	Factors are mentioned in the research publications occasionally
Approach to risk	Cather (2010), Hardaker et al. (2004b), Senkondo (2000), Smidts (1990), Pritchet et al. (1996), Ogurtsov et al. (2008), Bard and Barry (2001), Gorzeń-Mitka (2015)	8
Social status	Hardaker et al. (2004b), Senkondo (2000), Smidts (1990), Pritchet et al. (1996), Kahneman and Tversky (1979), Mailisth and Postlewaite (2002)	6
Education	Ermoliev et al. (2000), Bouma et al. (2005), Pradlwarter and Schueller (1999), Melnik-Melnikov and Dekhtyaruk (2000), Johnson (2008)	5
Mood	Yuen and Lee (2003), Hermalin and Isen (2008), Damasio (1995)	3
Psychological state	Heilman (2006), Hermalin and Isen (2008)	2
Health condition	Meuwissen et al. (2001), Vujčić et al. (2015)	2
Experience	Pennings et al. (2002)	1

Source: Developed by the author based on the literature review

depressed, usually are not inclined to make risky decisions. Usually they maintain a pessimistic point of view.

An approach to risk shows the decision-maker's risk toleration level determined by his/her personal experience. A range of possible approaches for the same situation may influence different behavioral profile and different outcomes of the situation. Meanwhile a person's experience in the context of risk management is viewed as the totality of knowledge and skills in production. The more experience a person has in a certain field, the better he/she perceives the reality, emerging threats, and potential scope of consequences.

Social status reflects the person's social position in the society. It reflects duties and rights. Social status covers financial state, political views, education, duties, profession, business and family relations, religion, etc. In broad terms, this concept also covers gender, race, age, and nationality. A person of a certain social status has a certain shaped worldview and follows certain norms of behavior that influence his/her decisions.

Education is a factor that covers knowledge in a certain field and skills in information search, systematization, application of various methods for solution of various problems. This means that insufficient education could lead to inadequate assessment of a situation and, in turn, influence inadequate assessment of the risk-to-reward ratio. Agriculture is a specific business area, where a farmer's education in a field other than agriculture may pose considerable risk to farm management.

Summing up, in order to manage human risk in agriculture it is necessary to ensure a good working environment that includes safety environment, positive microclimate, and qualified, motivated labor force. But as it was mentioned earlier, young and qualified people tend to migrate to urban areas, as work at farmers' farms is not viewed as a prestigious job, so there is a need for programs/methods on how to attract young people to agriculture sector. As there is lack of qualified human resources in rural areas, attracting immigrants, migrants, refugees, young and older persons, women, persons with disabilities, and minority workers will help to solve some social problems in national level and to increase agribusiness efficiency. In order to reach this goal specialized training programs for human risk management must be adapted.

3 Labor Force Statistical Analysis

Human risk in agriculture is not comprehensively an analyzed phenomenon, so there is lack of programs/systems that could be adapted to farms in order to minimize human risk manifestation in farms. It is important to note that different countries, according to their level of economic development, have different problems. Countries with high economic level usually can offer higher salaries, better working conditions, than low economic level countries, so workers from these countries migrate to high economy countries. This migration results in countries with low economy level lacking labor force, especially qualified labor force, and countries with high economy level not having such problems. This example presents that different countries can have different vulnerable populations groups, so different training models or systems would be required.

Using Eurostat database unemployment level of 33 countries was analyzed. Table 2 presents unemployment rate of youngest and oldest group (working age) of population.

As it is seen from Table 2, highest unemployment level of young people is in Greece, Former Yugoslav Republic of Macedonia, Spain, Italy, Cyprus, Croatia, Portugal, Slovakia, France, Turkey, Romania, Finland, Belgium, Luxembourg, Poland, Sweden, Bulgaria, Slovenia, and Ireland. Meanwhile highest unemployment level of old people is in Greece, Spain, Cyprus, Portugal, Former Yugoslav Republic of Macedonia, the Netherlands, Finland, Bulgaria, France, Slovenia, Hungary, Estonia, and Slovakia.

As data shows some countries have high unemployment levels for both young and old persons: Greece, Former Yugoslav Republic of Macedonia, Spain, Cyprus, Portugal, France, Bulgaria, and Slovenia. Highest female unemployment is found in Greece, Spain, Cyprus, Croatia, Portugal, Slovakia, Italy, France, Latvia, Finland, and Slovenia.

Table 3 shows data of 25 countries, year—2014 (latest available date) of first generation of immigrants self-declared over-qualified employees as percentage of the total employees.

Table 2 Unemployment rate by age groups and sex (2016)

Unemployment by age group, %				Unemployment by sex, %			
Countries	Age from 15 to 24 years	Countries	Age from 60 to 64 years	Countries	Female	Countries	Male
Greece	50.7	Greece	16.6	Greece	14.7	Greece	13.4
Macedonia	48.8	Spain	16.3	Spain	12.9	Spain	12.8
Spain	44.9	Cyprus	9.1	Cyprus	8.2	Cyprus	9.0
Italy	39.6	Portugal	8.5	Croatia	7.2	Latvia	7.9
Cyprus	32.1	Macedonia	8.2	Portugal	6.9	Croatia	7.8
Croatia	31.3	Netherlands	8.1	Slovakia	6.2	Portugal	7.8
Portugal	28.8	Finland	6.9	Italy	6.1	Italy	7.2
Slovakia	26.3	Bulgaria	6.2	France	5.6	France	6.6
France	24.1	France	6.1	Latvia	5.4	Ireland	6.5
Turkey	23.5	Slovenia	6.0	Finland	5.4	Lithuania	6.5
Romania	21.8	Hungary	5.7	Slovenia	5.1	Slovakia	6.3
Finland	18.6	Estonia	5.1	Sweden	4.6	Finland	6.2
Belgium	18.2	Slovakia	5.0	Denmark	4.4	Estonia	5.6
Luxembourg	18.0	Sweden	4.7	Lithuania	4.3	Sweden	5.5
Poland	18.0	Latvia	4.6	Netherlands	4.2	Belgium	5.2
Sweden	17.3	Belgium	4.4	Belgium	4.1	Bulgaria	5.2
Bulgaria	16.9	Ireland	4.1	Estonia	4.0	Slovenia	5.0
Slovenia	14.7	Germany	4.0	Luxembourg	3.9	Austria	4.7
Ireland	14.6	Croatia	3.9	Bulgaria	3.8	Romania	4.5
Hungary	12.9	Italy	3.6	Ireland	3.8	Denmark	4.2
Lithuania	12.6	Denmark	3.3	Austria	3.5	Netherlands	4.2
Latvia	12.1	United Kingdom	3.1	Poland	3.4	Poland	4.2
Czech Republic	11.4	Switzerland	2.5	United Kingdom	3.0	Luxembourg	4.1
United Kingdom	11.1	Czech Republic	2.3	Hungary	2.8	Norway	3.9

(continued)

Table 2 (continued)

Unemployment by age group, %				Unemployment by sex, %			
Countries	Age from 15 to 24 years	Countries	Age from 60 to 64 years	Countries	Female	Countries	Male
Malta	11.0	Turkey	1.9	Czech Republic	2.7	United Kingdom	3.7
Denmark	10.9	Poland	1.9	Norway	2.6	Hungary	3.5
Estonia	10.6	Norway	1.0	Malta	2.5	Germany	3.3
Netherlands	10.3	Romania	x	Romania	2.5	Malta	3.2
Austria	10.2	Malta	x	Germany	2.4	Iceland	2.6
Norway	9.3	Luxembourg	x	Iceland	2.4	Czech Republic	2.5
Switzerland	8.4	Lithuania	x			Turkey	x
Iceland	6.4	Iceland	x				
Germany	6.1	Austria	x				

Source: Eurostat (2017)

Table 3 First generation of immigrants self-declared over-qualified employees as percentage of the total employees, 2014

Countries	%	Countries	%
Spain	54.1	Luxembourg	21.9
Cyprus	38.2	Poland	20.8
Portugal	33.3	Belgium	20.2
Sweden	33.3	Finland	20.2
Slovakia	32.3	Czech Republic	18.4
France	28.7	Germany	16.6
United Kingdom	28.5	Croatia	16.4
Italy	28.1	Slovenia	15.6
Switzerland	26.2	Latvia	14.5
Malta	25.4	Greece	13.4
Estonia	24.1	Lithuania	12.1
Austria	23.9	Hungary	9.7
Norway	22.3		

Source: Eurostat (2017)

From Table 3, it is seen that some countries that have high unemployment levels also have high immigrant levels: Spain, Cyprus, Portugal, and Slovakia. So it is possible to conclude that vulnerable population attraction to agriculture sector should solve some countries' unemployment problems. Table 4 presents agricultural training of farm managers in 2013 (latest available date).

Table 4 data shows that highest education rate of agriculture managers is in Luxembourg, Czech Republic, France, Latvia, Poland, Austria, Estonia, and Ireland. Basic training is common to Italy, the Netherlands, Germany, Denmark, Finland, Slovenia, and France. These countries' experience could be adapted for countries which use mostly unqualified work labor.

4 Problems and Perspectives in Human Risk Analysis

Agribusiness is faced with higher risk than other sectors. So agricultural risk assessment and management is a complex process, since the risk arises from different sources. Due to different risk sources, it is important to consider such factors: seasonality, agricultural products are perishable; variability in prices of raw materials and a long production cycle; climate changes; agriculture is impacted by environmental protection restrictions; fluctuations in agricultural produce demand, supply and prices; high transportation prices lead to an increase in product prices, which entails higher economic risk; climatic conditions; animals and plant welfare, etc. (Harangus 2008; Brain 2010). Studies analyzing agriculture risk address such problems: how business entities assess and manage different risk types; how to assess natural disaster risks; what problems small enterprises face in risk assessment; how risk management affects cash flows in farms; what types of risk are typical of

Table 4 Agricultural training of farm managers in 2013, percentages in structure

Countries	Basic training	Countries	Practical experience only	Countries	Full agricultural training
Italy	90.79	Romania	96.40	Luxembourg	50.00
Netherlands	64.15	Greece	93.91	Czech Republic	34.63
Germany	53.22	Bulgaria	92.88	France	29.31
Denmark	44.02	Cyprus	92.54	Latvia	28.41
Finland	38.46	Malta	87.09	Poland	27.57
Slovenia	38.19	Portugal	82.72	Austria	27.21
France	32.24	Spain	82.24	Estonia	25.74
Ireland	25.52	Hungary	82.15	Ireland	24.13
Austria	22.66	Slovakia	75.69	Belgium	21.19
Poland	20.21	Norway	71.05	Sweden	19.21
Belgium	19.73	Sweden	69.26	United Kingdom	15.53
Lithuania	19.27	United Kingdom	68.12	Lithuania	15.36
Czech Republic	18.70	Lithuania	65.37	Germany	14.85
Norway	18.05	Estonia	60.40	Slovenia	11.77
United Kingdom	16.36	Belgium	59.08	Norway	10.91
Spain	16.14	Latvia	58.44	Finland	10.44
Slovakia	15.06	Poland	52.21	Slovakia	9.25
Portugal	14.81	Finland	51.10	Netherlands	7.72
Hungary	14.38	Ireland	50.35	Denmark	6.14
Estonia	13.86	Austria	50.14	Italy	6.12
Latvia	13.14	Slovenia	50.04	Bulgaria	5.80
Malta	12.06	Denmark	49.84	Hungary	3.47
Luxembourg	12.02	Czech Republic	46.67	Portugal	2.47
Sweden	11.53	France	38.45	Spain	1.63
Cyprus	6.95	Luxembourg	37.98	Malta	0.85
Greece	5.50	Germany	31.93	Greece	0.59
Romania	3.13	Netherlands	28.13	Cyprus	0.51
Bulgaria	1.32	Italy	3.10	Romania	0.47

Source: Eurostat (2017)

the agricultural sector (Dao and Peduzzi 2004; Hardaker et al. 2004a; Dillon 2003). However, there is lack of research directed to human risk analysis in agriculture. Human risk analysis is related with psychological, social, and behavioral science, as most of identified human risk factors cover psychological state of mind, mood, and approach toward risk and social status. As indicated, human risk factors are common to all types of organizations and all types of activities. The agriculture sector has its specifics: qualified humans tend to migrate to urban areas, as work at farmers' farms is not viewed as prestigious; unqualified human resources tend to have some social

or health problems, e.g., alcoholism, poor social skills, irresponsible attitude toward work, and unwillingness to work.

Another problem related to human risk analysis in agriculture is lack of statistical data for research. In statics database it is possible to find only common aggregated data and no detailed information. For some data, latest year for analysis is 4 years back, which makes it more difficult to do real-time analysis and to find solutions for today's problems.

However, this research has shown that there is lack of qualified work labor in agriculture and that there is a trend that usually the youngest and oldest parts of populations have highest unemployment level. Most of analyzed countries have high level of unemployment and migration.

All these problems could be solved by creating programs/models for attracting vulnerable populations in agriculture, including immigrants, migrants, refugees, young and older persons, women, persons with disabilities, and minority workers. After exploring the agricultural employers' willingness to hire vulnerable workers, as well as their willingness to work in agriculture, it is possible to increase safety and health for agriculture workers and decrease human risk manifestation in agriculture and to make agriculture sector socially beneficial.

5 Conclusions

Modern human resource management system cannot be adapted to farms because of following reasons: work at farmers' farms is not prestigious; shortage of qualified human resources in rural areas; inclination to migrate to urban areas or foreign countries among young and prospective employees; farmers usually do not hire, and are both the sole decision-makers in farm management and the farm workers.

Human risk analysis has showed that the most significant human risk factors are approach to risk, social status, i.e., honor, popularity, image, expectations, and education. The researchers consider such factors as experience, person's mood, health condition, and psychological state to be less significant.

Human risk analysis is related with psychological, social, and behavioral science, as most of the identified human risk factors cover psychological state of mind, mood, and approach toward risk and social status. As indicated, human risk factors are common to all types of organizations and all types of activities. The agriculture sector has its specifics: qualified human tend to migrate to urban areas, as work at farmers' farms is not viewed as prestigious; unqualified human resources tend to have some social or health problems, e.g., alcoholism, poor social skills, irresponsible attitude toward work, and unwillingness to work.

There is need of programs/models for attracting vulnerable populations in agriculture, including immigrants, migrants, refugees, young and older persons, women, persons with disabilities, and minority workers. After exploring the agricultural employers' willingness to hire vulnerable workers, as well as their willingness to work in agriculture, it is possible to increase safety and health for agriculture workers

and decrease human risk manifestation in agriculture and to make agriculture sector socially beneficial.

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Part VI
Inequality

The Impact of Income Inequality on Economic Growth Through Channels in the European Union

Zita Tamasauskiene and Aidas Dilius

Abstract There is contradictory evidence about the impact of rising income inequality on economic growth through different transmission channels. Inequality can positively influence growth by raising savings and investments, providing incentives for innovation, investment in research and development, as rich people save a higher part of their income, especially in less developed countries. However, inequality may be harmful to growth because it leads to higher levels of social and economic instability, which reduces investment. Investment may also be discouraged by less demand from lower income households in countries where the level of inequality is high. The aim of this research is to assess the impact of income inequality on economic growth through the savings channel and sociopolitical unrest channel in the European Union's 28 countries grouped according to the level of income inequality and country's level of development. We use the ordinary least square regression method for panel data of 28 EU countries, divided into groups, over the period 1995–2014. Econometric results show that rising inequality has a negative impact on growth through savings channels in all groups of countries. However, it was also found that rising inequality had a negative impact on growth through the sociopolitical unrest transmission channel in the groups of the countries defined by the lower income inequality level at different stages of country development and a positive impact in the groups of the countries defined by the higher income inequality level.

Keywords Income inequality · Economic growth · Savings channel · Sociopolitical unrest channel

Z. Tamasauskiene (✉) · A. Dilius
Regional Development Institute, Siauliai University, Siauliai, Lithuania
e-mail: zita.tamasauskiene@su.lt

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1 Introduction

The increasing income inequality in the past decade has sparked discussions about the impact of inequality on growth. Does increasing income inequality create incentives for people to work harder and invest? Does it hinder economic growth? Some authors emphasize that some degree of inequality may not be a problem insofar as it provides the incentives for people to compete, save, invest in human and physical capital, innovate and move ahead in life (Dabla-Norris et al. 2015). Other authors claim that inequality hampers domestic consumer and investment demand, promotes market dysfunctions hindering growth. Economic growth and income inequality are the two most important parameters influencing public welfare and poverty reduction.

A number of studies have been carried out to assess the impact of income inequality on economic growth. The results of carried out research show that inequality can have a positive, negative or insignificant impact on economic growth. The impact of income inequality on economic growth is undeniable; however, insufficient attention is paid in scientific literature to the channels and mechanisms through which this impact manifests.

In theoretical literature and empirical studies, the following transmission channels of the impact of income inequality on economic growth are investigated: credit market imperfection channel, sociopolitical unrest channel, fiscal policy channel, capital market imperfection channel, investment channel, investment indivisibility channel and economic instability channel. There is contradictory evidence about the impact of rising income inequality on economic growth through different transmission channels. Inequality can positively influence growth by raising savings and investments, providing incentives for innovation, investment in research and development, as rich people save a bigger part of their income, especially in less developed countries.

However, inequality may be harmful to growth because it leads to higher levels of social and economic instability, which reduces investment. Investment may also be discouraged by less demand from lower income households in countries where the level of inequality is high. Charles-Coll (2010), Chen (2003), Barro (2000), etc. argue that assessing the impact of income inequality on economic growth, not only income inequality changes but also income inequality levels in a country should be taken into account. In Benhabib's (2003) theoretical model, the increase of income inequality, when the inequality level in a country is low, promotes growth, and when inequality reaches a certain level the incentives to seek rents as well as sociopolitical unrest increase and growth decreases.

Besides theoretical emphasis made by scientists, the results of empirical studies assessing the impact of inequality on growth in different countries prove that the impact of inequality on economic growth also depends on the level of income per capita (Brueckner and Lederman 2015; Fawaz et al. 2014; Gründler and Scheuermeyer 2014; Jaumotte et al. 2013; Herzer and Vollmer 2012; Malinen 2009; Barro 2000; Forbes 2000). The aim of this research is to assess the impact

of income inequality on economic growth through the savings channel and sociopolitical unrest channel in 28 countries of the European Union, grouped according to the level of income inequality and on a country's level of development.

The novelty of this chapter is that some researchers of this topic analyse whether inequality impact is different in the groups of countries of different levels of income inequality and development regardless of the channels through which this effect may occur. Brueckner and Lederman (2015) seeking to evaluate income inequality impact on growth in countries of different levels of development used the econometric model that included an interaction term between initial GDP per capita and income inequality. Therefore, the first contribution of this chapter is that we assess the impact of income inequality on economic growth through two channels by focusing on groups of the EU countries with distinct income levels and different income inequality levels. In the panel model, we introduce an interaction term between income inequality and a variable that is used as a proxy for the channel. Secondly, for reliability of results, assessing the impact of income inequality on economic growth, four different variables measuring income inequality are used. Arjona et al. (2003, p. 124) highlight that "...the Gini—coefficient is particularly sensitive to changes in the middle of the income distribution...", thus, it is not a suitable indicator assessing the relationship between inequality and economic development. Results of the analysis of the impact of income inequality on growth through the savings channel demonstrate that the tenth (top) deciles are the most suitable. On the other hand, assessing the impact of sociopolitical unrest, the data of the first (lowest) deciles, i.e. 10% of the population receiving the lowest income, is the most suitable. We use alternative inequality indicators to examine whether the different parts of the distribution have different effects on economic growth.

The chapter is structured in the following order: Section 2 briefly reviews the literature that evaluated the impact of income inequality on economic growth through savings and sociopolitical unrest channels. Section 3 presents variable definitions and econometric methodology. Section 4 presents the empirical results. Lastly, Section 5 provides the concluding remarks of our investigation.

2 Review of the Theoretical and Empirical Literature

2.1 Savings Transmission Channel

According to the opinions of representatives of classical economics theory, the rising level of income inequality stimulates economic growth, as rising income inequality increases the savings rate of the wealthiest layer of individuals. Wealthy people can invest the saved income, and rising capital may be used to increase the production level, i.e. to stimulate economic growth.

According to representatives of Marxist theory, capital accumulation and investment may increase due to declining wages for employees. Spending less on wages, savings can be used for investment. Thus, the rising level of income inequality

Table 1 The results of studies on the impact of income inequality on economic growth (the savings channel)

Variables	Impact result	Authors
Savings rate	Positive impact	Malinen (2009), Barro (2000)
	Negative impact	Carvalho and Rezai (2015)
Investment	Positive impact	Castells-Quintana and Royuela (2014), Gründler and Scheuermeyer (2014), Halter et al. (2013), Muinelo-Gallo and Roca-Sagalés (2011), Arjona et al. (2003), Barro (2000), Figini (1999), Alesina and Perotti (1996)
	Negative impact	Malinen (2009)

Source: Created by the authors

stimulates the increase of savings rate, investment growth and economic growth. According to a neo-Austrian school representative Hayek (1899–1992), in companies reducing wages for employees, savings can be used for promotion of innovations and technological progress. As technological progress stimulates economic growth, it is possible to state that in this case the rising level of income inequality stimulates economic growth (Susanu 2012).

The increasing inequality of income stimulates the savings rate for wealthy individuals, which allows them to invest more. Companies can use the investment for scientific research and experimental development. However, during a short period the increasing inequality in society can lead not only to the increasing rate of savings but also to the decreasing level of consumption, which is one of the factors determining economic growth. A number of empirical studies have been carried out to evaluate the impact of income inequality on the growth through the savings channel. The results of carried out studies are presented in Table 1.

Malinen (2009) and Barro (2000), investigating the impact of income inequality on economic growth through the savings channel, found the positive effect of *savings rate* on economic growth. Carvalho and Rezai (2015) carried out research of the US case in the period of 1967–2010 by assessing the impact of inequality through the savings channel. To measure inequality they used the Gini coefficient and found the negative effect of the savings rate on economic growth. The different scope of countries, different periods of time, different methods, different variables used by mentioned authors as a proxy of the channel could determine the disparities of research results. Malinen (2009) used both ordinary least squares method and cointegration method. Barro (2000) used the three-stage least squares method, whilst Carvalho and Rezai (2015) used the vector autoregression method.

Barro (2000) assessed the impact of income inequality on economic growth using three variables measuring the savings channel. Malinen (2009) used the savings rate and investment volume, whilst Castells-Quintana and Royuela (2014) used the investment volume and technological progress. As already mentioned, the increasing

rate of savings should also increase the volume of investment. However, the ambiguous impact of investment on economic growth has been identified. The studies carried out by some researchers prove that this impact is positive, whilst the studies carried out by other researchers prove that this impact is negative (see Table 1).

Castells-Quintana and Royuela (2014) investigated the impact of income inequality measured by the Gini coefficient and quintile ratio on economic growth in 51 countries over the period of 1970–2007. Gründler and Scheuermeyer (2014) investigated the impact of income inequality measured by the Gini coefficient on economic growth in 152 countries over the period of 1960–2014. Castells-Quintana and Royuela (2014) and Gründler and Scheuermeyer (2014), after carrying out the regression analysis of the impact of income inequality on economic growth, identified the positive impact of investment on economic growth. Castells-Quintana and Royuela (2014), as well as Gründler and Scheuermeyer (2014), used the least squares method in their studies. Thus, using different variables as a measure of the savings channel (saving rate and investment), the ambiguous impact of income inequality on economic growth has been identified.

2.2 Sociopolitical Unrest Transmission Channel

Sociopolitical unrest increases uncertainty which has a negative impact on various economic decisions, e.g. accumulation of physical capital and savings rate. Income inequality also has a negative impact on political stability. Thus, political instability may be one of the variables reflecting the impact of income inequality on economic growth through the sociopolitical unrest channel (Susanu 2012; Nissanke and Thorbecke 2005). Political instability increases political uncertainty which decreases the investment in human or physical capital, decreases savings rate. Thus, income inequality under increasing political instability slows down the economic growth (Gründler and Scheuermeyer 2014; Castells-Quintana and Royuela 2014; Neves and Silva 2014; Halter et al. 2013; Charles-Coll 2013). In comparison to the studies assessing the impact through the savings channel, relatively fewer studies dealing with the impact of income inequality on economic growth through the sociopolitical unrest channel have been carried out (Table 2).

Figini (1999) carried out the case research of 62 countries using the data of 1970–1990. He used three income inequality indicators, i.e. the Gini coefficient, quintiles and quintile ratio. Alesina (1997), using the data of 1960–1990, carried out the case research of 20 countries and used the Gini coefficient to assess inequality. The results of the studies carried out by these scientists prove the negative impact of inequality on economic growth through the channel of sociopolitical unrest; however, the results of the study carried out by Charles-Coll (2010) show the positive impact of political instability on economic growth. Figini (1999) used the least squares method, whilst Charles-Coll (2010) and Alesina (1997) used the three-step least squares method. Nel (2003) carried out the case research in Sub-Saharan Africa

Table 2 The results of studies dealing with the impact of income inequality on economic growth (the sociopolitical unrest channel)

Variables	Impact results	Authors
Political instability	Positive impact	Charles-Coll (2010)
	Negative impact	Madsen and Yan (2013), Keefer and Knack (2002), Figini (1999), Alesina (1997), Alesina and Perotti (1996)
	Insignificant impact	Gründler and Scheuermeyer (2014), Castells-Quintana and Royuela (2014), Nel (2003)

Source: Created by the authors

using the data of 1986–1997 and the least squares method. Nel (2003) as well as other authors, i.e. Gründler and Scheuermeyer (2014), Castells-Quintana and Royuela (2014), found out the insignificant impact of political instability on economic growth. Aisen and Veiga (2013) did not research the impact of income inequality on economic growth through the sociopolitical unrest channel; however, they researched the impact of political instability on the factors determining economic growth. The authors carried out the case research in 169 countries using the data in the period of 1960–2004 and found out that a larger degree of political instability could decrease the accumulation of physical and human capital.

3 Variable Definitions and Econometric Methodology

To carry out empirical research, the period of 1995–2014 has been chosen. A longer period has not been chosen due to the lack of data. Nevertheless, such a period allows to achieve the aim of the research. The research has been carried out on the basis of data of the Statistical Office of the European Union (Eurostat) and the World Bank. Assessing the impact of income inequality on economic growth in groups of the EU countries, the real GDP per capita is used in the purchasing power standard (hereinafter referred to as PPS) as a dependent variable.

Based on the fact that the Gini coefficient scarcely measures income differences in upper and lower margins of income distribution and that it does not measure the form of inequality distribution, as well as to evaluate whether the impact of inequality on the growth depends on the measures of inequality, four income inequality indicators are used in the empirical research: the Gini coefficient (Gini), the deciles ratio (Dec), the first deciles (D1) and the tenth deciles (D10). The indicators are calculated according to PPS. The increase of Gini, Dec, D10 shows the increase of income inequality, whilst the increase of D1 shows the decrease of inequality. The indicators reflecting income inequality are taken from the database of the Statistical Office of the European Union (Eurostat).

To evaluate whether the impact of inequality on the growth in EU-28 countries depends on the level of countries' development and the level of income inequality,

Table 3 The groups of countries

	Lower income	Higher income
Lower inequality	Czech Republic, Croatia, Hungary, Malta, Slovenia, Slovakia	Belgium, Denmark, France, Cyprus, Luxembourg, the Netherlands, Austria, Finland, Sweden
Higher inequality	Bulgaria, Estonia, Greece, Latvia, Lithuania, Poland, Portugal, Romania	Germany, Ireland, Spain, Italy, the United Kingdom

Source: Authors' grouping using "Eurostat" data (2015)

the countries are divided into four groups. First, the average levels of income inequality of each EU-28 country are calculated. Then the total Gini average of all countries of the analysed period was found. The countries in which the average Gini coefficient in the period of 1995–2014 was higher than 30.0% were assigned to higher inequality, whilst the countries in which the average Gini coefficient of the same time period was lower than 30.0% were assigned to lower inequality. By analogy, the countries in which real GDP per capita was more than 21 thousand EUR during the analysed period are assigned to the higher development level, and the countries in which real GDP per capita was less than 21 thousand EUR are assigned to the lower development level.

All groups of countries are divided according to two features. The group of countries with lower income inequality and lower income (LILI) is selected as the base group. Other groups are as follows: higher level of income inequality and lower level of income per capita (HILI); lower level of income inequality and higher level of income per capita (LIHI); higher level of income inequality and higher level of income per capita (HIHI). The groups of countries are presented in Table 3.

The regression analysis of the impact of income inequality on economic growth through the transmission channels is carried out using panel data, also called aggregate data. The open-source software package Gretl for econometric analysis of panel data is used. We use savings rate and gross fixed capital formation as proxies for the savings channel and political stability and absence of violence index as a proxy for the sociopolitical unrest channel. The variables and data sources are provided in Appendix "Data definitions and sources".

To avoid overestimation of the impact of analysed variables on the analysed phenomenon, control variables are used in each created econometric model. The first control variable, which is also included in other studies assessing the impact of inequality on growth, is a *higher education* indicator (Charles-Coll 2010; Nahum 2005), i.e. percentage of *the population aged 30–34 years with completed tertiary education.* The second control variable is real government expenditure per capita according to PPS. Increasing government expenditure stimulates economic growth, however, it may crowd out private investment and decrease economic growth (Gründler and Scheuermeyer 2014; Malinen 2009). The third control variable is the level of production prices, i.e. GDP deflator. This indicator shows macroeconomic stability. Another control variable is the health indicator—life expectancy. Better health allows people to work longer and harder, i.e. it increases labour

productivity. The increasing labour productivity stimulates economic growth. The fifth control variable is the trade openness indicator, i.e. real export volume, in millions of Euros according to prices of 2010.

Assessing the impact of income inequality on economic growth, various methods are used in studies, i.e. the least squares method, the two-step least squares method, the three-step least squares method, the fixed effects method and the random effects method. In this research, the least squares method which is the most suitable due to a short time s*eries* data is used. All data included in the model is represented in a logarithm for two reasons: first, taking logarithms is a way to make a nonlinear, multiplicative relationship between variables into a linear, second, logarithm is used to calculate coefficients which would show elasticity.

To assess the impact of inequality on economic growth through the savings channel in different groups of the EU countries, the econometric model of interaction is created by authors:

$$\begin{aligned}
&\Delta \ln\left(\mathrm{gdp}_{\mathrm{i,t}}\right) = \alpha + \mathrm{td}_3 1997 + \ldots\ldots + \mathrm{td}_{20} 2014 + \beta_1 \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \\
&+\beta_2 \Delta \ln\left(\mathrm{Svng}_{\mathrm{i,t}}\right) + \beta_3 \Delta \ln\left(\mathrm{Invs}_{\mathrm{i,t}}\right) + \beta_4 \Delta \ln\left(R\&D_{\mathrm{i,t}}\right) + \beta_5 \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \cdot \mathrm{HILI} \\
&+\beta_6 \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \cdot \mathrm{HIHI} + \beta_7 \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \cdot \mathrm{LIHI} \\
&+\beta_8 \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \cdot \Delta \ln\left(\mathrm{svng_channel}_{\mathrm{i,t}}\right) \\
&+\beta_9 \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \cdot \Delta \ln\left(\mathrm{svng_channel}_{\mathrm{i,t}}\right) \cdot \mathrm{HILI} \\
&+\beta_{10} \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \cdot \Delta \ln\left(\mathrm{svng_channel}_{\mathrm{i,t}}\right) \cdot \mathrm{HIHI} \\
&+\beta_{11} \Delta \ln\left(\mathrm{Ineq}_{\mathrm{i,t}}\right) \cdot \Delta \ln\left(\mathrm{svng_channel}_{\mathrm{i,t}}\right) \cdot \mathrm{LIHI} \\
&+c_1 \Delta \ln\left(\mathrm{Educ_tert}_{\mathrm{i,t}}\right) + c_2 \Delta \ln\left(\mathrm{Gov}_{\mathrm{i,t}}\right) + c_3 \Delta \ln\left(\mathrm{PI}_{\mathrm{i,t}}\right) + c_4 \Delta \ln\left(\mathrm{Life_exp}_{\mathrm{i,t}}\right) \\
&+c_5 \Delta \ln\left(\mathrm{Expr}_{\mathrm{i,t}}\right) + u_{\mathrm{i,t}}
\end{aligned}$$

where dependent variable gdp is real GDP (PPS) per capita, α is constant; td_t is time variables that absorb time effect on the research results; Ineq is an indicator approximating income inequality; svng_channel is the savings channel; Educ_tert is a part of individuals with higher education; Gov is governmental expenditure; PI is the level of prices; Life_exp is life expectancy; Expr is the volume of export; u is the model error. The subscript "i" and "t" is for a country and time period. All β and c are interpreted as elasticity coefficients. β_1–β_4 show the impact of savings, investment and *R&D* expenditure on growth; β_5–β_7 show the difference of impact of inequality on growth in different groups of countries comparing with the base group; β_8 shows the impact of interaction between inequality and the savings channel on growth in the base group; β_9–β_{11} show the difference of the impact of interaction between inequality and savings channel on growth in different groups of countries comparing with the base group of the countries. c_1–c_5 show the effect of control variables on growth.

Two indicators are used in the created model as a proxy for the savings channel: saving rate (Svng) and gross fixed capital formation (Invs). Interaction between the transmission channel and inequality is used because we believe that transmission

channels shape the impact of inequality on economic growth. We also use the interaction term between inequality and country groups because we want to test whether the effect of inequality on economic growth depends on the level of economic development and income inequality. To assess the impact of inequality on growth through the sociopolitical unrest channel, the following econometric model of interaction is created:

$$\begin{aligned}
&\Delta \ln\left(\mathrm{gdp}_{i,t}\right) = \alpha + \mathrm{td}_3 1997 + \ldots\ldots + \mathrm{td}_{20} 2014 + \beta_1 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \\
&+\beta_2 \Delta \ln\left(\mathrm{UNR}_{i,t}\right) + \beta_3 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \cdot \mathrm{HILI} + \beta_4 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \cdot \mathrm{HIHI} \\
&+\beta_5 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \cdot \mathrm{LIHI} + \beta_6 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \cdot \Delta \ln\left(\mathrm{Unr_channel}_{i,t}\right) \\
&+\beta_7 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \cdot \Delta \ln\left(\mathrm{Unr_channel}_{i,t}\right) \cdot \mathrm{HILI} \\
&+\beta_8 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \cdot \Delta \ln\left(\mathrm{Unr_channel}_{i,t}\right) \cdot \mathrm{HIHI} \\
&+\beta_9 \Delta \ln\left(\mathrm{Ineq}_{i,t}\right) \cdot \Delta \ln\left(\mathrm{Unr_channel}_{i,t}\right) \cdot \mathrm{LIHI} + \\
&+c_1 \Delta \ln\left(\mathrm{Educ_tert}_{i,t}\right) + c_2 \Delta \ln\left(\mathrm{Gov}_{i,t}\right) + c_3 \Delta \ln\left(\mathrm{PI}_{i,t}\right) + c_4 \Delta \ln\left(\mathrm{Life_exp}_{i,t}\right) \\
&+c_5 \Delta \ln\left(\mathrm{Expr}_{i,t}\right) + u_{i,t}
\end{aligned}$$

where β_6–β_9 are the coefficients of interest to be estimated; β_6 shows the impact of interaction between inequality and sociopolitical unrest channel on growth in the base group, i.e. in LILI countries; β_7–β_9 show the difference of the impact of interaction between inequality and sociopolitical unrest channel on growth in different groups of countries comparing with the base group of countries. Polit_stabil, political stability and absence of violence index, is used as a proxy for sociopolitical unrest channel (Unr_channel) in the groups of the EU countries. To ensure the validity of the research results, the model was checked for heteroscedasticity, autocorrelation and multicollinearity. We checked for heteroscedacity in the econometric model using White's test. Heteroscedacity has been found to prevail, the variance of the error term is not constant for all countries in the sample. Therefore, model estimates have been calculated using robust (HAC) standard errors.

4 Research Results

4.1 The Impact of Income Inequality on Economic Growth Through the Savings Transmission Channel

Assessing the impact of income inequality on economic growth, the group of countries of lower inequality and lower income (LILI) has been chosen as the base group. Four indicators are used to measure the income inequality. The research results are presented in Table 4.

The research results show that in all four groups of countries the impact of interaction between inequality and savings rate on economic growth is negative.

Table 4 The impact of income inequality on economic growth through the savings channel (savings rate is used as a proxy for the channel)

	Coefficient estimates calculated using stabilized residual error regression (HAC)			
	Income inequality indicators			
	1	2	3	4
Variables	Gini	Dec	D1	D10
Ineq·Svng	−1.591***	−0.794***	1.376***	−1.606***
Ineq·Svng·HILI	0.857***	0.702***	−1.301***	0.787***
Ineq·Svng·HIHI	0.575	0.500**	−1.471**	0.648
Ineq·Svng·LIHI	1.522***	0.722***	−1.340***	1.264***
Svng	0.024*	0.021	0.022	0.023*
Invs	0.176***	0.171***	0.172***	0.183***
R&D	0.024**	0.025*	0.024*	0.027**
Educ_tert	0.067	0.058	0.058	0.059
Gov	0.268***	0.256***	0.256***	0.272***
Expr	0.188***	0.207***	0.213***	0.185***
PI	0.070	0.090	0.098	0.070
Life_exp	−0.550	−0.584	−0.609	−0.451
N	172	170	170	170
Adjusted R^2	0.889	0.886	0.884	0.889
p-value of testing H0: no autocorrelation	−0.058	−0.052	−0.051	−0.048
p-value of testing H0: heteroscedasticity not present	0.002	0.000	0.000	0.001

*Sig. Level 90%, **Sig. Level 95%, ***Sig. Level 99%
Source: Own calculations

The coefficient estimates show this impact on economic growth in the base group of countries: −1.591, −0.794, 1.376 and −1.606, at 99.0% of significance (see Table 4, Line 1). Measuring inequality using D1, the interaction coefficient is positive; however, considering that at the increase of D1 the inequality is decreasing, it is possible to state that the impact of interaction between inequality and savings rate on growth is negative. The differences in the impact of this interaction on growth, comparing with the base group, are the largest in the group of LIHI countries. In this group, the negative impact of interaction between inequality and savings on growth is almost twice as week by measuring the inequality using Gini, D10 and Dec indicators to compare to the base group of countries. The reliability of the results is proved by the fact they do not depend on the indicator by which the inequality is measured, it does not have a significant influence on the results of empirical analysis when the impact of interaction between inequality and savings rate is assessed.

To the best of our knowledge, there are no studies evaluating the impact of interaction between inequality and savings in the groups of countries of different development levels. However, Carvalho and Rezai (2015), analysing the impact of income inequality through the savings channel, also indicated the negative impact of the savings rate on economic growth. The authors of the present chapter used the

Table 5 The impact of income inequality on economic growth through the savings channel (investment is used as a proxy for the channel)

	Coefficient estimators calculated using stabilized residual error regression (HAC)			
	Income inequality indicators			
	1	2	3	4
Variables	Gini	Dec	D1	D10
Ineq·Invs	−0.393	−0.067	−0.226	−0.620
Ineq·Invs·HILI	1.212	0.110	0.258	1.275*
Ineq·Invs·HIHI	−0.655	−0.019	0.755	0.919
Ineq·Invs·LIHI	−0.368	−0.084	0.323	−0.535
Svng	0.023*	0.021	0.019	0.021
Invs	0.173***	0.176***	0.178***	0.173***
R&D	0.023**	0.025***	0.024**	0.024**
Educ_tert	0.048	0.050	0.048	0.051
Gov	0.273***	0.264***	0.263***	0.273***
Expr	0.191***	0.200***	0.202***	0.192***
PI	0.119	0.113	0.113	0.118
Life_exp	−0.361	−0.536	−0.531	−0.358
N	172	170	170	170
Adjusted R^2	0.901	0.878	0.877	0.880
Test p-value H0: no autocorrelation	0.045	−0.003	−0.009	−0.055
Test p-value H0: heteroscedasticity not present	0.044	0.000	0.001	0.048

*Sig. Level 90%, **Sig. Level 95%, ***Sig. Level 99%
Source: Own calculations

Gini coefficient as a measure of income inequality. Table 5 provides the results when the investment is used as a proxy for the savings channel.

In all country groups, except for the HILI group, the negative impact of interaction between income inequality and investment on growth is found by measuring the inequality using Gini, Dec and D10; however, the impact is not statistically significant in any group of the countries. The research results show the positive impact of investment on growth. It has been found out that at the increase of investment by 1% growth increases by approximately 0.17%; however, the impact of interaction between investment and inequality on growth though being negative but is statistically insignificant. To sum up, it can be stated that the direction of inequality impact on growth by using the interactions does not depend on the inequality measuring indicator by applying the savings channel model.

Table 6 The impact of income inequality on economic growth through the sociopolitical unrest channel (political stability and absence of violence index is used as a proxy for the channel)

	Coefficient estimators calculated using stabilized residual error regression (HAC)			
	Income inequality indicators			
	1	2	3	4
Variables	Gini	Dec	D1	D10
Ineq·Polit_stabil	−2.490***	−1.366***	2.623***	−2.609***
Ineq·Polit_stabil HILI	6.025***	1.879***	−2.687***	6.142***
Ineq*Polit_stabil·HIHI	4.788***	2.390***	−3.980***	4.490***
Ineq·Polit_stabil· LIHI	10.576**	1.894	−2.579**	8.532**
Polit_stabil	0.041	0.016	0.004	0.025
Educ_tert	0.021	0.019	0.018	0.023
Gov	0.375***	0.353***	0.338***	0.375***
Expr	0.291***	0.2947***	0.308***	0.279***
PI	0.163*	0.181*	0.186*	0.154*
Life_exp	−1.092	−1.198*	−1.236	−1.126
N	184	182	182	182
Adjusted R^2	0.793	0.788	0.782	0.790
Test p-value H0: no autocorrelation	0.019	−0.013	−0.022	−0.006
Test p-value H0: heteroscedasticity not present	0.000	0.002	0.000	0.000

*Sig. Level 90%, **Sig. Level 95%, ***Sig. Level 99%
Source: Own calculations

4.2 The Impact of Income Inequality on Economic Growth Through the Sociopolitical Unrest Channel

During the analysed period, the largest average values of the index of political stability and absence of violence were found in the groups of LILI and LIHI countries, they made 0.90 and 1.04, respectively. The results presented in Table 6 show the negative impact of interaction between income inequality and the index of both political stability and absence of violence on economic growth in the base group of LILI countries when Gini, D10 and Dec are used to measure inequality. By measuring the inequality using D1, the positive interaction is found; it shows that at the increase of income of the poorest layer of individuals (decreasing inequality) the economics will grow.

The negative impact of income inequality on economic growth through the sociopolitical unrest channel is found in the group of LIHI countries. Though in this group of countries the coefficients indicating the differences of the impact of interaction between income inequality, approximated using the Gini coefficient and the tenth deciles, and the index of both political stability and absence of violence on economic growth are 10.576 and 8.532, the hypothesis that the differences of interaction impact are insignificant is confirmed, as $p > 0.05$.

It is possible to state that in the groups of countries of low inequality and different levels of income per capita, the direction and strength of the impact of interaction between inequality and the index of both political stability and absence of violence on economic growth are the same.

However, in the groups of countries of high inequality, in which the Gini coefficient during the analysed period was higher than 30, and the values of the political stability and absence of violence index were 0.53 (the group of countries with low income) and 0.63 (the group of countries with high income), respectively, the positive impact of income inequality and sociopolitical stability index on economic growth was found. Considering the research results and the fact that the political stability and absence of violence index was significantly lower in the groups of countries of high inequality, it is possible to state that economics should grow as stability is increasing. In the group of HILI countries, the coefficients of the impact of interaction between income inequality and political stability on economic growth are the following: 3.535; 0.513; 3.803, measuring inequality using Gini, Dec and D10, and in the group of HIHI countries they are 2.298; 1.024 and 1881, measuring inequality using the same indicators (see Table 6, Columns 1, 2 and 4) at the significance of 99.0%.

The research results show that measuring the inequality using D1, i.e. the part of income for the poorest layer of individuals, the impact of interaction between inequality and sociopolitical stability index on economic growth in all groups of countries is positive. However, evaluating the fact that inequality is decreasing when D1 is increasing, it is possible to state that the negative impact of interaction between inequality and sociopolitical stability index on growth in all groups is found. The hypothesis that the differences of interaction impact are insignificant is confirmed, as $p > 0.05$.

The authors of the present chapter have not found the studies in which the impact of interaction between the inequality and the index of both political stability and absence of violence on growth would be assessed. However, the research results of scientists who assessed the impact of political instability on economic growth are ambiguous: some authors (Figini 1999; Alesina 1997) indicated the positive impact of political stability on economic growth, others (Charles-Coll 2010) indicated the negative impact of political stability on economic growth and another group of authors (Gründler and Scheuermeyer 2014; Castells-Quintana and Royuela 2014) in the carried out studies indicated the insignificant impact of political instability on economic growth. The results of the present research show the negative impact of interaction between political instability and inequality on economic growth in the groups of countries of the lower income inequality level, when different indicators were used to measure inequality. The income inequality impact on growth through the sociopolitical unrest channel is influenced by the specific characteristics of the groups of the countries.

5 Conclusion

The issue of the inequality impact on growth through the savings and sociopolitical unrest channels in the EU countries is important for society and is debatable in theoretical and practical approaches that receive contradictory evaluations and criticism. The panel data is used in the research to assess the impact of income inequality on growth through different channels in the groups of the EU countries differentiated according to the level of income inequality and the level of income per capita; the interaction between inequality and indicator that is used as a proxy of the channel is included in the model.

Assessing the impact of income inequality on growth through the savings channel in the groups of countries, when the savings rate is used as a proxy for it, the negative impact of interaction between inequality and savings rate in all groups of countries is found, and this impact is the strongest in LILI group. It is possible to state that even **though** the savings during the analysed period were increasing, the level of consumption and general demand was decreasing, and this led to the decrease in growth. Thus, the research results do not confirm the classical approach that increased savings will reduce interest rates and will encourage investment, so the countries where inequality is higher will grow more rapidly.

The strongest negative impact of inequality on growth through the savings channel was found when Gini and D10 indicators of income inequality are used, but the impact direction did not change when measuring inequality using Dec and D1. Even though the Gini coefficient overemphasises changes in the middle of the distribution and cannot account for changes that happen in the extremes, the estimates from the interaction model show that the direction of the impact does not depend on the income inequality measure. The estimated effect is robust to variations in measures of income inequality.

Different impact of interaction between investment and inequality is found when investment is used as a proxy for the savings channel. However, the obtained results are not statistically significant. On the basis of the research results, assessing the inequality impact on growth through the savings channel, it is possible to state that for economic growth it would be appropriate to reduce income inequality in all groups of countries. The different direction of the impact of income inequality on growth through the sociopolitical unrest channel, using the interaction between inequality and political stability, is found in different groups of countries. In the groups of countries of lower income inequality and different levels of development, the impact on growth through the sociopolitical unrest channel is negative when four indicators are used to measure inequality and in the groups of countries of higher inequality and different income it is positive when Gini, Dec and D10 indicators are used to measure inequality, moreover, the negative impact is observed when D1 indicator is used to measure inequality.

Appendix: Data Definitions and Sources

Transmission channels	Variable	Full variable name	Unit	Source
Saving channel	Svng	Total saving rate	Percentage of GDP	Eurostat
	Invs	Gross fixed capital formation per capita	Euros in PPS, absolute values	Eurostat
Sociopolitical unrest channel	Polit_stabil	Political stability and absence of violence index	Index from −2.5 to 2.5	The World Bank, Kaufmann and Kraay (2016)

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Analyzing Opportunities for Eliminating Inequality in Female Digital Entrepreneurship in Spain

Cristina Mora-Rodríguez, Antonio Jose Verdú-Jover, and Jose M. Gómez-Gras

Abstract This paper analyses several aspects of female digital entrepreneurship with the aim of determining if digital businesses help reduce inequality between female and male entrepreneurships. It is divided in five main points: women's motivations, barriers, digital business, requirements for entrepreneurs, and their future perspectives. This qualitative study used an in-depth survey of a group of Spanish women entrepreneurs in digital business. The research identified a number of situations that affect women's decisions to become digital entrepreneurs. Their particular characteristics, such as, their various ages, different motivations for entrepreneurship, the same business model and barriers, do not reinforce the conclusion that the majority of research considers female entrepreneurship to be influenced by the same factors as in traditional business models. The findings show that all women agree on the same aspect, independently of each case, and that is the need to focus on basic children's education in order to eliminate inequality. This cultural aspect, linked to the other findings, continues to be a gender effect that remains an obstacle to entrepreneurship in general, but less so in digital entrepreneurship.

Keywords Female entrepreneurship · Gender inequality · Digital · Woman in tech

1 Introduction

In the past few years, those who have dedicated a special interest in the study of entrepreneurship from the perspective of gender have had differing motivations. Castro Nuñez and Santero Sánchez (2014, p. 488) claimed "One of the empirical findings that the majority of studies into entrepreneurship confirms, is that women

C. Mora-Rodríguez (✉) · A. J. Verdú-Jover · J. M. Gómez-Gras
Department of Business, Miguel Hernandez University of Elche, Elche, Spain
e-mail: c.mora@umh.es; ajverdu@umh.es; gras@umh.es

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demonstrate less probability of becoming entrepreneurs than men, and amongst the self-employed, in the majority of countries, you can observe a gender gap."

Some studies (Contreras and Aramayo 2012; Álvarez et al. 2017) take as reference the institutional economic theory of North (1990, 2005) and speak of formal and informal factors in female entrepreneurship, revealing that informal factors (perception of entrepreneurial skills, social networks, and family role) are more relevant to female entrepreneurship than formal factors (funding, noneconomic support policies, and training). In turn, other studies show that in the initial stages of business development, the network of personal contacts is a decisive factor in female entrepreneurship (Robinson and Stubberud 2009; Hampton et al. 2011).

Numerous studies agree that both psychological aspects and subjective perceptions, as well as the social and institutional socioeconomics of woman, play a key role in the decision to become an entrepreneur (Cromie 1987; Minniti and Nardone 2007; Contreras and Aramayo 2012; Castro Nuñez and Santero Sánchez 2014). Existing differences ensure that the presence of women in traditional businesses continues to be much inferior to that of men, especially when taken into account that women make up more than half of the global population (Contreras and Aramayo 2012). Some of these differences are the following: training, access to funding, network of contacts, self-confidence, security and risk associated with entrepreneurship, family responsibilities, motivation, opportunity or necessity, and social and cultural aspects.

Castro Nuñez and Santero Sánchez (2014) reveal that significant differences exist between men and women in autonomous entrepreneurship depending on the activity of the sector (with a larger male presence in industrial and construction sectors, while there are more females in the services sectors, with the largest differences being in areas of social and personal services), the level of studies (with women having a higher level of education), age (most women were in central age groups), and Autonomous Community of residence (with a larger proportion of men in Communities with a higher volume of economic activity).

Interest in the study of entrepreneurship increases if you take into account new models of existing business, known as digital business, due to their presence on the Internet, and it is these new forms of digital entrepreneurship which are making us consider if they really can reduce the inequalities, which, even today, exist in businesses worldwide. The interconnection of business and technology offers unique opportunity for women to become involved in the innovative and entrepreneurial spirit (Braun 2010). Capitán and García (2012) examine the sociodemographic profile of women entrepreneurs in Spain in an attempt to characterize the singularity of the companies in which they were developing their business, extracting data from the GEM project (2016). However, information related to digital business selected by the women entrepreneurs and the implication of a reduction in the inequality between both sexes was not found in this study; with the type of company created, in the case of women with a more conventional character, being less technological and more oriented to consumerism. Contreras and Aramayo (2012, p. 153) state, "The internet provides a new space for businesses which is attractive to women because it permits flexible work and time, allows for a work-life balance, compensates for the

lack of mobility, creates work more suited to their preferences; and all this benefits society by eliminating inefficiency and preserving diversity. ICT (Information Communication Technology) allows the dissemination of information and innovation and also boosts the network of contacts, a fundamental factor in SMEs and particularly important for women entrepreneurs."

This study aims to analyze if the selection of digital business by women is a form of reducing inequality between male and female entrepreneurships. To do so, a literature review was carried out in order to position ourselves within an existing theoretical framework. Subsequently, from six in-depth interviews by women digital entrepreneurs, the data obtained from the interview questions—which were split into five blocks—was then analyzed. The blocks, although independent, maintained links between one another, and were the following: women's motivations, barriers, business model, requirements for entrepreneurs, and their future perspectives. Of these five, we will only analyze the first and third blocks of the interviews; motivation and digital business.

In this research framework, the use of the following terms in relation to entrepreneurship—digital, internet, technology, and ICT—refer indistinctly to the action of starting a business thanks to technology, and with the Internet as its only medium without which it would not exist, independently of the sector or the activity of the business, thus being companies which use digital business which differ from traditional models.

The first part of this study consists in carrying out a review of the literature which demonstrates the interest, up until the present day, of other researchers toward women digital entrepreneurs. We highlight the contribution of Contreras and Aramayo (2012) who argue that there is a clear necessity to revise existing literature in order to learn of the cases of women who have established online businesses and to indicate a new direction for future studies. There is scarce number of studies in the field which is a clear lack of accumulated knowledge as well as theories and explicative proposals.

On the contrary, we can find a wide range of articles referring to entrepreneurial spirit, those which offer "a great variety of definitions, a myriad of measurement tools, profusion of concepts and variables and little union between the different studies" Ormeño (2014, p. 34) as well as research into female entrepreneurship from the perspective of gender, which reveals significant differences, not only between levels of participation of men and women in entrepreneurial activity, but also between the orientations, motivations, and business opportunities of both (Pérez-Pérez and Avilés-Hernández 2016).

2 Methodology

The study was carried out using case studies which employed in-depth (semi-structured) interview techniques. This choice was considered appropriate given the novel subject, and its significance in light of existing literature, besides also being a

technique considered as valid and reliable in the area of business in recent years (Yin 1989, 1993, 1994; Martínez Carazo 2006).

The content of the interview is divided into five modules: women's motivations, obstacles, business model, requirements for entrepreneurs, and their future perspectives. The decision was made based on the reading of other research with a similar objective, such as that of Duffy and Pruchniewska (2017), Dy et al. (2017), Fuentes-Fuentes et al. (2017), Hampton et al. (2011), McGowan et al. (2012), Ormeño Coronado (2014), and Pérez-Pérez and Avilés-Hernández (2016). This facilitated the development of the research and gave rise to further analysis with the aim of discovering if the information could, with this new sample, differ in some aspect.

The interview, of between 45 and 60 min, allowed questions to be asked to the interviewees with the advantage of being able to adapt to each situation according to the course of the interview. In this way, the order and the language used could be changed with each woman as necessary.

The sample was selected at random by the researcher, and is composed of six female digital entrepreneurs, aged between 25 and 45. All are autonomous women, only one has a business partner, and three are supported by a team, and they work in diverse sectors, such as communication, product design, electronic commerce, and consulting. They are from different countries: Spain, Poland, Mexico, France, Uruguay, and Colombia but are resident in the area of Barcelona. The decision to carry out the interview in this city was due to the large network of entrepreneurs who fitted the profile of the study—female digital entrepreneurs. Finally, six interviews were carried out of the eight which were initially planned, due to the unavailability of two of the entrepreneurs. In relation to the size of the sample, we can say that it is within the range proposed by authors such as Eisenhardt (1989, p. 545) who suggests between four and ten cases, and states: "while an ideal number of cases doesn't exist, a range of between four and ten, will usually work out well. With less than four cases, it is difficult to generate complex theory, and empirically, it is probably inconvenient."

3 Analysis and Discussion of Results

The results obtained from qualitative analysis show the characteristics of each of the profiles of the female digital entrepreneurs. The interview is divided into five modules: motivations, obstacles, business model, requirements for entrepreneurs, and their future perspectives. Those of which are based on qualitative interviews carried out in other studies whose objectives bore relation to this study, as stated and quoted previously. For this study, the first and third module have been selected, with a view to answering the question posed by this investigation. Can the selection of this business model by women be a way of reducing inequality between male and female entrepreneurs?

3.1 Module I: Motivation

The women who were interviewed had been entrepreneurs for 1–3 years. All of them came up with the idea by themselves, and from the initial idea they carried out their project individually, with the exception of one, who worked in a collective manner.

> E1: "...I was working for a company as a consultant in the area of outplacement and I started to see the difficulty my pregnant colleagues had once they'd given birth and after their four months of maternity leave. Many left their jobs because they weren't able to manage it in any way, and that's when I saw an opportunity to launch my own business idea because there was nothing on the market to help women specifically in this situation..."

> E3: "...the idea was collective; we were two people who decided to start a business..."

The motives for becoming entrepreneurs were opportunity in all of the cases, coinciding with personal development (six out of six), vocation (three out of six), whereas only two of them included aspects such as work–life balance and the development of the idea or project. Some of the women speak of opportunity and necessity as a combination or even as a starting point, although, subsequently, they have become opportunities, as they indicate.

> E5: "I started it as necessity, because I was dismissed, but then I returned to work and left voluntarily for personal reasons. I couldn't stand it, being back in a multinational where they tell me what I have to do. Not anymore. And personal development, although I've always had a lot of flexibility and ease in balancing life and work."

> E4: "I spotted an opportunity closely linked to my personal situation when I saw that keeping up the pace of work with a child wasn't going to let me do my job well nor be the mother I wanted to be. So, out of necessity I created it, I didn't want to go out and find another job and be in a similar position so I thought, I'm going to create something that not only resolves my situation but work for everyone else who has the same need."

We found differences in terms of the question regarding support received in their entrepreneurship, referring as much to who as to what type of support. Of the six interviewees, five received family support, three of them from institutions, two of them from friends and business partners and mentor/coach and only one of the interviewees stood out for doing it alone. Concerning types of support, all of them corresponded in receiving emotional support and less so other forms of support, such as economic, technical, or other collaborations.

> E6: "In my case, I relied on support from family, friends, partners, institutions, mentors ... and each one supported me with a different aspect, family with the economic effort, and the push to keep going. I've had a coach for more than a year-and-a-half and my partners that form part of the project..."

Before making the decision to set up their own business, more than half of the entrepreneurs worked for multinationals occupying posts of responsibility or as freelancers. Five of the six consider that they do not possess the appropriate skills required to start their own business despite being graduates and in some cases,

having a Master's degree. Even then, half considered that they lacked education in areas such as marketing, digital technologies, administration, finance, and sales.

E1: "...Everything, no. There are things that escape me, that don't come from my own performance at work, like all these tasks around the edges. Commercial management, marketing, finance..."

To close the module, the last question made reference to the achievements gained as a woman when it came to starting her digital business. From the analysis of the answers the following information was obtained: to have identified a need in society and for it to be a utility for people who need it, the very fact of being an entrepreneur in itself, having maintained the business for more than a year and having economic resources, evolution as a person and to be able to work in something that you feel passionate about and that motivates you.

E2: "...the fact of being an entrepreneur, of getting out of a comfortable situation and moving into a limited economy. The fact of evolving as a person. Also for starting and maintaining the business in spite of giving birth to a son at the same time..."

E3: "...the fact I can combine both jobs for me is an achievement..."

E5: "...to have survived a year is already a lot..."

3.2 Module III: Digital Business

In all cases, the business model chosen by the entrepreneurs is digital, using technology and the Internet as a base. Only in one case was it combined with another model, that of multichannel. Three out of the six women already had experience in companies which had the same model based in digital technology. The reasons they chose this business model were diverse, all of them corresponding in scalability, profitability, reach, easy access to clients, and the costs involved, much less than a traditional business model. Only one indicated that the reason for choosing the digital model was work–life balance, although the rest of them maintain the theory that although during the first years, work–life balance is difficult due to the number of hours dedicated to the business, everyone agreed that it brought them greater flexibility; they can work 24 h of the day, including weekends, which favors a work–life balance, although they had to cater for the business as if it were a child, giving it attention in the moments of necessity.

E6: "...I've only done this in digital business, it's a robust model, scalable, it allows you to grow..."

"...I've never considered another type of model, with this one we can work from anywhere in the world..."

From the answers to the question, does the digital model help the development of the business and of the entrepreneur? The information obtained is a firm "yes" from all six women. Some consider that the ease of access to clients helps the business in scalability and growth. While being an entrepreneur improves work–life balance, it

helps expand technical knowledge, brings flexibility, you can physically move your business anywhere in the world and continue working with your clients as well as widen your client base.

E3: "...you can get onto the market quickly, you can try out your idea before investing your money or that of others and you can pivot..."

E2: "...because it's scalable, profitable and has future..." "...I widened my technical knowledge creating ecommerce, and before I didn't know anything..."

In the same block, the entrepreneurs were asked if the digital model helped female entrepreneurship. All answered "yes, completely," highlighting the ease of access to resources, to the market, trying an idea before investing, saving money, no physical presence, more speed in general, in contrast to the traditional model where manual work prevails.

E3: "... yes, because it's so easy to launch a digital project from home, there's not as many obstacles as there would be in a physical shop, where you need to look for a suitable place, etc., it's much quicker."

E6: "...it's much more simple not having a physical presence, you don't need to go anywhere, no expenses..."

Finally, without analyzing the block on obstacles, the women do not disregard the problems that face female entrepreneurs in digital business, as well as those appearing in traditional business models. Education received at school, as well as the culture that surrounds the female entrepreneur, mark out determined roles which are difficult to eliminate; limitations that women place upon themselves because they lack self-confidence, and absence of family support. The fear of starting a business is because they do not know what is going to happen, the fear of the digital world, lack of technical and digital training. Highlighting the opposite, one of the interviewees stresses that this fear is at the margin of gender and that in her opinion, the lack of knowledge and fear of the digital world is also experienced by male entrepreneurs. Apart from the hurdles, of which they are well aware, they all agree that digital business is a means of breaking the glass ceiling.

E2: "...I believe that still, even as children, at school, when they grow up and have to choose a career, that it's strongly determined what is masculine work and what is feminine, what a woman has to do, and what a man has to do, the professions. In this setting, what your family, society, school, set out, what you see, there are few references for women, and entrepreneurship isn't in women..."

E4: "...the difficulty of a female digital entrepreneur is making the decision to become an entrepreneur. I was brought up believing that I could achieve anything I set my mind to, security of taking the leap and if you make a mistake, it doesn't matter. Just the point of being able to accompany someone in their development so that when they make the decision, they have the basis to resolve a lot of things, because a lot of the limitations are self-imposed. Digital business is a way of breaking the glass ceiling..."

4 Conclusions

After an analysis of the literature, it can be noted that there continues to be a scarcity of research in the area of the study of female digital entrepreneurs, as was also concluded by Contreras and Aramayo (2012). Work that examines the relation between the variables: woman–entrepreneurship–technology (digital), is so little that it is impossible to generate theories that demonstrate that the selection of this business model by females contributes to a reduction in the existing differences between both sexes in the world of business.

We must not lose sight of the contribution of Duffy and Pruchniewska (2017), who indicate that gender rules persist and continue playing a role in the professional success or failure of women in digital business. As well as Dy et al. (2017) who go against those who continue to believe the promise of the Internet as a new site of entrepreneurial opportunity realization, and believe the current trend of encouraging digital enterprise as a means to social mobility and economic independence for the disadvantaged to be, at the least, questionable.

This exploratory study will continue contributing information to the existing scientific literature, both nationally and internationally, starting with the in-depth interviews into the profile of the female digital entrepreneur in Spain (Contreras and Aramayo 2012), of the characteristics of the process of entrepreneurship and the companies they have founded.

The results of the investigation are presented through conclusions that bring us closer to the theory that female digital entrepreneurship can help reduce the inequalities which exist today between male and female entrepreneurs. The female entrepreneurs agree on the advantages that exist in digital entrepreneurship compared to traditional business models: the ease of launching a business idea on to the market without the risks of doing it traditionally. Flexible working—an aspect that minimizes one of the limitations that women have which is family responsibility—favors a work–life balance, a problem which does not affect men as much as it does women.

Socialization as an obstacle is also diminished now that they can easily access contacts thanks to digital social networks, which help widen the network of professional contacts—so long established for men, and so necessary for women. Cultural aspects, self-belief, and fear continue to be what stops entrepreneurship, which strengthens the idea that they should raise awareness and preparation from school age in order to promote the idea of female entrepreneurship (Pérez-Pérez and Avilés-Hernández 2016).

In the same way, the entrepreneurs agree on the necessity to motivate women to make decisions that will lead them to creating their own digital businesses given the importance of technology for the value-added growth of the economy of the country (Hampton et al. 2011).

All these advantages imply one more step toward equality in entrepreneurship between men and women, as some of the limitations women have with respect to men are reduced thanks to technology, and this is evident in a number of scientific

studies. The results show that digital entrepreneurship can help break the much-maligned glass ceiling of traditional business models.

Some limitations of the study have to be taken into account, such as:

- The opinion of men was not used in this research. Their answers could have offered different conclusions to those drawn.
- The chosen sample focused on entrepreneurs in digital, who had varying levels of previous experience in this field. Entrepreneurs working in traditional business models were not considered.

Future lines of investigation proposed are, to widen the study by analyzing the rest of the blocks included in the interview: obstacles, requirements for entrepreneurship and future perspectives, to include other geographic areas, nationally, and internationally, to carry out the interviews with a sample of men with the aim of finding out if the conclusions drawn from the female interviewees would differ much, and also to include a sample of entrepreneurs, of both sexes, working in traditional business models. All this with the aim of finding the answer to our initial question: Does digital business help reduce inequality between male and female entrepreneurs?

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Part VII
Tourism

Tourist Clusters as Instruments of Implementation of Smart Regional Specializations in Tourism on the Example of Poland

Małgorzata Borkowska-Niszczota

Abstract The mail goal of this chapter is showing, which Polish voivodeships have tourism as their regional smart specialization and what is the level of development of tourism clustering in individual regions, especially those focused on tourism development and selecting tourism as the economic branch strategic to their development. Additionally, the chapter presents theoretical issues connected with smart specializations and the roles of clusters in their development. As the method of research, the desk research and analysis of subject literature was used. Tourism clustering is developing in voivodeships which have tourism as their regional specialization as well as in voivodeships which are turning toward other specializations. All regions with a specialization connected with tourism have a chance for development due to the existence of tourism clusters in their areas. The voivodeships which focus on health tourism and which have well prospering clusters connected to medicine and health have especially good predispositions for development.

Keywords Tourism · Clusters · Smart regional specializations · Poland

1 Introduction

In recent years there has been a development of cluster cooperation in Poland. It has taken place in many branches of the economy, including tourism. Tourist clusters are usually created in regions of increased tourism traffic, in the vicinity of tourist spots, which determine the location of the clusters, their density and size. At the same time, over the years, in order to fulfill the requirements of the European Union and obtain development support for the current financial perspective of 2014–2020, smart regional specializations have been chosen in Polish voivodeships. These were entered in the planning documentation—the Regional Strategies of Research and

M. Borkowska-Niszczota (✉)
Department of Management Engineering, Bialystok University of Technology, Bialystok, Poland
e-mail: m.borkowska@pb.edu.pl

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Innovation for Smart Specialization (RIS3). Some of the voivodeships basing on regional attributes and resources has selected tourism development. At the implementation stage of the Strategy, tourist clusters should be effective platforms fulfilling the implementation of smart specializations.

The main goal of this chapter is to present and analyze research results, which was aimed at finding the answer to the following questions: which Polish voivodeships have tourism as their regional smart specialization and what is the level of development of tourism clustering in individual regions, especially those focused on tourism development and selecting tourism as the economic branch strategic to their development. The research uses the desk research method. The main source of information was the RIS3 strategic documents, prepared for 16 Polish voivodeships, cluster catalogs prepared by the Polish Agency for Enterprise Development (PARP) for each region, and the map of clusters in Poland—a database on the country's clusters. Additionally, the chapter presents theoretical issues connected with smart specializations and the roles of clusters in their development. Analysis of subject literature was used as the research method.

So far, the development of tourist clustering in Polish regions, in particular in regions which selected tourism as their leading smart specialization, has not been analyzed in detail.

There was no search for the answer to the question whether regions with tourism as one of their smart specializations have a chance for its development based on clusters, which voivodeships have especially good predispositions and in which is the need for further development of tourism clustering.

2 Review of Literature

The idea of smart specialization is a relatively new factor, which should be taken into account in documentation on planning of activities supporting the development of innovation, created on a regional level (Del Castillo et al. 2011). A smart specialization is based on the selection of those branches of economy and science which are crucial from the point of view of the region's potential and the Focus of intervention aimed at a radical development of the voivodeship through an increase in innovation of economy based on absorption of the results of highly advanced research.

The significance of directing the development of regions using smart specializations has been stressed in the EUROPE 2020 strategy—a strategy for smart, sustainable, and inclusive growth. Smart specialization remains in strict connection with the main priority of the program—smart growth, which is economic development based on knowledge and innovation (Romanowska et al. 2014). The strategy points to the need for reforming the regional innovation systems, including the research-development sector, in such a way that their functioning should benefit the development of smart specialization, and result in better cooperation between universities, researchers and businesses as well as improve cooperation conditions in regions which can offer a specific added value and efficient spreading of technology in the

country and in the EU (European Commission 2010). The concept of smart specialization is the result of a search for new, balanced concepts of growth, and is a new direction from the model of searching for markets leading to competition and entering them, as it leans more toward the identification of own resources and using them in the creation of a higher added value (Ketels 2013).

Smart specialization is not seen as a permanent (unchangeable) element of a region's characteristic, which should be included in strategic planning. The assumption is for the smart specialization to evolve, in pair with the dynamic changes which are characteristic for a modern economic system. This is why special attention is paid to the presence of mechanisms and platforms for cooperation between various environments which have an interest in innovative growth, which will in turn enable to verify strategic documentation in relation to their suitability to the social and economic conditions (PAG Uniconsult 2012).

Smart specializations of a region are a result of the choices based mainly on regional assets and endogenic resources, including present and future R&D activity and entrepreneurship. Smart specializations of a region should also have an external dimension. In the case of an innovation strategy for smart specialization, an analysis of only internal factors can be insufficient. One of the most important issues is making strategic decisions, while taking into account the position of the region in Europe. The region should determine its competitive advantages also through comparisons with other regions, looking for examples, performing an effective benchmarking. Such approach is significant for weaker regions, which will probably have to import knowledge and technology from outside the region. This cannot, however, be a blind mimicry of solutions from other regions, as in such a case the region will not have the possibility to become a competitive leader in any field. Important candidates for smart specializations can be areas of experiment. These would be the areas, in which the region has real chance for success, despite the fact that the areas were not treated as a priority before (Foray et al. 2012).

The determining and support of specializations is one of the elements of economic growth stimulation and modernization, toward creating a competitive advantage based on high saturation of offered products and services as a result of R&D and knowledge. The engagement of the scientific world, entrepreneurs, research units, education and local governments and institutions is key to creating a cooperation for innovative development (PAG Uniconsult 2012). The result of developing smart specializations should be the increase of diversity between regions of the EU in terms of scientific, technological, and economic specialization (Foray 2009).

Clusters are a significant part of specialization, including those focused on tourism. Tourism clusters are seen as geographic groupings of interconnected businesses, suppliers and service providers or companies operating in the tourism sector and institutions connected to them (e.g., universities or trade groups or financial institutions), which compete and cooperate with each other at the same time (Skowronek 2015). In clusters we can encounter a combined potential of the private sector, the R&D sector and the public sector. The tourism clusters exist in many European countries, most of them with a highly efficient activity (Scutaru et al. 2016). The main premise of smart specialization is diverting toward the development

of world-class clusters and creating space for diversified connections between the sectors which can fuel the diversification process by participating in cross-regional networks as well as collective leadership—effective management of the system innovations of scientific institutions, companies, local government, and the users of innovation (the quadruple helix model) (Foray et al. 2012). The EU regional development policy, and at the same time, of competitiveness and supporting R&D and innovation policies, is based primarily on the creation and development of innovative clusters that support smart specialization, designed to support regional development and reducing disparities between countries and regions, growth and economic development of all EU states (Scutaru et al. 2016).

In the concept of smart specialization, clusters are seen as the basic element of identification of priority regions, as well as the implementation of regional innovation strategies. According to the European Commission clusters can be used for designing, implementing strategies, regional competitiveness and resource identification, determining priorities and region competitiveness. The use of clusters to identify the smart specialization allows to avoid copying specializations from other regions (Ropęga 2016).

Clusters have a natural ability to shape and support cooperation between businesses and other organizations, including the science-research sector, and they are an instrument of industrial competitiveness, innovation, and regional growth. At the stage of strategy implementation, the clusters should be efficient platforms for the fulfillment of smart specialization goals (Foray et al. 2012). Partnerships are also thought to be necessary to achieve success. Smart specialization uses clusters as a tool for the intensification and effectivity of the development efforts undertaken by the EU, using cluster properties based on trust, making it easier to transfer knowledge and innovations. The following effects of cluster activities can be listed taking into account the concept of smart specialization (Golej 2015):

- Investment strengthening, possibility of conducting larger investments by the cluster organizations than if they were to operate individually
- Intensification of knowledge transfer, focusing research on the strengthening of the IS areas
- Development of business cooperation within clusters, transfer of focus to innovative actions and related investments
- Integration and harmonization of infrastructure, social, educational, research, and business activities in areas of smart specialization

3 Research Methodology

In order to identify regions in Poland which have smart specialization an analysis of current strategic documentation was conducted—the Regional Innovation Strategies for each region of Poland. The identification and analysis of documentation was conducted for 16 voivodeships: podlaskie, świętokrzyskie, podkarpackie, lubelskie,

warmińsko-mazurskie, kujawsko-pomorskie, śląskie, lubuskie, pomorskie, dolnośląskie, zachodniopomorskie, łódzkie, opolskie, mazowieckie, wielkopolskie, and małopolskie. The identification of tourist clusters located in respective voivodeships was conducted based on the cluster catalogs for individual regions, created by the Polish Agency for Enterprise Development (PARP) as a part of the "Polish clusters and cluster policy" undertaking (www.pi.gov.pl) and the Map of clusters in Poland—a database on local clusters, maintained by PARP (https://mapaklastrow.pi.gov.pl). Strategic documentations (RIS3) was also a source of information on clusters. Ultimately, 40 currently functioning clusters were identified, which were initiated in Poland in 2004–2016. The confrontation of regional smart specializations and the identified clusters allowed to draw conclusions.

4 Regional Smart Specializations in Tourism and the Development of Tourism Clusters in Poland: Results of Research

In individual regions of Poland smart specializations are defined both in the sector scope (industry and service), as well as horizontal, multidimensional scope pointing to the need for cooperation not only a tan economic level but also at a social and institutional level. The most frequently selected smart specializations on a regional level were information and communication technologies. The majority of voivodeships based their future growth on areas connected with natural resources. There are also those voivodeships which have traditional branches of industry as the main focus of their regional growth. Singular voivodeships chose very specific specializations such as aviation and astronautics or design (Ropęga 2016).

The conducted research shows that eight Polish voivodeships (50%) selected tourism as their main smart specialization or its extension. This is related to the podlaskie, świętokrzyskie, podkarpackie, warmińsko-mazurskie, kujawsko-pomorskie, lubuskie, zachodniopomorskie, and małopolskie voivodeships. Tourism as the main specialization was chosen by three voivodeships (świętokrzyskie, kujawsko-pomorskie, zachodniopomorskie). One voivodeship (opolskie) declared this specialization as a potential one. Health tourism is the dominant specialization among the voivodeships. Figure 1 shows the location of each voivodeship in Poland and their smart specializations in tourism (main, extended, potential).

Based on the results of research, Table 1 lists each region in Poland, the determined number of regional specializations, target on tourist specialization, the number and names of tourism clusters operating in the region (as of June 2017) as well as the year they were created in.

Regional Smart Specializations of the podlaskie voivodeship were determined using the chain of value both in the group of leading companies as well as small but dynamic ones. The planning document (RIS3) points to one "specialization core," which is "innovation in areas in which the voivodeship currently has above-average

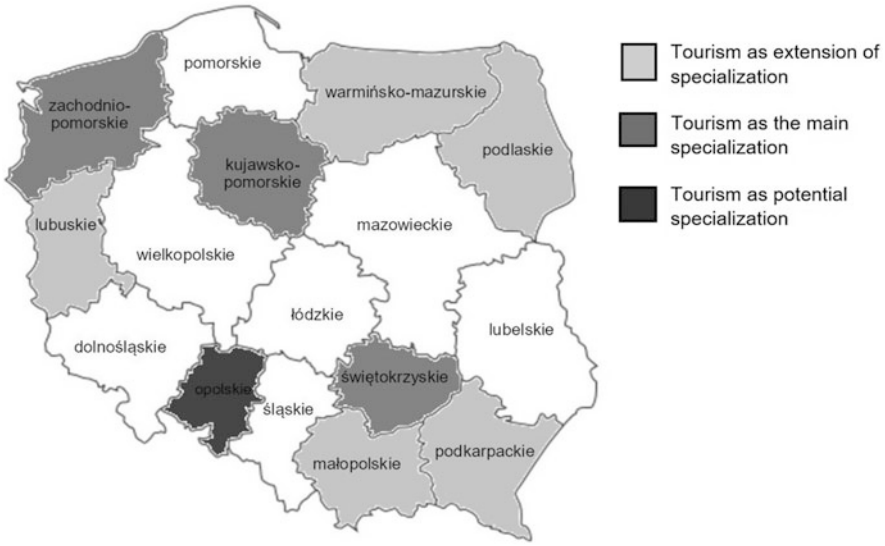

Fig. 1 Regions (voivodeships) having tourism as smart specialization (Source: Own elaboration based on the Regional Strategies of Research and Innovation for Smart Specialization (RIS3))

potential," which consists of four economy sectors: the medical sector, life sciences and sectors connected with a chain of value (in which health tourism is a priority) and eco-innovation, science of environment and sectors linked with a chain of values (in which one of the priorities is ecotourism). Economic activities supplementary to this core are the ones which show a high growth dynamic, promising enough to be called "Rising specializations." The main aim of the plan is an increase in innovative activity and an increase of the number of businesses, through supporting the creation of network initiatives in the specialization core area (Urząd Marszałkowski Województwa Podlaskiego 2016). Currently there are three identified tourist clusters operating in this voivodeship (Table 1).

The świętokrzyskie voivodeship has four main smart specializations (including health and pro-health tourism) and three horizontal supporting specializations (including the fair and congress trade). Each specialization must be implemented through a proper development concept by a specialization leader competent in: animating cooperation, information exchange, knowledge and technology transfer from the R&D sector to companies operating within the specializations, promotion of innovation, international cooperation. This voivodeship has health spas known all over the country with potential for further development based on sulfidic and thermal waters; there is a low unemployment rate and health facilities using the PPP formula are created—which is an innovation at a national scale (Urząd Marszałkowski Województwa Świętkorzyskiego 2014). The region has two tourist clusters, including one focused on health tourism (Table 1).

One of the two leading smart specializations in the podkarpackie voivodeship is the quality of life, which includes four areas such as: balanced and responsible

Table 1 Polish regions, their specialization in tourism and operating tourist clusters

Number of regional specializations	Specialization in tourism	Number of clusters	The name of the cluster/ year of appointment
Podlaskie voivodeship			
2 smart specializations (core, emerging specializations)	*Yes (extension of specialization)* Health tourism, ecotourism as priority actions of 2 sectors within the "core of specialization"	3	• Tourism Brands Cluster of Eastern Poland/2012 • Okopski Agrotourism Cluster/2007 • The "Suwalszczyzna-Mazury" Cluster/2012
Świętkorzyskie voivodeship			
4 major intelligent specializations and 3 horizontal supportive	*Yes (the main specialization)* Health and wellness tourism as the main intelligent specialization Trade and Congress sector as horizontal specialization	2	• Cluster of Świętokrzyskie Spas/ 2013 • Cluster of Tourism and Regional Development "Słońce Regionu"/2007
Podkarpackie voivodeship			
2 intelligent leading specializations, 1 supportive	*Yes (extension of specialization)* Tourism sustainable as an area of leading intelligent specialization—quality of life	6	• Innovative Health and Tourism Cluster "Uzdrowiska – Perły Polski Wschodniej"/2009 • The Quality of Life Cluster "The Land of Podkarpacie"/2012 • Tourist Cluster "Dolina Wisłoki"/2012 • Subcarpathian Medical-Tourist Cluster/2013 • Carpathian Tourism Cluster/2013 • Cluster "Podkarpackie smaki"/2013
Lubelskie voivodeship			
4 smart specializations (key, complementary, emerging, supporting)	*No direct reference to tourism (Specializations related to tourism)* Medicine and health (including medical and health services) as a complementary area of intelligent specialization	2	• Restaurant and Hotel Cluster/2006 • The Local Tourist Organization Cluster "The Land of Loess Gorges"/2007
Warmińsko-mazurskie voivodeship			
3 regional specializations	*Yes (extension of specialization)* Services related to the tourism industry—Accommodation and wellness (including hotels, SPA & Wellnes,	4	• The Elbląg Tourism Cluster/2011 • The Mazury Tourist Cluster/2012 • West Mazury Tourism Cluster/2012

(continued)

Table 1 (continued)

Number of regional specializations	Specialization in tourism	Number of clusters	The name of the cluster/ year of appointment
	water parks, spas) and water sports (sports events) and water transport as part of the specialization "Water Economics"		• The "Trail of Cultural Heritage" Social Cluster/ 2011
Kujawsko-pomorskie voivodeship			
8 smart specializations	*Yes (the main specialization)* Health tourism	4	• The Toruń Tourism Cluster/2014 • The Ciechocinek Spa Cluster "Valley of Health"/2007 • Cluster of Tourism Medical and Spa/2013 • Cluster of Health Tourism/2014
Śląskie voivodeship			
3 thematic specializations of the region	*No*	4	• The Tourist Cluster – Beskidzka 5/2004 • Jurassic Cluster of Tourism/2011 • Cluster of Culture and Tourism Industry/2011 • Silesian Cluster of Culture, Tourism and Recreation/2013
Lubuskie voivodeship			
3 areas of specialization	*Yes (extension of specialization)* Health tourism combined with other activities such as sport, recreation and leisure within the specialization Health and quality of life	2	• Western Medical and Tourism Cluster/2013 • Lubusz Cluster of Entrepreneurship and Tourism/2015
Pomorskie voivodeship			
4 areas of specialization	No direct reference to tourism (Specializations related to tourism) Medical technologies for civilization diseases and aging	5	• The Sopot Tourism Cluster/2011 • Chojnicko-Człuchowski Tourist Cluster "Wrota Borów"/2014 • Pomeranian Horeca Cluster/2010 • The Malbork Tourism Cluster/2012 • Baltic Cluster of Health Touris/2015

(continued)

Table 1 (continued)

Number of regional specializations	Specialization in tourism	Number of clusters	The name of the cluster/ year of appointment
Dolnośląskie voivodeship			
6 areas of specialization	*No*	3	• Cluster Ceramics and Tourism/2007 • Lower Silesian Cluster of Tourism/2013 • Karkonosze-Izerski Tourist Cluster/2014
Zachodniopomorskie voivodeship			
5 areas of specialization	*Yes (the main specialization)* Tourism and health (health tourism, medical, wellness and spa)	1	• Cross-border tourist cluster water trail "Berlin – Szczecin-Bałtyk"/2008
Łódzkie voivodeship			
6 areas of specialization	*No direct reference to tourism (Specializations related to tourism)* Medical sector, pharmacy and cosmetics (including spa medicine)	0	
Opolskie voivodeship			
5 technology groups—15 technology—smart specialization 1 product and service group—3 products and 1 process—potential specializations	*Yes (potential specialization)* Integrated regional tourism product (from the group of products and services—potential smart specialization)	2	• The Opole Tourism Cluster "Land of Milk and honey flowing"/2008 • Tourist Cluster "VisitOpolskie"/2012
Mazowieckie voivodeship			
4 areas of specialization	*No*	0	
Małopolskie voivodeship			
7 key areas	*Yes (extension of specialization)* Creative industries and leisure (including the travel industry)	1	• The Małopolska Tourist Cluster Beskid/2011
Wielkopolskie voivodeship			
6 areas of specialization	*No*	1	• Tourist Cluster "Piast Route in Wielkopolska"/ 2016

Source: Own elaboration based on: Polska Agencja Rozwoju Przedsiębiorczości (2017a, b), Deloitte Business Consulting S.A (2013), Dudziński et al. (2014), PAG Uniconsult (2012), Urząd Marszałkowski Województwa Małopolskiego; Urząd Marszałkowski Województwa Podlaskiego (2016), Urząd Marszałkowski Województwa Pomorskiego (2016), Urząd Marszałkowski Województwa Świętokrzyskiego (2014), Urząd Marszałkowski Województwa Zachodniopomorskiego (2016), Woźniak et al. (2015), Zarząd Województwa Lubuskiego (2015), Zarząd Województwa Opolskiego (2014), and Zarząd Województwa Warmińsko-mazurskiego (2010)

tourism, health and well-being. The smart specialization as an area of the quality of life aims at supporting the activities of all the sectors which are characterized by a fully defined eco-innovation, creating green growth. Priority actions and technologies for a support area of balanced tourism are: adventure tourism, recreational tourism, eco-tourism, farm tourism, health tourism, business tourism, religious tourism, culinary tourism, enotourism. The supporting instrument with a horizontal and functional role for the development of smart specializations, requiring support is clusters (Woźniak et al. 2015). Table 1 shows that in this voivodeship there are currently six functioning clusters, including two related to medicine and health.

The warmińsko-mazurskie voivodeship has high tourist qualities, and is considered as one of the most beautiful places in the world, and the Land of the Great Mazury Lakes was one of the finalists of the seven New Wonders of Nature. This region is therefore focused on the development of specialized tourism services (health, rehabilitation, sport), which will allow to provide services which increase the income and reduce the seasonality in this sector, and at the same time increase the balanced growth of this sector of economy (Zarząd Województwa Warmińsko-mazurskiego 2010). In the Strategy of socioeconomic growth "Water economy" was listed as one of the three smart specializations, which is based on the largest surface water resources in Poland, around which tourism has developed along with other types of business, which have a large innovation potential. The elements of this specialization are services in tourism such as accommodation and wellness (hotels, SPA & Wellness centers, health resorts, water parks), water sports (including sailing, organization of sport events), water transport (passenger cruises). Cooperation, including clusters, is to be one of the directions of focus leading to the fulfillment of the operational goal—increase of competitiveness through the development of smart specializations (Zarząd Województwa Warmińsko-mazurskiego 2013). As shown in Table 1 there are currently four active tourism clusters in the voivodeship.

In the kujawsko-pomorskie voivodeship as a part of the "medicine, medical services and health tourism" specialization it is planned to develop medical treatments and equipment as well as their commercial use, especially in connection with the development of highly advanced sanatorium and treatment services, including health tourism and additional activities (e.g., sport, recreation, rehabilitation). As a result of this focus on the mentioned specialization, due to the cooperation of the science-research sector and the business and medical facilities sector in the region, there will be created innovative medical technologies, used to shape the offer of treatment services, diagnostics, rehabilitation, and wellness. A crucial element here is the development of a cooperation network between the leading dressing manufacturers, SME companies, health resorts, and R&D units (PAG Uniconsult 2012). Currently, there are four active clusters in the voivodeship. Three of them are strictly related with health tourism.

Health and quality of life in the lubuskie voivodeship is a specialization with a horizontal significance for the region development. It bases on the negative demographic trends existing in Poland and the whole of Europe related to the aging of the society, but also on the quality of life improvement trends, especially during illness or as preventive medicine. This specialization includes the development of treatment

methods based on medical technologies and equipment especially in connection with: highly advanced medical services which include preventive medicine and rehabilitation and health tourism along with other additional activities such as: sport and recreation (Zarząd Województwa Lubuskiego 2015). There are two active clusters in this voivodeship, one of which is related to medicine.

One of the specializations of the zachodniopomorskie voivodeship—"Tourism and health" focuses on health tourism including health resort tourism, medical tourism, and spa and wellness tourism. Tourists are attracted by numerous health and recreation resorts in Szczecin and at the seaside, as well as widely known health resorts. Unique climate qualities of this region, air saturated with iodine at the seaside, peat and saline waters beneficial for health are the basis for a developed network of services, healing treatments, rehabilitation as well as spa and wellness services provided through a rich treatment offer. A vast majority of the businesses in the voivodeship belongs to the SME sector. In order to develop innovations, cooperation between companies must be developed, especially creating and development of cluster initiatives and establishing cooperation with larger companies which have the potential to undertake initiatives in the R&D department and implementation of innovative projects (Urząd Marszałkowski Województwa Zachodniopomorskiego 2016). This voivodeship has one active tourist cluster.

In the opolskie voivodeship there are five technology groups (15 technologies as smart specializations) and one group of products and processes (two products, including an integrated regional tourist product and one process as a potential smart specialization). In this voivodeship there is a serious deficit of partnership connections, i.e., cooperation between entrepreneurs, science institutions, and self-government units in the region. There is also a low effectiveness of consolidation of cluster initiatives. In order to ensure a high quality of cooperation in the voivodeship it is advisable to support the creation of a connection network, especially regarding clusters. Singular units are not capable of generating innovative solutions on their own and therefore they cannot obtain a competitive edge (Zarząd Województwa Opolskiego 2014). There are currently two active tourist clusters in this voivodeship.

One of the smart specializations of the małopolskie voivodeship is the creative and free time industries, including the production, manufacturing, presentation and sales of copyright goods, cultural activities and the tourist industry. The free time industry is a multidisciplinary economy branch, which is connected with tourism, rest, entertainment, recreation and spending free time, including work on a hobby. The voivodeship aims to support businesses operating within existing and newly created clusters. Support will be given chiefly to actions which can have the potential for innovation (Urząd Marszałkowski Województwa Małopolskiego 2015).

In the strategic documentation of the lubelskie, pomorskie, and łódzkie voivodeships there are no direct mentions of tourism as a focus for smart specialization support. Nevertheless, there is an area dedicated to medicine and public health, which are connected to tourism (Dudziński et al. 2014; Urząd Marszałkowski Województwa Pomorskiego 2016; Deloitte Business Consulting 2013). Despite the lack of a clear mention of tourism as a future direction for development, the first of the three voivodeships has two active tourist clusters, the second one has five, one of

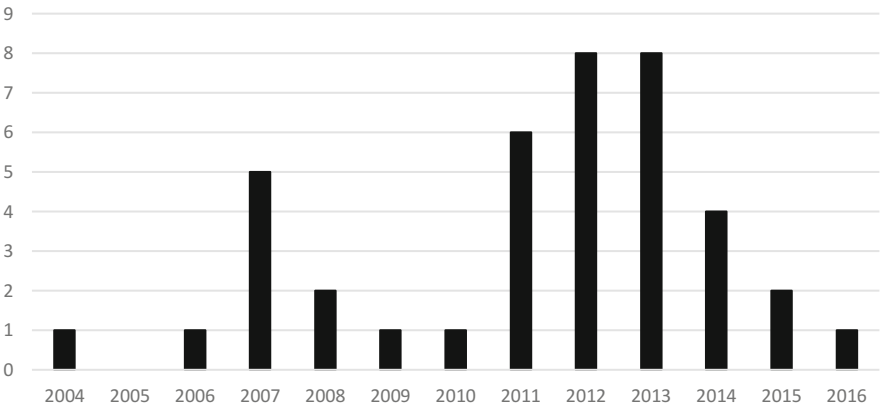

Fig. 2 Number of clusters formed in 2004–2016 in Poland (Source: Own elaboration based on research results)

which is focused on health tourism. Only the łódzkie voivodeship has no clusters connected to tourism.

Of the four voivodeships which do not specialize in tourism and do not have medical and pro-health services listed, only one has no active tourism clusters (the mazowieckie voivodeship). In the remaining three there are respectively: four clusters—the śląskie voivodeship, three clusters—the dolnośląskie voivodeship, one cluster—the wielkopolskie voivodeship. It is then clear that despite the lack of tourism as an IS, voivodeships, especially the southern ones, are tourism oriented.

The analysis of the duration of cluster initiatives in Poland shows that their largest development falls to the period of 2011–2013. In the recent years only singular structures have been created. The number of clusters created in individual years is shown in the chart (Fig. 2).

Of the three voivodeships which have tourism as their basic specialization, the most developed clustering can be found in the kujawsko-pomorskie voivodeship. This voivodeship focuses on health tourism and the majority of its active clusters is connected with this specialization. Of all the regions, which point to tourism as their main area or elements of this area, the highest number of clusters (6) can be found in the podkarpackie voivodeship. The warmińsko-mazurskie voivodeship is in second place.

5 Conclusion

In Poland tourism clustering is developing in voivodeships which have tourism as their regional specialization as well as in voivodeships which are turning toward other specializations. Twenty-five cluster structures are currently active in voivodeships focused on tourism as their main specialization or its extension, with

the remaining 15 structures being related to regions in which tourism does not have a significant meaning in the development of the region.

In the regions of Poland the level of development of the structures, however, is varied. Of all the voivodeships which specialize in tourism, there are regions in which tourism clustering is not very popular (only 1–2 active clusters), as well as regions in which, in recent years, there was an intensive growth of cluster structures, with 4–6 active clusters (the podkarpackie, warmińsko-mazurskie, kujawsko-pomorskie voivodships).

All regions with a specialization connected with tourism have a chance for development due to the existence of tourism clusters in their areas. The voivodeships which focus on health tourism and which have well prospering clusters connected to medicine and health have especially good predispositions for development. This includes three voivodeships: świętokrzyskie, kujawsko-pomorskie and lubuskie. In order to implement main smart specializations in two of the voivodeships (zachodniopomorskie and świętokrzyskie) there is the need for further development of tourism structures. In regions in which tourism is not currently a priority, due to the development of tourism clustering, there seems to be a chance for significant success in this area in the future.

Chances for development of regions based on smart specializations are connected to the support of the existing and newly created clusters through financing of coordinating activities, including the cluster initiatives. In this way the functioning of institutions playing a key role in the development of cooperation, interaction and knowledge flow within business clusters can be ensured, and through this an increase in their innovativeness and competitiveness (Ropęga 2016). An important skill is also project management in networks and consortiums by the cluster managers. The pace of development of tourism as a smart specialization is dependent, to a large extent, on the phase of development of clusters.

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Quantitative and Qualitative Aspects of Non-financial Reporting in Hotel Enterprises in Croatia

Nidžara Osmanagić Bedenik, Ivan Strugar, Darko Prebežac, and Vedran Kojić

Abstract Dynamic business environment requires publishing accurate and reliable information about company business performance. In this context company financial reporting becomes standard, obligatory and important company communication channel. Publishing company performance information is not for the interest of investors only, but it is because of the interest for customers as well. In present business environment, growing interest for environmental protection and sustainable development, the financial reporting framework becomes insufficient. Information related with social and environmental aspects of business grows in importance not only for employees and local community but for investors and customers as well. Tourism industry highly prioritises environmental protection issues and sustainable development as factors of highest importance for sustainable destination management. In this context non-financial reporting was voluntary for many years, but now non-financial reporting becomes not only important market issue but becomes obligatory, and standards for non-financial reporting are still developing. The primary objective of this study was to identify the level of existing experience and readiness of hotel companies in Croatia to report on sustainable reporting and sustainable business.

Keywords Financial reporting · Sustainable development · Hotel industry

N. O. Bedenik (✉)
Department of Managerial Econonomics, University of Zagreb, Zagreb, Croatia
e-mail: nosmanagic@efzg.hr

I. Strugar
Department of Informatics, University of Zagreb, Zagreb, Croatia
e-mail: istrugar@efzg.hr

D. Prebežac
Department of Tourism, University of Zagreb, Zagreb, Croatia
e-mail: dprebezac@efzg.hr

V. Kojić
Department of Mathematics, University of Zagreb, Zagreb, Croatia
e-mail: vkojic@efzg.hr

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1 Introduction

'In December 2014 the European Parliament adopted the 2014/95/EU (Directive 2014/95/EU, 10.2014). Directive on non-financial reporting. This Directive is part of a broader initiative of the European Union regarding corporate social responsibility which includes a consistent approach to reporting and support to smart, sustainable and inclusive growth under Europe 2020 objectives. Starting from 1 January 2017, this Directive makes non-financial reporting in the entire European Union mandatory for public interest entities employing more than 500 people. According to the Directive, the disclosure of non-financial information is central for combining long-term profitability with social justice and environmental protection. Non-financial reporting includes ecological aspects, social and employee-related matters, respect for human rights, anti-corruption measures, description of the business model, outcomes and risks of the policies on the above issues and the diversity policy applied by the management and supervisory bodies' (Osmanagić Bedenik and Barišić 2019, p. 99).

'Financial reporting on the business performance of companies was introduced several decades ago, after which it developed through several stages as voluntary reporting, mandatory reporting and highly standardised reporting' (Osmanagić Bedenik and Barišić 2019, p. 96). The modern business economy, however, faces ever clearer demands for non-financial reporting, which includes reporting on social and ecological aspects of business, i.e. sustainable business practises or sustainability. For many years non-financial reporting was a voluntary practise, but since recently non-financial reporting has become mandatory. This trend of making non-financial reporting a company's obligation has also emphasised the need to create standards for reporting.

The hotel industry represents the most important segment of tourism in terms of its financial impact and in terms of its broad and comprehensive impact on the entire society. 'The significance of the hotel industry has been especially pronounced in the period of economic contraction when sustainability and positive financial results prove to be the precondition for future growth, sector development and the growth of the national economy alike' (Škuflić and Mlinarić 2015). Our study of quantitative and qualitative features of non-financial reporting by enterprises within the category 'hotels and restaurants' covers three dimensions:

- Quantitative aspects
- Qualitative aspects

The quantitative aspects of reporting encompassed several dimensions in our study. Namely, we researched how many hotel enterprises within the selected sample disclosed sustainability reports and what the size of those reports was, as measured by the number of pages. We also wanted to analyse how economic, social and ecological aspects were represented in the structure of the report and how many indicators/groups of indicators were used to determine economic, social and ecological aspects of business.

We also researched the qualitative aspects of reporting by trying to find answers to the following questions: the relationship between the business strategy and sustainability strategy; the reporting standards used; the motives for sustainability reporting; the stakeholders interested in sustainability reporting and satisfying their information-related needs; the interactivity of reports; monitoring the relationship between the level of investment in sustainability and generated profit; and the use of mathematical methods to monitor such relationship.

The primary goal of this chapter is to identify the level of existing experience and degree of preparedness of hotel enterprises in Croatia to deal with sustainability reporting. The results of the empirical research allow us to discover quantitative and qualitative characteristics of the current situation regarding non-financial reporting in hotel enterprises in Croatia. On the basis of research results, it is possible to stimulate enterprises and stakeholders to further develop sustainability reporting. This chapter also aims to affirm the need for establishing a broader perspective on business activity by abandoning the narrow focus on profit. It tries to provide more insight into corporate social and ecological responsibility as well as to provide support and assistance to enterprises in the process of introducing and implementing sustainability reporting.

2 Shareholder Value and Profitability

Value creation is often emphasised as the most important business objective (Osmanagić Bedenik and Barišić 2019, p. 95). There are two different concepts of value creation in business, depending on the perspective of parties involved in value allocation (Kochalsky 2016). Shareholder value is a concept according to which a company, based on its activity, has a primary obligation to create value to shareholders. The American economist and Nobel Prize winner Milton Friedman significantly influenced the modern understanding of profitability, arguing that 'the social responsibility of business is to increase its profits'. Friedman thought that a company should have no social responsibility to the public or society because its only concern was to increase profits for itself and for its shareholders and that the shareholders in their private capacity were the ones with social responsibility (Osmanagić Bedenik et al. 2016). This attitude has resulted in the focus on profit and profitability neglecting the way profit is generated as well as neglecting the consequences of such focus (Kramer et al. 2006).

Creating shareholder value is a concept according to which a company should only satisfy the interests of its owners. According to that concept, the enterprise is most commonly understood as an investment project with a pronounced financial aspect of activity, and business performance in that concept is most commonly measured by profitability as the main indicator of success (Osmanagić Bedenik and Barišić 2019, p. 95).

3 Stakeholder Value and Sustainability

Modern developments in the economy and society are marked by two phenomena: companies are becoming bigger and more powerful while social pressure for responsible business is becoming more pronounced (Osmanagić Bedenik and Barišić 2019). According to the World Bank (2016) among the 100 largest economies in the world, 69 are corporations and only 31 national economies! Companies are more powerful than ever and with power comes their responsibility for their own behaviour towards people, the community and the environment. A short-term focus on profit is detrimental for all and it is necessary to establish balance between monetary and non-monetary business objectives as well as between short-term, medium-term and long-term goals. Sustainability reporting has its role here as it encompasses not only economic effects of the business activity of a company, but also the effects on people, general community, nature and the environment (Osmanagić Bedenik and Barišić 2019).

At the same time, we are witnessing climate change causing unexpected droughts and floods, glacial meltdowns, migrations of population, a drastic decrease in biodiversity, unlimited expansion and growth of business which contributes to the destruction of nature and animal habitats. The pollution of air, water, soil as well as light, noise and electromagnetic pollution are just forms of environmental pollution caused by human activity, or better yet, caused by company activities. Therefore, companies today face great challenges because they can transform undesirable trends in the economy and society into socially and ecologically responsible creation of new activities and long-term jobs, inventions and new methods of production and consumption in the areas of energy, forestry, transport, agriculture, tourism and other areas of human activity.

The stakeholder theory implies that companies have the obligation to individuals and groups within and outside of companies, including owners, employees, customers and the wider community. The stakeholder concept was first used in 1963 in the internal memorandum at the Stanford Research Institute. According to that concept, the stakeholders are those groups without whose support the organisation would cease to exist. Figure 1 depicts typical company stakeholders (Boundless 2017). Freeman advocates the ethical principle according to which the concept of corporate responsibility implies responsibility to all stakeholders (Freeman 1994). Freeman is considered the father of stakeholder theory which explains that stakeholders are individuals and groups affected by, or affecting, directly or indirectly, policies, activities and decisions of the company. In that context, a company needs to create value for its stakeholders balancing their demands in decision-making and defining priorities (Osmanagić Bedenik and Barišić 2019, p. 98). The stakeholder theory has become a dominant paradigm of corporate social responsibility and sustainability (Boundless 2017).

'Creating value for stakeholders is a broader concept which harmonises different interests of particular stakeholder groups at the same time. The company is considered an element of the environment so that this concept represents the foundation of

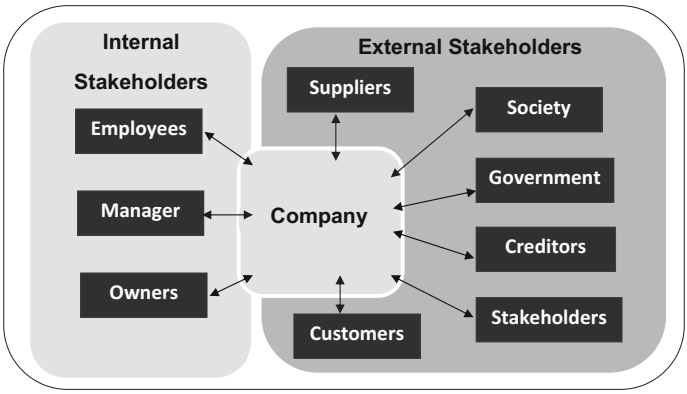

Fig. 1 Company stakeholders (Source: Based on Boundless (2017))

sustainable business. According to that concept, business performance is viewed as a function of balance between economic, social and ecological aspects of business activity. There is no doubt that companies do their business activities in an environment where there are numerous interrelations and relationships' (Osmanagić Bedenik and Barišić 2019, p. 97). 'Thus, an enterprise should not be considered as an instrument of its owners, but rather as an organized whole composed of many parts, groups. In view of the above, a company may not ignore its stakeholders, but it should function in symbiosis with them' (Kochalsky 2016). Business performance should therefore be assessed based on the company's economic performance, environmental quality and social justice (Svendsen et al. 2001).

We have already mentioned that shareholders are owners of the company and the company has the obligation to maximise value for them. According to the stakeholder theory, however, there are other interest groups or stakeholders who are involved in the functioning of the company. Some scenarios suggest that even competitors can be considered company stakeholders. The stakeholder theory proposes that the company should aim to satisfy the interests and needs of its stakeholders, as opposed to merely focusing on maximising profit for the owners.

Stakeholders can be categorised in different ways: business and non-business, primary and secondary etc. The relationship with stakeholders is becoming increasingly important for each company so that the perspective is changing from stakeholder management towards dialogue with stakeholders in order to explore potential agreements and build trust between individuals and organisations. Moreover, the quality of relationship with stakeholders and the capacity to create long-term value are two sides of the same coin (Tsoulfas and Pappis 2012).

According to research results, (Osmanagić Bedenik et al. 2016) the interests of investors, customers and employees are common subjects of studies. As for investors, studies try to find out what investors are interested in when it comes to non-financial reporting. Findings suggest that 64.5% investors regularly assess ecological and social aspects of business but only 35.5% conduct a modest analysis of these aspects or conduct no analysis at all (EY 2015a, b).

Customers also show great interest in sustainability and recent data on customer trends are clear in that respect (Solarcity 2017):

- Seventy-two per cent of customers are interested in learning what companies are doing in terms of sustainability and 'going green'
- Seventy-five per cent of customers would more likely purchase products and services from companies which are making a great effort to adopt environmentally conscious practices
- Eighty-two per cent of consumers are more likely to purchase a product that demonstrates a company's corporate social responsibility initiatives than one that does not
- Ninety-three per cent of Americans reported having done something to conserve energy in their household in the past year

According to the same study, a younger generation shows an even stronger trend of green consumption.

Employees are also very important stakeholders. Many future employees use ecological policies to measure corporate values. In 2007, MonsterTRAK (EY 2015a, b) reported that 92% of students and entry-level workers were seeking an environmentally friendly company for employment. According to SHRM 2011 survey, 89% of organisations assessed the importance of sustainable strategy as 'important' or 'very important' in creating a positive employer who attracts talents. According to 2011 Deloitte survey, 70% of millennial job seekers said that a firm's community image is an important determinate in job selection. It is obvious that sustainability message and image have an impact on attracting the best talent. When companies were asked to rank three most important stakeholders in their sustainability initiatives, employees ranked second with 22% of replies, after consumers who ranked first with 37% replies while owners ranked third with 15% of replies (EY, Trend-3 2017).

4 Financial and Non-financial Business Reporting

Business reporting provides information on the business activity of a company, which is necessary to decision-makers outside or inside the company. Target external users of business reports are owners, investors, customers, suppliers, future employees, the media, state bodies and general public. The most important internal users include the management, employees and trade unions. The system of business reporting includes financial and non-financial reports which are interrelated and aligned with the objective to provide a comprehensive overview of the business activities and results of a company with consequences for people and the environment (Osmanagić Bedenik and Barišić 2019).

4.1 Financial Reporting

Financial reporting constitutes a traditional and generally accepted method of reporting on the business activity of a company, as regulated by the Accounting Act and International Accounting Standards. Financial reporting includes several basic financial statements: balance sheet, profit and loss account, cash flow statement, statement of changes in equity and notes to the financial statements. These basic financial statements reflect, in a structured way, different aspects of a company's business activity. The statements also complement each other, reflect monetary values and refer to a specific time period, most often, annual or semi-annual (Osmanagić Bedenik and Barišić 2019, pp. 93–94). The aim of financial statements is to '...inform interested users on the financial position of the company and business performance. To inform users means to present all relevant, and at the same time, reliable accounting information in the form and content recognisable and understandable to those they are aimed at' (Žager and Žager 1999).

According to the Accounting Act, 'financial statements need to present a fair and true view of the financial position, financial performance and cash flow of a business. The fair view demands that the effects of transactions and other business events are true and faithful and in accordance with the criteria used to recognise assets, liabilities, equity, income and expenditure' (Croatian Assotiaton 2008). Financial statements are primarily aimed at external users of a company, especially owners and investors, to allow them to make decisions on resource allocation. They represent a method of communicating financial information on the company.

'Financial reporting has a long history. In different parts of the world the first financial statements were published as early as at the end of the nineteenth century' (Osmanagić Bedenik and Barišić 2019, p. 96). The intention to clearly structure and compare financial statements led to the passing of Generally Accepted Accounting Principles which provide a set of basic guidelines (GAAP 2017). After World War 2, as economic integration occurred and capital started to travel over national borders, it became necessary to harmonise financial statements internationally and to devise International Financial Reporting Standards. In order to improve cooperation in the international application of reporting standards, the Accounting Standards Advisory Forum was established (FASB 2017). The development of the economy and reporting standards as well as the development of international investments led to the development of financial auditing, certification and testing of financial statements based on international auditing standards (GAAS, IAASB, ISAs) (Osmanagić Bedenik and Barišić 2019).

4.2 Non-financial Reporting

It is nowadays becoming increasingly clear that financial statements can no longer be sufficient when it comes to business reporting because they do not reflect the entire business activity of a company. The information in financial statements reflects only

short-term monetary aspects of business but does not provide insight into environmental, social and managerial aspects of business which are, in the long term, much more important. Non-financial reporting is a 'must' in the modern economy for different groups of the general public as it reflects the responsibility of a company to conduct business activities in a sustainable way (Osmanagić Bedenik and Barišić 2019, p. 98). On the basis of a sample of 200 senior executive managers across the world, and according to the results of a study conducted by The Economist, 87% of respondents agree that sustainability will become more important over the next 3 years. Fifty-seven per cent of respondents say that their firms use sustainability reporting as a basis for new business strategies. The results show that 49% of respondents report progress in meeting their environmental sustainability goals and 53% report progress towards social sustainability (Economist 2010). There is growing evidence that sustainability reporting increases in significance. According to the results of KPMG from 2008, almost 80% of the world's largest 250 enterprises report on sustainability (Economist 2010; Osmanagić Bedenik and Barišić 2019, p. 98).

Even though it seems to us that sustainability is a modern concept and problem, the first requirements for sustainable business activity date back several centuries (Osmanagić Bedenik and Barišić 2019, p. 97). Hans Carl von Carlowitz (1645–1714) is considered to be the founder of the sustainability principle. In his work *Sylvicultura oeconomica* from 1713 he demanded, due to the crisis in raw materials (wood), that one should only lumber so many trees as can be grown by reforestation and planting. This was the demand of 'sustainable' usage and sustainable forest management soon caught as a professional term. This principle from forestry gave rise to the motto 'to live off the interest, not the capital' (Colsman 2013).

Contemporary terms of sustainability and sustainable development were coined in the early 1970s. The foundation of the definition of sustainability is the Brundtland report, according to which sustainable development is that development which '. . .meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED 1987). In other words, the goal is better quality of life for everyone now and for the generations to come. That is why modern business conditions demand a change in the dominant paradigm—from a reductionist focus on profit towards a holistic perspective and balance between economic, social and ecological aspects and dimensions of business accountability of a company (Osmanagić Bedenik et al. 2010; Osmanagić Bedenik and Barišić 2019).

The level of sustainability can be measured on macro and micro levels. There are several macroindicators of sustainability which offer information on the current state, dynamics and basic stimuli from the human and environmental system. For example, Green GDP, Human Development Index (HDI), Inclusive Wealth (IW) and Genuine Savings (GS), Genuine Progress Indicator (GPI), Index of Sustainable Economic Welfare (ISEW), Material Flows Accounting (MFA), Ecological Footprint (EF), Happy Planet Index (HPI), Environmental Sustainability Index (ESI), Performance Index (EPI), etc. It is especially interesting to mention the Gross National Happiness (GNH) index, a concept developed in 2011 which relies on four pillars. These four pillars of the GNH philosophy include: sustainable and equitable socio-economic development, conservation of the environment, preservation and promotion of culture, and good governance. The GNH policy

represents a unique vision for 5-year planning in Bhutan and represents the foundation for all executed economic and developmental plans of the country. This policy shows how sustainable tourism can be developed under the slogan 'high value, low impact'.

The idea of sustainable development finds its reflection on the micro level as well, in sustainability reporting in particular (Sustentare 2017). For instance, the profit and loss account is a common and mandatory financial statement for companies while non-financial statements tend to be voluntary and focused on reflecting the company's performance in the wider context of sustainability. Known under different names such as sustainability reporting, integrated reporting, global reporting initiative, triple bottom line, principles and standards which encompass reporting on business, social and ecological activities have recently gained more importance and are applied increasingly.

Business sustainability is often defined as the triple bottom line management, a process in which companies manage their financial, social and ecological risks, threats and opportunities (Osmanagić Bedenik and Barišić 2019). These three impacts are often called 'Profit, People and the Planet' or 3P—a syntagm introduced by Elkington in 1994 (Economist 2009). The concept of Corporate Social Responsibility—CSR, is being increasingly replaced by another concept, Holistic Corporate Responsibility—HCR (Colsman 2013). The trend of sustainability reporting is on the rise, but the tools are still being developed (Tschandl and Zingsheim 2005). CorporateRegister.com analyses corporate responsibility reports in the world; in 1992 it counted 26 reports, and in 2010 it counted as many as 5593 (EY, Trend-4 2015b). Since non-financial reporting, as of 1 January 2017, is mandatory for all undertakings in the EU employing 500 or more people, we wanted to analyse the current situation and contribute to the application of the Directive in the business practise. Business practise is familiar with the terms such as sustainability reporting, integrated reporting and non-financial reporting so we wanted to explore the similarities and differences among these reports.

Sustainability report (Osmanagić Bedenik et al. 2016) is a report which provides information on economic, environmental, social and managerial aspects of a company's performance. Integrated report integrates information on sustainability together with traditional financial information in a single report. It offers a comprehensive picture of value creation through time (KPMG 2011). It is important to notice that only the reports which include all three dimensions of sustainability simultaneously can truly be referred to as 'sustainability reports' unlike one-dimensional reports which only cover isolated aspects of sustainability. In that sense, the so-called sustainability reports often exclude important aspects of business activity, especially the economic aspects which are usually presented in a separate annual report (Friedman 1970). The non-financial report provides stakeholders with an important and comprehensive overview of the position and characteristics of a company's business activity. In a nutshell, the common core of all these reports is their focus on social and ecological aspect of a company's business activity. While sustainability reports and non-financial reports can be disclosed autonomously, an integrated report represents a single report which includes not only social and ecological but economic aspects as well. In that sense, integrated reports are

comprehensive, reflecting a holistic perspective on business activity (Osmanagić Bedenik and Barišić 2019, p. 99).

4.3 Open Questions in Non-financial Reporting

Non-financial reporting is a relatively new topic in the business practise, only a couple of decades old. Reports on corporate social responsibility and corporate citizenship were mostly disclosed on a voluntary basis and they were rarely true integrated reports on social and environmental activities. Yet, under pressure from customers and competition, the situation has changed so that non-financial reporting is becoming a mandatory business practise.

Some important open questions in this area certainly include the type of data and information which are disclosed, the way the data are collected and processed and the way they are presented—in a qualitative and/or quantitative form. Since business activities of the company in the social and ecological aspect refer to the company as whole, the data on these activities are collected from different parts of the company, which often constitutes a great challenge because different data need to be integrated into information of high quality. IT support plays a very important role in that process because collecting data for non-financial reporting is often done manually, which certainly makes the preparation of the documents harder and slower. The experience of financial reporting may be precious in that sense because, in certain phases of its development, financial reporting went through similar difficulties and eventually managed to overcome them.

The next open question deals with research studies in this area. An increasing number of companies which decide to disclose non-financial reports allow research to be conducted in that area as well. Since there are different standards and guidelines for such reporting and companies are free to choose reporting standards, it is often difficult to collect and process data, especially to compare different reports. Even though there are not too many studies on non-financial reporting, the obtained data are encouraging in the sense that there is a significant increase in the number of companies which disclose sustainability reports. It should also be stressed that the findings obtained represent a stimulus and encouragement to other companies in the process of disclosing non-financial reports.

5 The Experience of Non-financial Reporting in the Hotel Industry: Empirical Research

Our study on quantitative and qualitative aspects of non-financial reporting was conducted to discover the present level of experience with non-financial reporting and the level of preparedness of tourism enterprises, hotels in particular, to apply the EU Directive 2014/95/EU regarding disclosure of non-financial statements.

5.1 Research Objectives and Methods

The study of quantitative and qualitative features of non-financial reporting of enterprises in the segment of hotels and restaurants included two dimensions:

- Quantitative aspects
- Qualitative aspects

The primary intention of this research was to raise awareness on the size and structure of disclosed non-financial reports and to find answers to some key issues like the relationship between business strategy and sustainability, motives and the most important stakeholders targeted by non-financial reports, etc.

Taking into account the objectives of our study as well as different aspects of the study that we wanted to research, we selected the sample and research methods. The methods which were mainly used in the quantitative part of research included observation and analysis of web pages of sampled hotel enterprises, analysis, synthesis and comparison and descriptive statistics. The qualitative part of research was conducted by an online survey whose results were processed by descriptive statistics.

5.2 Research Sample

It is clear that tourism in general, and especially hotel enterprises, represent segments of the economy which are especially susceptible to changes in the environment and preservation of social and ecological features of the destination. That is why we have selected this segment as our sample. The sample is based on the list of top 30 enterprises in 2015 by total revenue in the segment 'Hotels and Restaurants', according to the data provided by FINA (Financial Agency) published in the magazine *Lider* (2015). The enterprises in the sample are the most important representatives of the segment 'Hotels and Restaurants': in 2015 top 30 enterprises in the sample generated total revenue in the amount 1.101.789.903€, profit before taxation of 133.905.291€ and employed 15,421 persons.

According to the data on business performance of these enterprises in 2015/2014, the greatest increase in revenue of 28.3% was recorded by Dubrovački vrtovi sunca d.o.o., Dubrovnik. The average increase in revenue was 10.7%, while the lowest increase in revenue of 0.10% was recorded by Liburnija Rivijera Hoteli d.d. Opatija. The biggest increase in profit before taxation was recorded by Valamar Riviera d.d. Poreč, in the amount of 365%, while the biggest fall in the amount of 424.6% was recorded by Arenaturist d.d. Pula. The average value of profit before taxation increase was 18.8%. The big gap between the best and the poorest business results in the period 2015/2014 reflects the complexity of business in this segment as well as its numerous external and internal challenges.

According to the analysis of top 30 enterprises in the segment 'Hotels and Restaurants', 12 of them, or 36.7% employ more than 500 employees, meaning that, as of 1 January 2017, they should disclose non-financial reports according to the European Commission Directive.

5.3 Time and Space of Research

The research study was conducted during 2015 with the data from the period 2013–2015. Since the sample consisted of top 30 enterprises by total revenue generated in the Republic of Croatia in 2015, the hotel enterprises located on the Adriatic coast dominated the sample even though some continental hotel enterprises were present too. The most important results of our three-dimensional research follow below.

5.4 Limitations of Research

Even though non-financial reporting has recently experienced intensive growth, it has a relatively brief history. In order to prepare non-financial reports, companies can use diverse guidelines and principles, which makes comparing different financial statements really hard. Studies are mainly conducted by surveys and results are based on the perception and experience of respondents. Thus, unclear and insufficiently known facts can be clarified to stimulate enterprises to improve their business practise.

The biggest limitation of this research is sample size: top 30 hotel enterprises by revenue in 2015. Despite three iterations in our questionnaire-based survey, we were only able to collect 14 valid replies that we processed. The enterprises are of different sizes and only 12, or 40% of the sample, are subject to the obligation of non-financial reporting because they employ more than 500 employees. On the basis of the existing sample and with modest experience of enterprises in the area of non-financial reporting, it is possible to obtain some indicative results and incentives for improvements, but still, any generalisation is not possible. We are aware that this is the major limitation of this study. Actually, if we want to analyse non-financial reporting of a company in a specific business segment and we wish to focus on large- and medium-sized enterprises, then the sample will most probably be modest.

Another limitation, which has already been mentioned, is reduced comparability of disclosed financial statements since enterprises have the freedom to choose reporting standards/principles so that every report is specific and different. The problem of comparability of non-financial reports stems from the nature of the object of study and should be recognised as a limitative factor in this research.

6 Study Results

6.1 Quantitative Aspects of Non-financial Reporting

The quantitative aspects of our study covered several dimensions. The aim was to find out how many companies within the sample disclosed non-financial statements, what the size of these reports was as measured by page number, to what extent their structure represented economic, social and ecological aspects and how many indicators/groups of indicators were used for economic, social and ecological aspect of business. In continuation, individual results of the quantitative aspect are presented.

6.1.1 Size and Structure of Non-financial Reports

According to the EU Directive, non-financial reports can be disclosed together with the management report or on the web page of the company. Within the sample, the greatest share of hotel enterprises (18 enterprises or 60%) do not disclose non-financial reports, while the remaining 40% of enterprises disclose non-financial reports in some way, whether in full, partially or upon request. In other words, only 6 enterprises, or 20% of the sample, disclose non-financial reports on their website (see Fig. 2). The results of our study are based on the reports found on the web pages of the hotel companies Valamar Riviera (2015), Pleter usluge (2015), Istraturist (2015), Ilirija (2015), Jadranka hoteli (2015), Maistra (2015), and Turist Hotel (2015).

The obligation to disclose non-financial reports relates to large public-interest entities with more than 500 employees. Our sample contains 14 companies which employ more than 500 employees, and among them, only 3 hotel enterprises disclose sustainability reports. It can be concluded that in the area of non-financial reporting there is significant room for improvement, especially for enterprises which have the obligation to disclose those reports.

In the next step, we analysed the size of disclosed non-financial reports, as measured by the number of pages. The results revealed a range from a 110-page-long integrated annual report (see Fig. 3) to a modest one-page report, most commonly dealing with the quality policy and environmental protection. It can be really challenging to find balance in the size of reports and the saying 'as little as possible, but as much as necessary' comes to mind in that respect.

Non-financial reports encompass three aspects of a company's business activity: economic, social and ecological. We were interested in discovering how these aspects of business were represented in the structure of the reports. If we rank different reporting areas, we will notice that ecology is the least present dimension with about 10%, followed by the social dimension, ranging from 14 to 23% of the report, while the economic dimension prevails in the range of 67–75% of total report size (see Fig. 4). Among the remaining disclosed reports, one or two pages cover social and ecological aspects respectively while the economic aspect is not part of those reports.

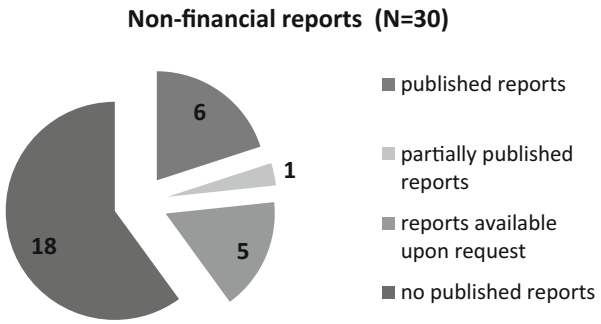

Fig. 2 Disclosing non-financial reports (Source: Authors' own study)

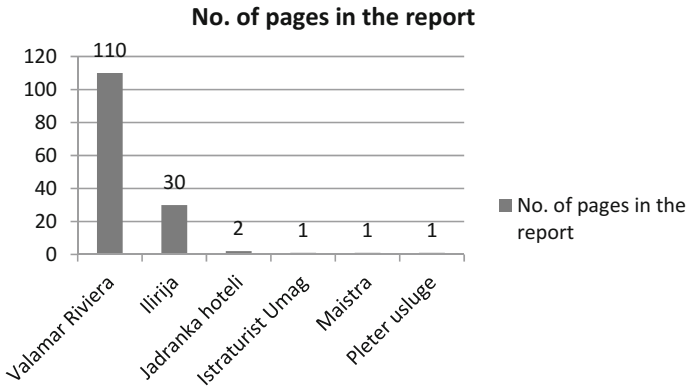

Fig. 3 Size of disclosed non-financial reports (Source: Authors' own study)

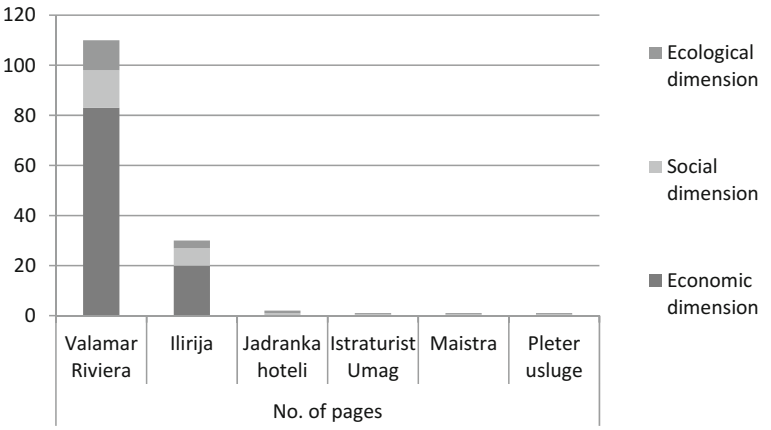

Fig. 4 Structure of disclosed non-financial reports (Source: Authors' own study)

In the area of non-financial reporting more attention has increasingly been given to indicators measuring different activities and results in social and ecological categories. In addition to describing particular activities in social and environmental categories, it is important to define indicators which measure such activities. The indicators of the economic dimension still prevail, which is only understandable due to tradition, rich experience and knowledge. It is harder to measure social and ecological dimensions of business as they depend on the specific features of business of each enterprise and their priorities, so that weaker presence of social and environmental indicators or their complete absence is not that surprising. According to the most comprehensive non-financial report of the hotel enterprise from the sample, examples of social indicators include: data on average salaries and their increase, number of employees according to the type of work contract, total number of hours of education and training in the previous year, share of local employees etc. Some ecological indicators include the number of ISO certified facilities and energy efficiency indicators.

Within disclosed non-financial reports of modest size, one or two pages provide information on sponsorship and donations and policy standards regarding quality and the environment (see Fig. 5).

6.1.2 Creating Indicators

In accordance with the Directive of the European Parliament and the Council, the non-financial statement includes information relating to at least environmental matters, social and employee-related matters, respect for human rights, anti-corruption and bribery matters, including (Official Journal, L330/4 2014):

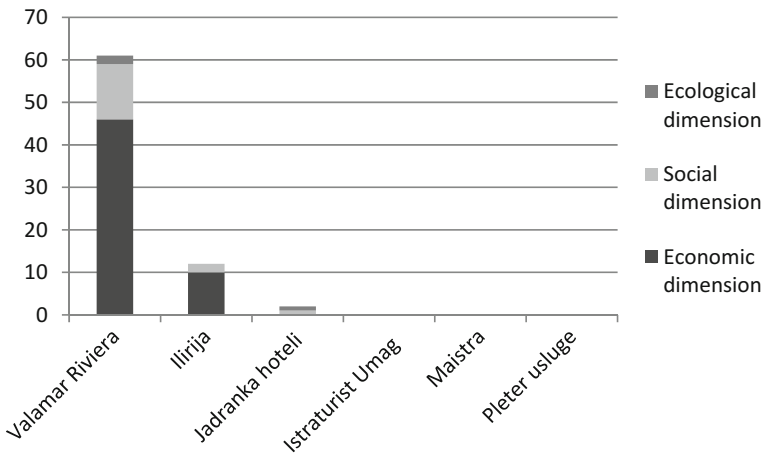

Fig. 5 Indicators/groups of indicators used in disclosed non-financial reports (Source: Authors' own study)

(a) A brief description of the undertaking's business model
(b) A description of the policies pursued by the undertaking in relation to those matters, including due diligence processes implemented
(c) The outcome of those policies
(d) The principal risks related to those matters linked to the undertaking's operations including, where relevant and proportionate, its business relationships, products or services which are likely to cause adverse impacts in those areas, and how the undertaking manages those risks
(e) Non-financial key performance indicators relevant to the particular business

Creating social and ecological indicators is a challenging process with few ready-made, simple and applicable solutions. In the initial phase of disclosing non-financial statements, verbal form dominates, similarly to the experience of companies in other countries (Hummel and Schlick 2013). It is interesting and stimulating to see the results of research according to which there is interdependence between sustainability and quantitative indicators of sustainability; quantitative indicators relevant for decision-making reflect better performance in sustainability whereas verbal indicators are used by companies of poorer performance in sustainability (Hummel and Schlick 2013). It is therefore important to distinguish qualitative and quantitative information and develop measurement indicators for social and environmental aspects of a company's business activity (Jianguo and Tong 2012). According to the mentioned source, important criteria for creating social and ecological indicators are certainly objectivity, reliability, stability and validity. In other words, it is important for an indicator to measure exactly what it should measure. This way of creating and using social and ecological indicators gives concrete information for decision-making and enables comparisons and progress monitoring in a particular area.

As regards social and employee-related matters, the information provided in the statement may concern actions taken to ensure gender equality, implementation of fundamental conventions of the International Labour Organisation, working conditions, social dialogue, respect for the right of workers to be informed and consulted, respect for trade union rights, health and safety at work and the dialogue with local communities, and/or the actions taken to ensure the protection and the development of those communities (Official Journal, L330/2 2014). In the area of social indicators, information often covers the number and structure of management and employees regarding age, gender and educational qualification, gender pay gap, employee fluctuation, time and financial aspect of further education of employees, absenteeism, work-related injuries, cases of discrimination, etc.

Environmental matters should contain details of the current and foreseeable impacts of the undertaking's operations on the environment, and, as appropriate, on health and safety; the use of renewable and/or non-renewable energy; greenhouse gas emissions; water use and air pollution (Official Journal, L330/2 2014). Among environmental indicators, indicators measuring energy consumption have a special place as well as indicators regarding the emission of CO_2 and other gases, waste water and other waste according to the method of their disposal, quantity of toxic waste and their disposal, etc.

The choice of indicators which reflect social and environmental aspects of business is a challenging task for owners, management and employees. This is because these indicators are important for particular interest groups and because they provide a consolidated view of a company's business priorities and the degree of goal achievement.

6.2 Qualitative Aspects of Non-financial Reporting

Qualitative aspects of non-financial reporting were researched by analysing the questionnaire which included a total of 11 closed questions (enumeration and intensity). In this part of the study we wanted to know the answers to the following questions: when was the first non-financial statement disclosed, which principles of reporting were used, what was the relationship between sustainability strategy and business strategy of the company, which were the motives for reporting and what was the significance of particular stakeholders, what was communication like with the users of their non-financial reports and what was the relationship between the level of invested funds into sustainable development and generated profit.

With regard to the above questions, our study placed great emphasis on large enterprises because they are the ones that have the obligation to disclose non-financial statements. Our sample included 30 hotel enterprises. The results are based on 14 complete replies (46.7% return rate). The structure of the sample is relevant because both large- (71.4%) and medium-sized enterprises (28.6%) are included, and they are especially interesting in the area of non-financial reporting (see Fig. 6). The results show that large enterprises disclose non-financial statements in 40% of cases, while medium-sized enterprises mainly (75%) do not disclose non-financial statements.

Company ownership is a characteristic which is often found to be relevant in studies. In our study, enterprises in domestic ownership prevailed (50%), followed by enterprises in foreign ownership (35.7%) and mixed ownership (14.3%) (see Fig. 7). These different types of ownership allow us to analyse more thoroughly the impact of ownership on particular aspects of non-financial reporting. The results show that enterprises in domestic ownership do not disclose non-financial statements (71%) as much as enterprises in foreign and mixed ownership which are more active in that respect (43%).

The relationship between sustainability strategy and business strategy is interesting and offers different possibilities. The ideal relationship exists when sustainability strategy represents the foundation for the business strategy of a company and a direction for all business decisions. The results of our study reveal a complementing relationship in our study so that sustainability strategy is part of the enterprise's business strategy (85.7%), and in two cases (14.3%), sustainability strategy in the enterprise does not exist at all (see Fig. 8).

Foreign experience is interesting when it comes to the relationship between business strategy and sustainability strategy. According to the results of a study conducted by

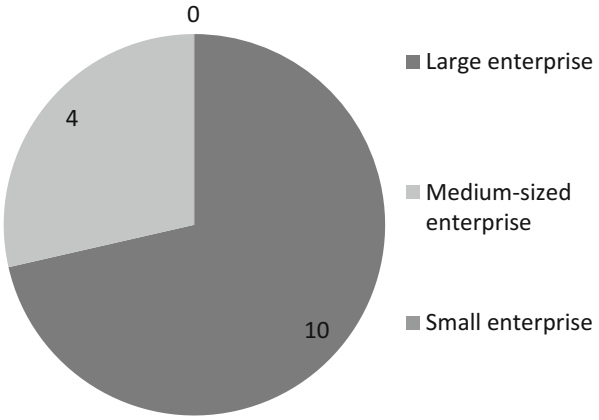

Fig. 6 Structure of sample according to enterprise size (Source: Authors' own study)

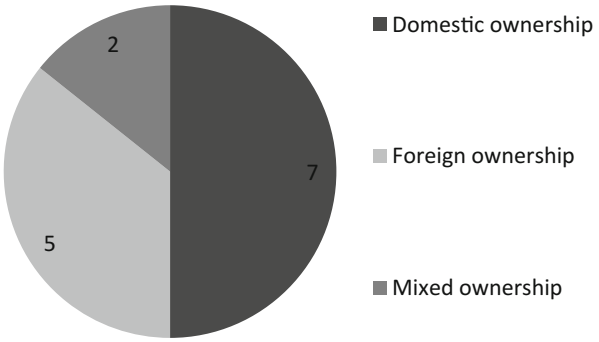

Fig. 7 Structure of sample according to ownership (Source: Authors' own study)

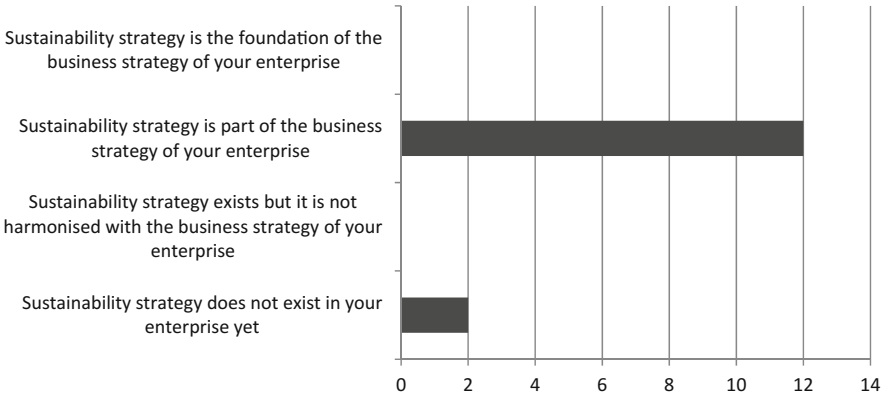

Fig. 8 Relationship between sustainability strategy and business strategy (Source: Authors' own study)

The Economist (2008) 29% of companies have a coherent sustainability strategy that covers the whole business and its supply chain. In 24% of companies sustainability strategy covers the business strategy but without the supply chain; sustainability strategy is developed in 23% of companies; 18% of companies have no plans for the development of sustainability strategy; and only 6% of respondents do not know/cannot answer that question. In other words, 53% of surveyed companies have a coherent sustainability policy as the foundation of business strategy and a source of direction for strategic and operative business activities (Kearney and Jones 2008).

Even though non-financial reporting has just become mandatory, some hotel enterprises in Croatia started publishing these reports in the period 2006–2010 (14.3%) so that some experience in this area exists (see Fig. 9). Still, most replies suggest that enterprises still do not publish sustainability reports (64.3%) and the EU Directive will certainly stimulate an increase in disclosure of such reports in the near future.

The experience of non-financial reporting so far has been voluntary and therefore modest while reporting guidelines have been selected freely. According to our results, the biggest number of enterprises uses their own reporting guidelines (61.5%) or they have not yet selected reporting guidelines (30.8%), while some enterprises use globally accepted guidelines such as GRI, ISO 14000 and UN guidelines. The EU directive has also announced the creation of some guidelines of non-financial reporting, which will certainly be helpful to companies in drawing up their reports (see Fig. 10).

A thorough analysis of results also discovered the relationship between the size of the enterprise and the selection and use of guidelines. We assumed that large enterprises more often chose some of the internationally recognised guidelines due to higher exposure to foreign guests and foreign investors. Our assumption was partly confirmed: among large hotel enterprises 30% use GRI guidelines, UN guidelines and ISO 14000 guidelines, while 40% of enterprises use their own

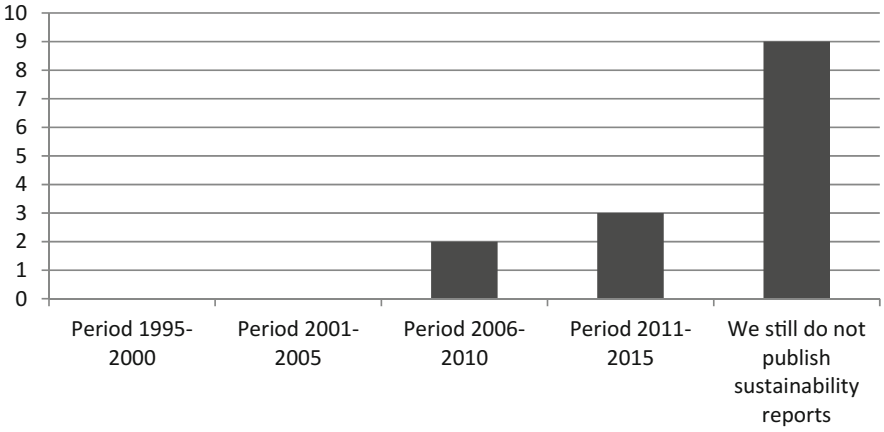

Fig. 9 Period of first disclosure of sustainability report (Source: Authors' own study)

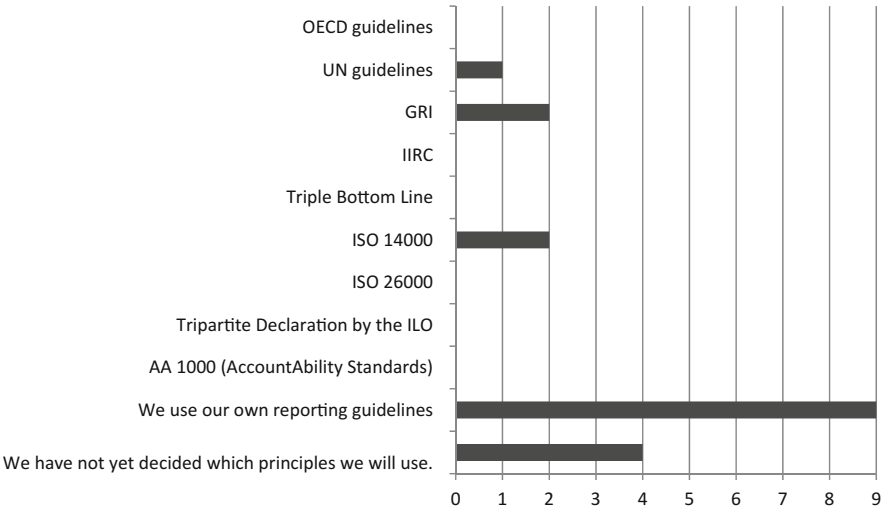

Fig. 10 Selection and use of sustainability reporting guidelines (Source: Authors' own study)

guidelines. Thirty per cent of large enterprises have not yet decided which guidelines they will use. Medium-sized enterprises mainly use their own guidelines, sometimes combined with ISO 14000 guidelines. The issue of selecting guidelines is very complex since there is a relatively wide array of guidelines available. In addition, the creation of guidelines by the EU Directive is also under way. The good news is that companies are free to choose guidelines as long as the reports include the most important issues in sustainability.

We also researched the relationship between the type of ownership of the enterprise and the selection of guidelines. It was discovered that enterprises in domestic ownership followed their own guidelines (57%) or they had not yet selected any guidelines (43%). It is clear that enterprises in foreign and mixed ownership more often follow international guidelines (57%) and more rarely their own guidelines (43%). These results can be an additional incentive in the selection of guidelines for those enterprises which still have not decided which principles of sustainability reporting they want to use.

The following important question deals with the motivation of enterprises to make an additional effort to disclose non-financial reports. What can stimulate companies to disclose non-financial statements? Reporting is the critical link between the big-picture ambitions on the one hand, and the data that show what action has been taken to achieve those ambitions and what progress is being made. Without reporting we cannot know what is being done or how close or how far we are from where the world needs to be (Bartels et al. 2016).

According to our results (see Fig. 11), all motives were assessed as very important, the average grade being 4.5. Within the narrow range from important to extremely important, the strongest motives were legal responsibility (grade 4.86), increase in the ability to create value in the future (grade 4.79), strategic advantage

Fig. 11 Reporting motives (Source: Authors' own study)

and long-term success (4.79), while altruistic motives have low importance. It is interesting to notice that enterprises have recognised the importance of good reputation in the public, improved customer relations and new business opportunities as highly significant motives of non-financial reporting (above average). The motives whose importance was ranked below average included capital market, supply chain, labour market and ethics. At this moment, they have not been recognised as motives of high priority. Innovativeness is not on the list of priority motives either, even if sustainability principles stimulate innovativeness in business processes and solutions in the areas of production and consumption.

As the next step, we analysed possible dependence between the size and type of ownership of the enterprise on the one hand, and dominant reporting motives on the other. The results show that in large enterprises the most important motives for non-financial reporting are legal responsibility, customer markets and strategic advantages while in medium-sized enterprises the greatest importance is also legal responsibility in addition to reputation and value creation in the future. For enterprises in domestic ownership, the most significant motive is increase in the ability to create value in the future. For hotel enterprises in foreign ownership, the most significant motives are customer markets and capital markets while enterprises in mixed ownership stress an equal importance of several motives: ethics, legal responsibility, and reputation, ability to create value in the future, strategic advantages and risk management strategy. It seems that enterprises in mixed ownership are the most motivated to recognise the importance of different motives for disclosure of non-financial statements.

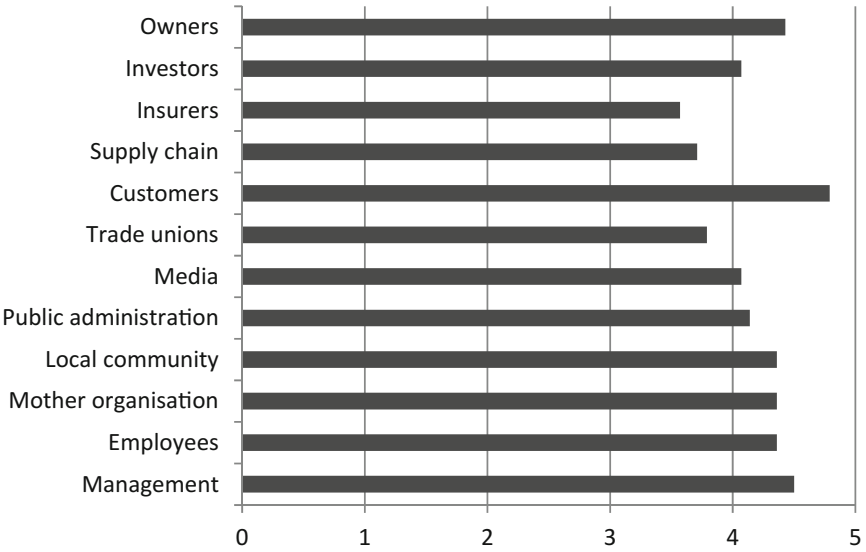

Fig. 12 Importance of stakeholders for sustainability reporting (Source: Authors' own study)

Organisations do not live in isolation, there is an incessant interaction with employees, customers, suppliers and other stakeholders. Non-financial reporting is aimed at stakeholders, different interest groups and their representatives since they, directly or indirectly, affect business decisions of the company. Non-financial reports help manage the relationship with stakeholders and create a positive impact on society. According to the results of other studies, investors, customers and employees have the biggest impact on business decisions of the company.

According to the results of our study (see Fig. 12), customers are the most important stakeholders (grade 4.79), followed by owners (4.43). These are followed by employees, mother organisation and local community with equal grades of importance (4.36). According to these results, investors' importance is below average, while the importance of trade unions, supply chain and insurers is at the end of the list of important stakeholders. In the future we can expect a significant shift in the importance of investors and suppliers because at this moment their role has not been recognised yet.

In-depth analysis also shows that customers/guests are the most important stakeholders for large hotel enterprises while for medium-sized hotel enterprises customers/guests and media are the most important stakeholders. The type of ownership shows that for hotel enterprises in domestic ownership management is the most important stakeholder, for enterprises in foreign ownership media are the most important stakeholders while for hotel enterprises in mixed ownership the most important stakeholders include customers/guests, media, public administration and local community. It is interesting to observe differences in priority given to certain stakeholders considering the size of the enterprise and type of ownership. Even more

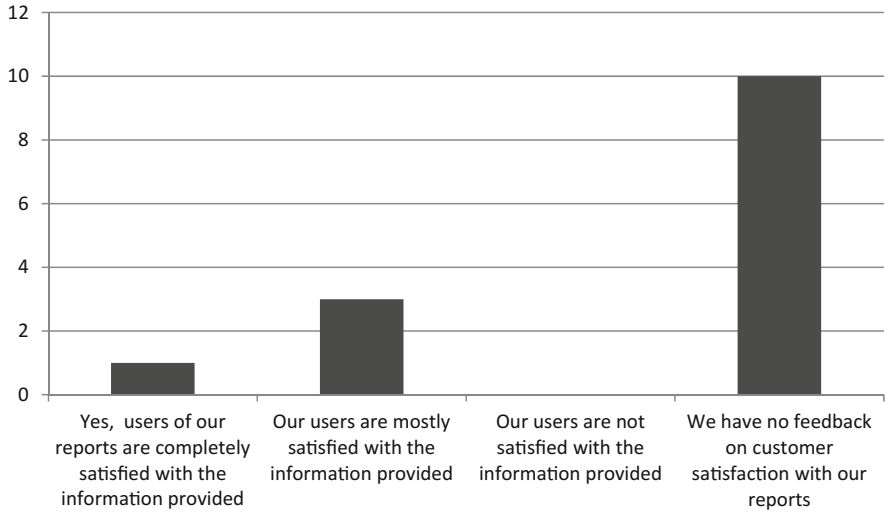

Fig. 13 User satisfaction with sustainability reporting (Source: Authors' own study)

interesting is the comparison of our results with the results of international studies, because in hotel enterprises in Croatia the importance of investors and employees has not at this point been recognised.

Non-financial reporting is designed for its users—stakeholders. One of the ways to measure the quality of non-financial reporting is the degree of user satisfaction. According to the results of our study (see Fig. 13), the largest number of surveyed enterprises (71.4%) have no feedback on the satisfaction of users regarding reporting while a total of 28% of respondents assess users as completely satisfied (7.2%) and mostly satisfied (21.4%) with reporting information.

The next step was to find out if there was a difference in user satisfaction with reporting between large and medium-sized enterprises. We assumed that large hotel enterprises cared more about user satisfaction than medium-sized enterprises but this assumption was not confirmed. As a matter of fact, 70% of large enterprises and 75% of medium-sized enterprises have no feedback on user satisfaction with their reporting. The results also show that from the point of view of ownership, there is no difference in significance regarding feedback from the users of non-financial reports. At this point, feedback on user satisfaction with non-financial reporting is clearly not in the focus of enterprises surveyed.

User satisfaction with reporting also depends on the method of communication. The ideal way to communicate with the users of reports would be through interactive reports which would allow users individualised selection of information and advanced search, adjusted to their interests and needs. The largest part of our respondents (42.8%) selected this method of communication with users as ideal while similar numbers of respondents (28.6%) think that written statements available on the web pages are the ideal form, or do not know/cannot answer (28.6%) what the ideal way to communicate with the users of reports would be (see Fig. 14).

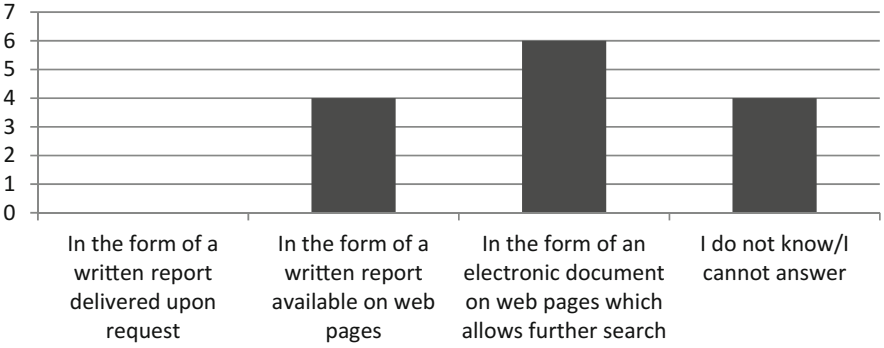

Fig. 14 Ideal method of communication with users of reports (Source: Authors' own study)

These results reflect, on the one hand, a high level of consciousness on the possibilities of interactive communication, but on the other, they reflect inertia and numerous uncertainties regarding the ideal way to communicate with the users of reports.

7 Conclusions and Perspectives

Sustainability is becoming an important business subject and a challenge which is already beginning to influence the business strategy of companies. The new business economy is increasingly characterised by ever clearer requirements for non-financial reporting, i.e. reporting on social, and ecological aspects of a company's business activity. Even though this type of reporting was voluntary for many years, it is now clear that non-financial reporting is becoming an obligation accompanied by requirements to create standards for non-financial reporting.

The study of quantitative and qualitative features of non-financial reporting of enterprises within the category 'hotels and restaurants' has covered two dimensions:

- Quantitative aspects
- Qualitative aspects

The results of the study are multidimensional. In terms of quantity, we can conclude that 20% of sampled hotel enterprises disclose some form of non-financial statements of varying size; from 1 to 110 pages. The most comprehensive report gives most space to the economic dimension, than social and only a little to the ecological dimension of business. The shortest statements show only social and ecological components. Economic indicators still prevail, followed by the indicators of social and ecological dimension. The shortest reports only disclose information on sponsorships and donations and standards of policy of quality and environment.

The qualitative aspects of the study which were based on the questionnaire show the following results:

- The first non-financial statements of hotel enterprises in Croatia were disclosed in the period 2006–2010 with growing tendency in the number of disclosed reports.
- The most commonly used reporting guidelines are own guidelines, international guidelines are used more rarely with a significant degree of uncertainty regarding the choice of guidelines to be used.
- Sustainability strategy is most often part of the business strategy of the company. The aim is to make it the foundation of the business strategy.
- Non-financial reporting among hotel enterprises is mostly motivated by legal responsibility, increase in the ability to create value in the future and strategic advantages and long-term success.
- Among numerous stakeholders, the most significant ones are customers, then owners and a group of stakeholders-employees, mother organisation and local community—with identical grades of importance.
- The largest number of surveyed companies have no feedback on user satisfaction with their reports.
- An electronic document on the web page which allows advanced search is the ideal way of communication with the users of report.
- In most hotel enterprises there are no experts/the relationship between investment in sustainability and level of profit is not monitored.
- Most often enterprises did not think about using mathematical methods to monitor and quantify the level of investment into sustainability and generated profit.

The results of quantitative and qualitative aspects of non-financial reporting in hotel enterprises in Croatia testify to existing experience and open new horizons and room for improvement. It was our intention in this study to contribute to the affirmation of sustainability and non-financial reporting and steer orientation away from the narrow focus on profit, offering a better understanding of broader social and ecological responsibility of a company's business activity. We also believe that the academic community has the obligation to provide support and help to the business community and companies in the process of introduction and application of sustainability reporting. Thus is certainly the final purpose of this chapter.

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Determinants of SME Innovativeness in Poland on the Example of the Market of Aesthetic Medicine Tourism

Eugenia Panfiluk

Abstract Innovativeness is a trait attributed to business entities. It reflects the ability of enterprises to undertake innovative activities. Innovativeness is a complex process. It depends on both external and internal factors. Owing to the small staffing and financial potential of the situation, there are SMEs. They have lower human and financial resources. Their innovation cannot be measured by the ratio of R&D expenditure. Therefore, it is important to consider what factors influence the innovation of this group of companies. The aim of the chapter is to examine the innovativeness determinant of SMEs and to determine the determinants influencing their innovativeness process. The study was conducted on the example of companies operating on the health tourism market, the subsector of aesthetic medicine tourism. The research was conducted on a representative group of Polish companies using a Delphi method and diagnostic survey method. As a result of the research, more than 80% of the companies are implementing innovation, dominating product innovations that are new to the region or to the organization. The innovativeness actions taken depend on the company. Factors related to systematic market analysis and market information gathering as well as human capital of the company (high medical staff and tendency to improve qualifications) were considered as the most important factors.

Keywords Innovativeness · Factors innovativeness entities · Tourism

1 Introduction

Innovativeness is a trait attributed to business entities. It reflects the ability of enterprises to undertake innovative activities. Innovativeness is a complex process. It depends on both external and internal factors. Owing to the small staffing and

E. Panfiluk (✉)
Bialystok University of Technology, Bialystok, Poland
e-mail: e.panfiluk@pb.edu.pl

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financial potential of the situation, there are SMEs. They have lower human and financial resources. In connection with the processes of globalization on the market of services new products are offered, which are innovative in themselves. They arise as a result of crossing or breaking down the institutional and sectoral boundaries. As research shows, this is an environment that is highly conducive to innovation. In such an environment, the providers of aesthetic medicine tourism services operate. Aesthetic medicine tourism is a newly emerging subsegment of health tourism. It was created as a result of changes brought about by the globalization of medical services, lifestyle changes to display a healthy lifestyle, care for figure and well-being related to the external appearance combined with a willingness to travel. The aesthetic medicine tourism sector offers an innovative tourist product. This product is a result of a combination of aesthetic medicine services that are developed on the basis of noninvasive or low-invasive methods to reduce physical appearance defects with tourist services, offering comprehensive travel services for traveling, leisure, sightseeing, and aesthetic medicine treatments (Panfiluk 2016). The fact of aesthetic medicine service providers opening to the tourist market is evidenced by the undertaken attempts of cooperation with accommodation facilities, in order to provide accommodation to their clients. On the other hand, there is a growing number of specialized travel agencies that offer their clients comprehensive travel packages combined with aesthetic medicine. Increasingly, aesthetic medicine services are also used by clients from outside the region and the foreigners (Panfiluk 2016, pp. 71–79; Szymańska et al. 2017). The aim of the chapter is to examine the innovation determinant of small- and medium-sized enterprises operating in the sector of aesthetic medicine tourism services and to determine the determinants influencing their innovativeness.

2 Literature Review

2.1 Innovativeness

Innovation is a feature attributed to economic entities, sectors, and regions (Pomykalski 2007).

It reflects their ability to take action to create new or improved products, services, work organization methods, promotion and market information, or other applications in the economy. Enterprise-level innovation is defined as a collective action that coordinates scientific knowledge and expertise of employees in order to promote, create products, services, and processes (Hult et al. 2004; Rubera and Kirca 2012; Story et al. 2015). This concept also points out that innovation is the ability of an enterprise, as it relates to the phenomenon of acquiring and implementing innovation (Hult et al. 2004). This ability refers both to the motivation and the ability to implement innovation and create new business solutions (Golgeci and Ponomarov 2013).

Innovation is a feature that may be discussed on the two-dimensional aspect; on the one hand, it is defined as a predisposition or an ability to innovate. On the other hand, it is considered as an enterprise's ability to implement them (Janasz and Kozioł 2007) and refers to the tendency of the company to introduce innovation to the market (Hult et al. 2004; Hurley and Hult 1998; Rubera and Kirca 2012; Tsai and Yang 2013). The measure of innovation in this meaning is the number of innovations introduced in the period from 1 to 3 years (OECD 2005).

The concept of innovation is derived from a functional understanding of the process involved in implementing innovation (Schumpeter 1960; McGowan 1996; Ciborowski 2004; Fiedor 1979; Świtalski 2005). The process of implementing innovation includes not only the final outcome of the implementation of a given solution, but also the preemptive actions such as design, implementation, and subsequent adaptation and use. In this sense, one can talk about the innovation process (Ciborowski 2004; Stawasz 1999). According to J. Schumpeter, it is possible to assume that the innovation process is a sequence of events, starting from the idea, through the embodiment in the form of innovation, and then dissemination (e.g., through imitation).

The analysis of enterprise innovativeness shows that manufacturing companies are more inclined to innovate than service companies (Hollenstein 2003), depending on the type of services offered. In the case of services, the production of which is closely linked to production and which are difficult to standardize, innovations are often aimed at reducing the information asymmetry perceived by the buyers. This group includes, among others, accommodation services. Services that are more susceptible to standardization are often focused on process innovation (Hall and Williams 2008).

2.2 *Factors Influencing the Innovation of an Organization*

Organizational innovation is a complex process. It depends on the internal factors of the organization and external factors. Internal factors determine the ability of an organization to take innovative actions. External factors create an environment for innovation. They can affect the organization and its innovativeness in a direct and indirect way. The management staff is responsible for the creation of the internal factors, and the responsibility for the creation of the external factors is borne by the administration entities of all levels.

Among the external factors are two groups of factors: macro-environment and regional factors. Macro-environment factors are general conditions related to conducting business, as well as the specific activities of the state and the link between the various entities called the National Innovation System (NSI) (Nelson and Rosenberg 1993; Lundvall 1992). Among them are five categories of factors that influence the innovativeness of an organization (Szymańska et al. 2017). Social and cultural—factors related to the degree of social development, openness to change (Sosnowska et al. 2003); the social factor is reflected, among others, in the dynamics

of development of the R&D sector and the development of education, including fairs, exhibitions, and scientific conferences, which are highly dependent on social initiatives and can stimulate enterprises to engage in innovative practices. Economic—factors resulting from the general economic situation of the country, including access to capital, level of economic development, tax system, degree of internationalization of the economy. Political—i.e., factors such as economic policy, including R&D spending, on all levels of education, including targeted training. Legal—factors defined by the legal system and legal norms conducive to innovation, including: changes in tax law, changes in commercial law, creation of intellectual property law, advisory authorities on economic regulations. Technological—level of technology development, now primarily IT, infrastructure and its quality, organization of technology development and diffusion.

As regards influence of the meso-environment factors on the organization's innovativeness, one can distinguish between the factors that derive from relations with stakeholders and the location (Sosnowska et al. 2003), such as: innovation expectations of buyers, level of cooperation with suppliers and buyers, innovation level of competitors, relations with competitors, relations with local authorities and representatives of local interest groups and characteristics of the natural and cultural environment, such as air quality, access to raw materials, traditions of hospitality, etc. Identification of the factors conducive to innovation within the company requires the determination of the resources that are necessary for this purpose (Eden et al. 2008). The most important ones include own expenditure on R&D work, enterprise's own expenditure on innovation, number and qualifications of staff, skills and research experience, production and marketing factors, effectiveness of information systems and elements of communication and motivation in an enterprise (Bogdanienko 2004).

A list of the factors influencing the organization's innovativeness should be supplemented by objective considerations of the size of the organization, while the small scale of the enterprise becomes a factor limiting innovation activity and is related to the lack of adequate resources, organizational and legal form, including affiliation to a specific sector of ownership, business model, especially in relation to franchise relationships or other durable cooperative relationships and industry affiliation (Szymańska et al. 2017).

Both systems involve a category of knowledge and information that reaches the organization and is processed within the organization. Due to the division of knowledge, it is possible to isolate open knowledge from documents, manuals, and databases, and hidden knowledge that is shared by individual employees and the organization itself. Codified knowledge is created and made available by different groups of actors, and its importance increases if it is connected with hidden knowledge, i.e., people who understand it and can apply it (Hall and Williams 2008). These conclusions confirm numerous studies on the spread of (and thus use) the knowledge of innovative medicines among medical professionals. A study conducted on a group of 125 physicians (85% of physicians practicing in a given area) indicates that this is done in phases and spread over time. Of course, the knowledge of innovative solutions is spreading the fastest in the case of existence of

professional ties, such as formal or informal ones, but in the end, innovation also reaches the ones remaining in isolation. Interestingly, for the physicians who had strong connections, the effectiveness of mutual contacts was revealed faster, but lasted for a shorter time, and for the "isolated" doctors it appeared later, but was of a longer lasting character (Coleman et al. 1957). Furthermore, it has been proven that knowledge is more effective in the case of cooperating individuals and groups and, on the other hand, sporadic relationships between groups provide access to a variety of information different from what is achievable within the framework of closely cooperating units.

This is confirmed both by research on creative people and on innovative companies. For example, a study of the structure of the network of a group of Broadway musical artists in the years 1945–1989 indicates that the networks of collaboration between them have had a significant impact on the creativity and artistic and financial success of the projects (Uzzi and Spiro 2005). These conclusions are supported by a study of the patent activity of over a thousand companies operating in 11 strategic alliances focusing on high technology industries in the United States. Networked companies showed greater patent activity. The networks had strong relationships with companies with a similar amount of knowledge, as well as relationships with distant enterprises that have access to new knowledge (Schilling and Phelps 2007).

2.3 Innovation of Aesthetic Medicine Tourism

The literature review shows that a favorable environment for the creation of innovation are the situations of crossing the institutional boundaries and overthrowing them (Garcia and Altes 2005), which is most likely to occur when a new type of service arises as a result of merging two types of services from different sectors. Research conducted in the field of health tourism development trends shows that within the health tourism market a new sub-sector is developing, aesthetic medicine tourism (Panfiluk 2016; Szymańska et al. 2017). Thus, in this case the services of aesthetic medicine tourism are an innovative product formed by the merger of aesthetic medicine services from the medical and tourism sector. The development of medicine is one of the driving forces for the tourism industry, and medical innovation can be an indicator for entrepreneurs in the tourism market (Hjalager 2009).

It should be noted that the determinants of the differentiating factors of aesthetic medicine tourism services are theme and destination and kind of medical services that a tourist uses. The goal of aesthetic medicine tourism is to remove appearance defects; the dominant motive is to improve the aesthetic appearance, which should result in improved mental health, well-being, including increased self-esteem. Aesthetic medicine tourism uses medical services, whose aim is not to prevent but repair "nature" or to delay the natural processes of aging. This trip is combined with sightseeing, recreation, and entertainment at the place of stay (Panfiluk 2016). Aesthetic medicine services used by tourists include preventive, therapeutic,

corrective, rehabilitative, or restorative treatments of physical appearance, using methods specific to the "official"/"restorative" medicinal domain (medicines, procedures, and treatments), diets, rehabilitation, and physical therapy. The basic remedies used in aesthetic medicine are medical, noninvasive, or invasive medical procedures. Services are performed in outpatient clinics of aesthetic medicine, performed by doctors. They are included in noninvasive or minimally invasive services. The basic treatments are prevention and regeneration (Panfiluk 2016).

3 Methodology

The research was carried out within the project "Innovative systems of health tourism services." By using the Delphi method, it was possible to identify a directory of entrepreneurs who can provide health tourism services within five categories of tourism: spa, spa and wellness, aesthetic medicine, medical and more. Entities for the research were separated according to the Polish Classification of Economic Activities (PKD). Subsequently, based on GUS data, the number of subjects classified in the survey for health tourism services was calculated. The representative sample size was calculated using a test sample calculator. For the calculation of its size, the following parameters were used: confidence level: 0.95, population size: 241,393.00, expected fraction size: 0.5, maximum error: 0.05. As a result of the calculation, the minimum population size was set at 384 entities. Collection of research material was conducted using the telephone interview tool. The research was conducted from November 2015 to May 30, 2016. As a result of the conducted research data was collected from 461 entities. The results of the study were verified based on the responses relating to the range of the provided health tourism services. Further studies have been conducted for those who have shown at least 1% of health tourism. Eventually, 386 respondents were identified as health tourism service providers. Among the providers of health tourism services, aesthetic medicine tourism service providers have been distinguished. The scheme of the research procedure is presented in Fig. 1.

The level of innovativeness of aesthetic tourism operators was determined in two stages. In the first stage, a group of entities was set up that implemented innovations from 2013 to 2015. The basis for the verification was the criterion for the implementation of at least one innovation in a 3-year period, covering the years 2013–2015, as demonstrated by 67 respondents (Fig. 2).

Enterprise innovation was calculated as the number of innovations introduced in the period from 1 to 3 years, and the innovation in the aesthetic medicine tourism subsector has been calculated as the percentage of entities that have implemented innovation. Taking into account the scope of implemented innovation, which reflects the level of novelty of the implemented innovation, from the world to the novelty for the organization and a number of entities, the innovation of enterprises was discussion on terms of quality, from very high to marginal. Very high level of innovation defines innovative implementers with a global reach, high on a national scale, low

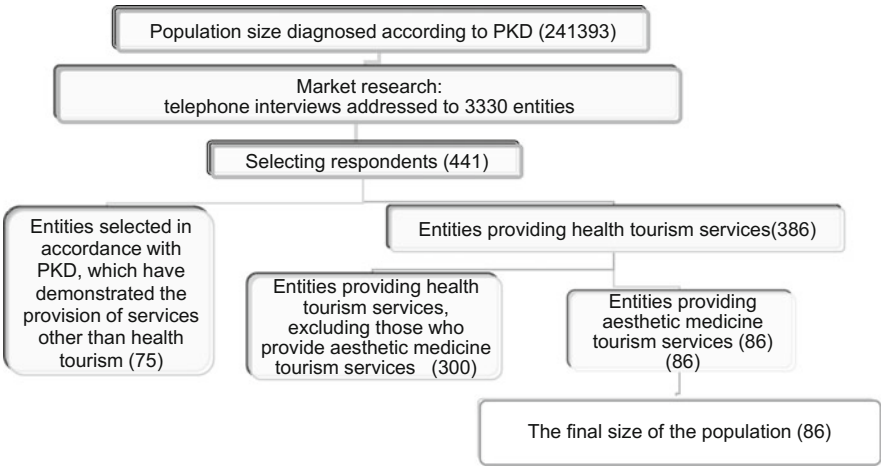

Fig. 1 Questionnaire survey procedure. Source: Own

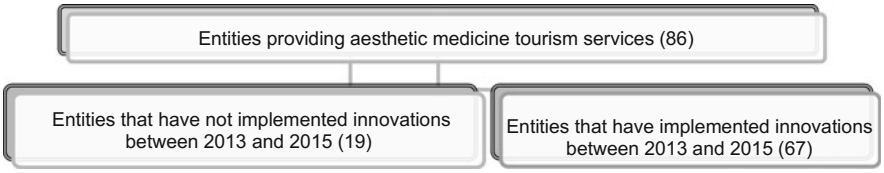

Fig. 2 Procedure for selecting innovative providers of aesthetic medicine tourism services. Source: Own study based on research results

innovation defines innovative implementers with regional reach and marginal innovation concerns innovative implementers introducing innovations new to the organization. Factors influencing the innovation of aesthetic tourism service providers have been grouped into external factors: macro-environment and meso-environment, as well as internal factors dependent on the organization. The grouping diagram is shown in Table 1.

Statistical analysis methods were used to interpret the results of the research on innovation factors: weighted average distribution structure, structure of indicative values, normalized size distribution structure, an average distribution structure that determines the measure of the trend of the central distribution and the standard deviation, defining the measure of the average deviation of the measurement results from the mean. Normalization of variables was performed using the unitarization technique, according to formula (1)

Table 1 Scheme of grouping the factors influencing the innovativeness of companies providing aesthetic medicine tourism services

Kind of factor	Factors included in the survey	Max. number of points
Macro-environment		
Formal education and research system	Higher education institutions Research institutes	10
Legal system	Legislation protecting consumers Certification systems Control system	10
Public sector support for investors	Government administration Public and private sector cooperation Public sector support for investors	15
Access to knowledge	Consulting companies Training companies Specialized Internet resources	15
Microenvironment		
Relations with competitors	Willingness to compete	5
Industry support	Organizations of professionals Industry organizations in the field of medicine Industry organizations in the field of tourism Industry media	20
Local environment	Openness to tourists Local medical traditions Willingness to cooperate between different entities Access to local resource information Level of education of local residents	25
Openness to international relations	Openness to external investors International relations Openness to international cooperation	10
Organization		
Systematic collection of market information	Systematic collection of market information Systematic cooperation with knowledge sector organizations Systematic collection of information from patients	15
Own innovation department	Own innovation department	5
Employees	Unit employees Owner of the unit Good brand of medical staff Culture of improving staff qualifications	5

Source: Szymańska et al. (2017)

Table 2 Significance of the factor in the innovation process of aesthetic medicine tourism service providers

Class span	Class number	Importance for innovation processes
0.00–0.19	I	Negligible
0.20–0.39	II	Low
0.40–0.59	III	Average
0.60–0.79	IV	High
0.80–1.00	V	Very high

Source: Own

$$z_{ij} = \frac{x_{ij} - x_{j\min}}{x_{j\max} - x_{j\min}} \quad (1)$$

where:

- z_{ij}—normalized (unitary) value of the jth variable for the ith characteristic
- $x_{j\min}$—minimum value of interaction factor of the ith characteristic
- $x_{j\max}$—maximum value of interaction of the factor of the ith characteristic

The normalized results were hierarchically ordered and grouped into five equally distanced degrees of significance, and class values were the dominants (Table 2).

4 Findings

As a result of the research it was found that the innovation of the subsector of aesthetics tourism service providers amounts to 77.9%, which means that among the examined 86 entities, 67 entities declared implementing innovation regardless of the number and range of innovations. Of the total of 259 implemented innovations, on average one organization accounts for 3.87 implemented innovations (Table 3). Innovation analysis based on the scope of innovation indicates the dominance of organizations implementing innovations that are novel for organizations (40.30%) and the region (22.39%), and their innovativeness, due to the average number of innovations being implemented, is significantly lower than the overall average. It can therefore be said that aesthetics tourism companies are characterized by marginal and low innovativeness, competing only on the local and regional market. The very high innovativeness of this subsector is decided by only 8.96% of entities, their innovative activity amount to 9.67 innovations per one entity and more than double the other entities (Table 3).

As a result of the research, there was no relationship between the innovativeness of service enterprises and the size of enterprises. This conclusion is empowered by the analysis of the number of full-time employees (contracts of employment) with the number of innovations being implemented and their coverage (Table 4). Detailed interviews conducted in micro-enterprises with the highest innovativeness index

Table 3 Innovativeness of aesthetic medicine tourism companies according to the extent of innovation

Innovativeness according to the range of innovation				Innovations					
		Company		Total number of implemented innovations	Including the number of innovations with coverage				Innovativeness based on the average number of innovations being implemented
Innovativeness	Range of activity	Number	Structure (%)		Global	National	Regional	Organization	
a		*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i(d/b)*
Very high	Global	6	8.96	58	46	5	2	5	9.67
High	National	19	28.36	80	0	66	11	3	4.21
Low	Regional	15	22.39	45	0	0	33	12	3.00
Marginal	Organization	27	40.30	76	0	0	0	76	2.81

Source: Own study based on research, N = 67

Table 4 Innovativeness of aesthetic medicine tourism enterprises by enterprise size

Innovativeness by enterprise size			Innovations					
				Including the number of innovations with coverage				
	Company							
Size of business	Number	Structure (%)	Number of innovations implemented	Global	National	Regional	Organization	Innovativeness by average number of deployments innovations
a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i(d/b)*
Large	1	1.49	2	0	2	0	0	2.0
Medium	3	4.48	21	0	9	8	4	7.0
Small	11	16.42	40	0	12	8	20	3.64
Micro	52	77.61	196	46	48	30	72	3.77

Source: Own study based on research, N = 67

indicate that these companies mainly employ staff for contract work. The high rate of innovativeness of these entities is determined primarily by the mobility of medical personnel (Panfiluk 2016).

Table 5 presents data characterizing the relevance of the segregated factors for individual groups of factors. For each factor, the percentage of respondents who rated the factor as insignificant (0 points), standard deviation, arithmetic mean, and % value of the indications were given. The standard deviation indicates the level of variation in the assessment of the relevance of the factor. Percentage of indications is the quotient of the arithmetic mean and the maximum value of the indications. It allows the comparison of the significance of individual groups of factors in the innovation process.

Analysis of the percentages of the indication of the lack of impact of a given group of factors allows to confirm the occurrence of the low activity of the examined group of companies in the scope of activities related to the innovation process. The formulation of such a statement is justified by a high percentage of enterprises that have not declared the impact of external and internal innovation factors. In addition, this conclusion is confirmed by the low percentage of entities that can be said to be knowingly competing in the global market as a result of global innovation. This data may also be indicative of a mismatch of pro-innovation activities to the needs of the group being analyzed, because a more detailed analysis reveals a significant degree of variation in responses indicating the lack of influence of a given group of factors.

A limited amount of influence of external factors on innovativeness has been noted with regard to public sector support for investors, i.e., macro-environment related factors and openness to international relations and local environment of the meso-environment factors. In all of these cases, over 90% of the surveyed respondents providing aesthetic medicine tourism services indicated the lack of influence of the given factor. This conclusion is confirmed by the analysis of the normalized value distribution structure. These variables are classified according to the importance of innovation processes in the lowest, first class. In addition, the impact assessment of a group of factors related to running their own innovation department is particularly unfavorable. This may be due to the fact that most of the surveyed entities pointing to the provision of aesthetic medicine tourism services are microenterprises. Companies with a maximum of nine employees are predominant in the surveyed group and it is too costly for the company to create an additional department.

The analysis of the formal and sectoral impact of the system of the dissemination of knowledge of macro- and meso-environment and the factors of collaboration with organizations within the knowledge sector at the organizational level suggests a barrier to the interaction of the former with the surveyed companies. Collaborating entities give these factors little meaning as evidenced by the low arithmetic mean and a fairly consistent response, as evidenced by low standard deviation. On the other hand, those who point to the positive influence of the industry experts are unequivocal in the assessment of their significance, as evidenced by the low value of the standard deviation.

Table 5 Values of factors influencing the innovativeness of companies providing aesthetic medicine tourism services

Category of factor	Factors included in the survey	Max. value of indications	% of indications of no impact	Standard deviation	Arithmetic mean of the indications	% of indications, up to the max value	Normalized value	Importance for innovation processes
Macro-environment								
Formal education and research system (1)	Universities (1.1) Research institutes (1.2)	10	83.5	1.35	1.14	11.4	0.32	Low
Legal system (2)	Certification systems (2.1) Efficient control system (2.2) Legislation protecting consumers (2.3)	15	86	1.21	1.36	9	0.25	Low
Public sector support for investors (3)	Government administration (3.1) Public and private sector cooperation (3.2) Public sector support for investors (3.3)	15	93	0.85	0.68	5	0.12	Minor
Access to knowledge (4)	Consulting companies (4.1) Training companies (4.2) Specialized Internet resources (4.3)	15	81	1.46	2.14	14	0.40	Average
Meso-environment								
Relations with competitors (5)	Willingness to compete (5)	5	62	2.10	1.5	30	0.90	Very high
Industry support (6)	Professional organizations (6.1) Industry organizations in	20	83	1.32	2.46	12	0.34	Low

(continued)

Table 5 (continued)

Category of factor	Factors included in the survey	Max. value of indications	% of indications of no impact	Standard deviation	Arithmetic mean of the indications	% of indications, up to the max value	Normalized value	Importance for innovation processes
	the field of medicine (6.2) Industry organizations in the field of tourism (6.3) Industry media (6.4)							
Local environment (7)	Open to tourists (7.1) Local medical traditions (7.2) Willingness to cooperate between various entities (7.3) Access to local resources information (7.4) Level of education of local residents (7.5)	25	91.4	0.94	1.34	5	0.12	Minor
Openness to international relations (8)	Openness to external investors (8.1) International relations (8.2) Openness to international cooperation (8.3)	15	90	1.04	1.05	7	0.19	Minor
Organization								
Systematic market analysis (9)	Systematic collection of market information (9.1) Systematic cooperation with suppliers and contractors (9.2) Systematic collection of information from patients (9.3)	15	78	1.66	4.99	33.26	1.00	Very high

Own innovation department (10)	Own innovation department (10)	5	97	0.61	0.07	1	0.00	Minor
Human capital of the unit (11)	Culture of raising qualifications (11.1) Owners of the unit (11.2) Unit employees (11.3) Good brand of medical personnel (11.4)	20	81.6	1.88	5.01	25	0.74	High
Cooperation with knowledge sector organizations (12)	Systematic cooperation with knowledge sector organizations (12)	5	87	1.34	0.46	9	0.25	Minor

Source: Own study based on research, $N = 67$

The analysis of the significance of the impact of formal and sectoral knowledge, from the broadly understood macro- and meso-environment points to the lower importance of formal knowledge than industry knowledge. This is evidenced by the high arithmetic mean and the high compliance in the assessment shown in the standard deviation. The arithmetic mean and the distribution of normalized values also indicated a higher importance of the industry knowledge gained from the macro-environment than knowledge originating in the meso-environment. Access to specialized Internet resources (item 4.3) is of major importance and only subsequently to consulting companies (4.2) (Fig. 3). In the category of industry knowledge originating in the meso-environment, the knowledge disseminated by the medical organizations (item 6.2) and the professional media (item 6.4) is considered important. These dependencies allow us to formulate a conclusion regarding the presence of innovation processes, resulting in the implementation of innovations that are novel in the region and for the organization.

The company's internal factors determine the company's innovativeness in the category of market analysis. This is evidenced by the highest normalized value of this variable as well as fairly high correspondence of the answers confirmed by the standard deviation. In this category, the systematic collection of market information is of dominating importance (item. 9.1)—Fig. 3. In the innovation processes, the company uses human capital. The most important for the innovation processes of companies is the good brand of medical personnel (item 11.4) and the culture of raising qualifications (item 11.1) (Fig. 3).

High importance in the processes of innovation, attributed to the relations with competitors from the regional environment enables the conclusion that the main impetus for the innovativeness of companies is the competition in the regional market and their tendency to compete. This is indicated by the highest percentage of respondents (38% of respondents), the highest class value in the normalized breakdown structure. It should be noted, however, that the respondents showed considerable differences in the assessment of the significance of this factor in the innovation processes, as evidenced by the highest value of standard deviation. Based on this data, it can be concluded that the innovation of the researched subsector is more a result of the need to maintain the company's activities than the well-thought-out activities related to the innovation process.

5 Conclusions

Examining the ability of entities to take action to create new or improved products, services, methods of work organization, promotion and market information, or other uses in the economy has shown that the vast majority of providers of aesthetic medicine tourism services have this capability. According to the Oslo OECD (2005), which recommends to assume the number of innovations introduced in the period from 1 to 3 years as a measure of innovativeness, it has been shown that the vast majority of entities are innovative. The average number of innovations per one

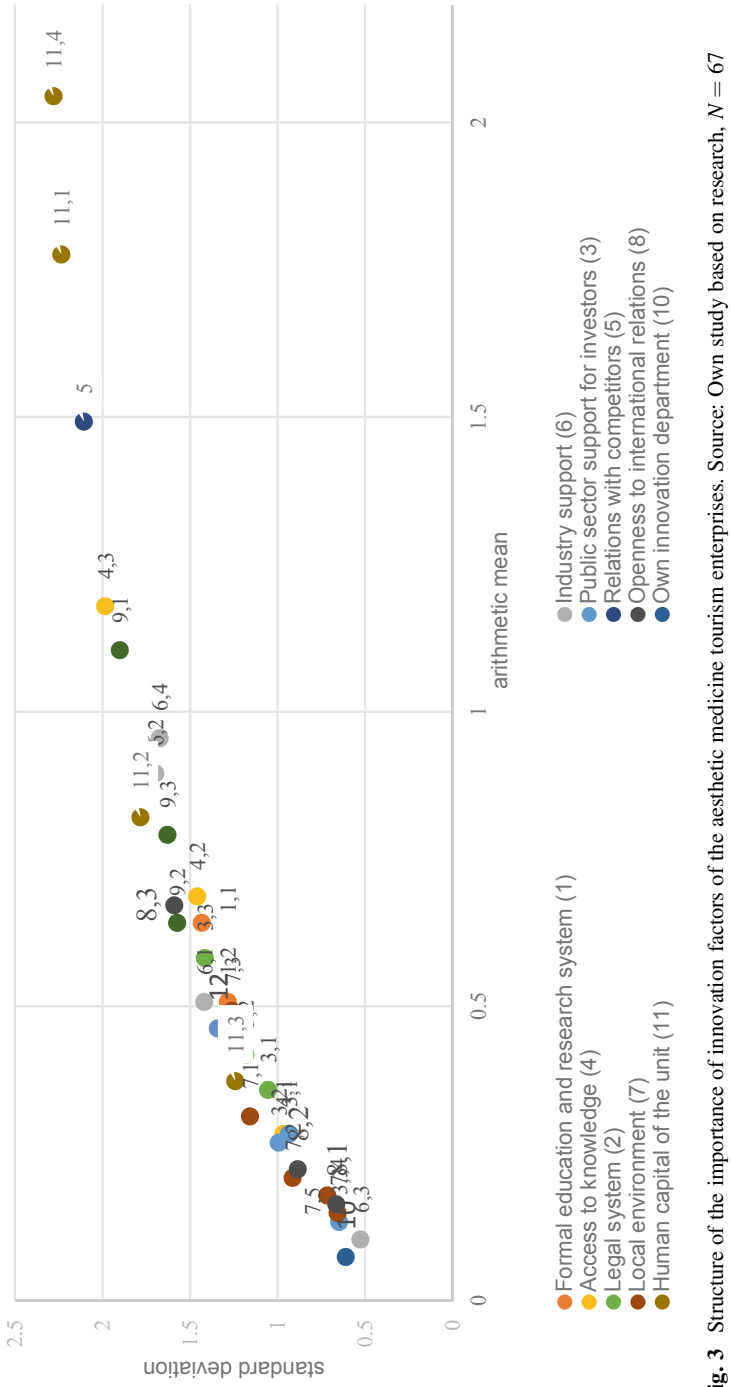

Fig. 3 Structure of the importance of innovation factors of the aesthetic medicine tourism enterprises. Source: Own study based on research, $N = 67$

examined subject amounts to 3.87. As a result of the research it was found that this measure is not a measure allowing for the full presentation of the phenomenon under investigation. Analysis of the innovation process according to the scope of implemented innovations indicates that for the vast majority of the respondents the innovation process is of marginal and low importance, as evidenced by the implementation of innovations that are new to the organization and the region. Their low activity indicates that the actions undertaken are not related to the thoughtful process of innovation. This is confirmed by the analysis of the innovation factors. On the one hand, there is a barrier between formal and sectoral knowledge and the company, on the other hand, high importance is attributed to relations with competitors from the regional environment, which indicates that the main impetus for the innovation of companies is the competition in the regional market and their tendency to compete. Undertaking innovative activities that are well-thought-out of crucial importance for the service sector is shown by less than 10% of service providers surveyed, indicating the extent to which innovation is being implemented and the number of innovations being implemented. The analysis of factors influencing the undertaken innovative actions shows that internal factors, especially those related to acquiring knowledge from the environment and human capital, include the good brand of medical personnel and their skills in improving their skills.

These characteristics determine the timely cooperation with medical staff on the basis of a contract of employment. Also, a significant impact was observed on the innovation processes of the macro-sector knowledge industry, including specialized Internet resources and consulting firms.

A limited amount of influence of external factors on innovativeness has been noted with regard to public sector support for investors, i.e., macro-environment factors and openness to international relations, and the local environment from the group of meso-environment factors.

In addition, the impact assessment of the group of factors related to running a dedicated innovation department is particularly unfavorable. This may be due to the fact that most of the surveyed entities indicating the provision of aesthetic medicine tourism services are micro and small businesses. Companies with a maximum of nine employees are predominant in the surveyed group and it is too costly for the company to isolate an additional department.

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Challenges and Problems of Sustainable Development of Tourism in Protected Areas: Example of National Parks in Poland

Halina Kiryluk

Abstract One of the most important global trends in nature conservation today is the desire to reconcile the interests of nature conservation with the various spheres of economic and social activity of man. Society is moving away from passive and conservative nature conservation to seeking active forms of protection that will ensure the integration of the function of ecological protected areas and their socio-economic development. Tourism is attributed a particular role in the process. The chapter presents contemporary challenges and problems of sustainable development of tourism in protected areas, both in theoretical and practical terms (on the example of national parks in Poland). In particular, the chapter analyses the theoretical aspects of the nature and principles of sustainable tourism development in protected areas, shows the system of protected areas in Poland, including the tourist potential of national parks to create competitive tourism products on the European market, identifies the main barriers to sustainable tourism development in national parks. The work uses the case study and the desk research method.

Keywords Sustainable tourism development · Protected areas · National park · Poland

1 Introduction

The natural environment is a value that is more and more appreciated in modern society, which results, among other things, in the growing pressure exerted by tourism on protected areas, including national parks. These areas have enormous natural potential to create attractive and competitive eco-friendly tourist products. The main element of this competitiveness is high biodiversity at the landscape, ecosystem, and species level. Poland is one of the European countries with the

H. Kiryluk (✉)
Faculty of Engineering Management, Department of Marketing and Tourism, Bialystok University of Technology, Bialystok, Poland
e-mail: h.kiryluk@pb.edu.pl

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highest biodiversity index (Central Statistical Office 2017). The development of tourism in protected areas, with poor organization and management, can pose a significant threat to their natural capital. Tourism competes with other ecological, social, and economic functions in accessing scarce resources, resulting in specific problems and conflicts. Therefore, the development of tourism in protected areas requires changing the current model of tourism in favor of sustainable tourism, which will allow to integrate the various functions of protected areas, make tourism an active form of nature conservation, and an important instrument for local development. Meanwhile, the level of knowledge and awareness (among policy makers, public and private sector stakeholders, and the general public) concerning sustainable tourism and its development is still very low.

The main objective of the chapter is to present contemporary challenges and problems of sustainable development of tourism in protected areas, both in theoretical and practical terms (on the example of national parks in Poland). In particular, the chapter analyses the theoretical aspects of the nature and principles of sustainable tourism development in protected areas, shows the system of protected areas in Poland, including the tourist potential of national parks to create competitive tourism products on the European market, identifies the main barriers to sustainable tourism development in national parks. Identifying the main challenges, problems, and barriers to sustainable tourism development in protected areas will help to identify the directions of desired changes in tourism and its social, environmental, and economic environment.

The main research method used in the study is a case study describing the system of protected areas in Poland and tourism development in national parks. The Bialowieza National Park, which is an International UNESCO Biosphere Reserve, will serve as a special example. A complementary method is the analysis of existing data (desk research), including a review of the latest scientific literature on the sustainable development of tourism and protected areas, statistical data on tourism in national parks in Poland, as well as documents and reports on the development of tourism in protected areas.

2 Sustainable Tourism Development: The Theoretical Aspects

The concept of sustainable tourism is derived from the more general concept of sustainable development, which is one of the contemporary challenges of global development. Its essence is based on the equal treatment of three areas: economic, social, and ecological. The concept of sustainable tourism is variously defined in world literature. Generally, sustainable tourism can be defined as "*tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities*" (UNEP and WTO 2005, p. 12).

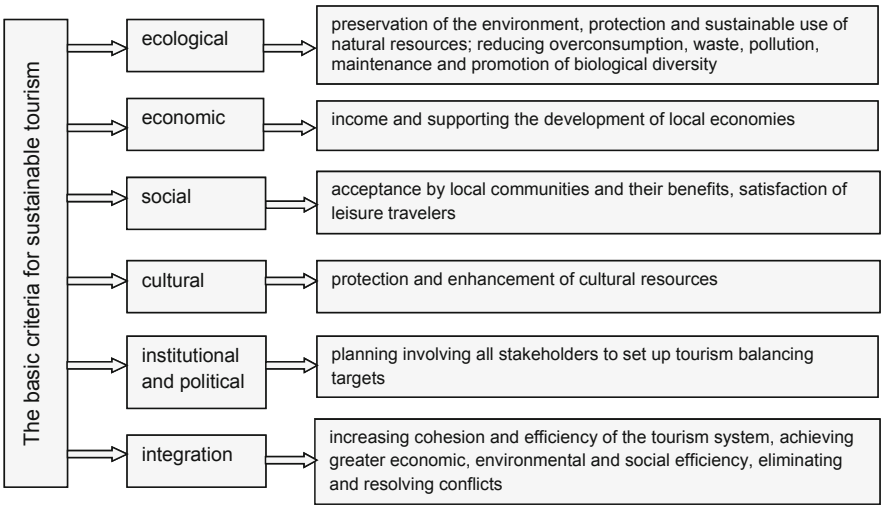

Fig. 1 The basic criteria for sustainable tourism. Source: Author's own study based on Dobrzański et al. (2014)

Research on sustainable tourism has been going on for many years (Eagles et al. 2002; Wiesmann et al. 2005; Plummer and Fennel 2009; Panfiluk 2011; Candela and Figini 2012; Jenkins and Schröder 2013; Mika 2015; McCool and Bosak 2016). Nevertheless, this concept is often unclear, which creates many research problems. These problems concern, among others, the ambiguity of the interpretation of this category, which affects the adopted research perspective; difficulties with the operational development of its theoretical assumptions in the research process (Mika 2015); problems of measurement and assessment of the degree of "sustainability" of phenomena and processes in tourism.

Without going into the discrepancy regarding the definition of the semantic scope of the concept of sustainable tourism, it should be noted that the concept of sustainable tourism should not be identified with a specific form of tourist traffic, but should be related to the organization and functioning of the tourism economy as a whole in a given area. In accordance with the overriding principle of sustainable development, sustainable tourism includes activities that are ecologically acceptable, economically justified, and socially desirable (both from the point of view of tourists, tourism organizers, and local communities). However, sustainable tourism should be perceived not as a narrow concept based on the search for balance in these areas, but an overarching paradigm that assumes many different paths of development, adapted to the conditions of a given place and the values of variables in time and space (Dobrzański et al. 2014). Following toward sustainable tourism development requires the fulfillment of certain criteria and rules. The basic criteria for sustainable tourism are presented in Fig. 1.

"The challenge of sustainable tourism development is to make use of tourism's positive impacts, enhancing and channeling the benefits into the right directions,

and to avoid or mitigate the negative impacts as far as possible" (ETE 2009, p. 8). The most important success factors in defining pathways for nature conservation and protection are linking development and conservation, involving multiple stakeholders and applying participatory approaches (Wiesmann et al. 2005).

In recent years, there have been a number of guidelines regarding sustainable tourism development (objectives, principles, and criteria), regarding both the general and protected areas, developed by various international organizations, as well as being the result of many important international conferences and agreements. Among them, it is worth to mention in particular:

- Charter for Sustainable Tourism (UNESCO et al. 1995; GSC et al. 2015)
- The Berlin Declaration (1997)
- Global Code of Ethics for Tourism (WTO 1999)
- Guidelines on sustainable tourism development (CBD 2004; CBD 2007)
- Agenda for a sustainable and competitive European tourism communication (Commission of the European Communities 2007)
- New political framework for the European tourism sector (Commission of the European Communities 2010)
- An EU Biodiversity Strategy to 2020 (European Commission 2011)

The signing of the Berlin Declaration at the International Environment Ministers' Conference on Biological Diversity and Sustainable Tourism was important for the sustainable development of tourism in protected areas in Europe. It contains general and detailed rules, the implementation of which will lead to sustainable tourism. The declaration was also signed by Poland, thus committing itself to implementing the priorities of sustainable tourism in the national economic policy of the country.

Recognizing the growing challenges of implementing sustainable tourism and increasing its contribution to sustainable development, the General Assembly of the United Nations has announced the year 2017 as "International Year of Sustainable Tourism Development." This initiative has greatly contributed to the revival of global discussion and partnership for sustainable development (General Assembly of the United Nations 2016).

3 The System of Protected Areas in Poland

The contemporary dynamics of tourism development and development trends cause the increase of tourists' interest in the natural environment and of pressure on the most valuable areas covered by legal protection. In Poland, the basic legal act, under which valuable natural areas are covered by legal protection is the Act of 16 April, 2004 on The Protection of Nature (Act 2004). It defines the goals, principles, and forms of protection of living and non-living nature and landscape. There are ten forms of nature protection in Poland (Table 1): national parks, nature reserves, landscape parks, protected landscape areas, Nature 2000 areas, nature monuments,

Table 1 Forms of nature protection in Poland in 2016[a]

Specification	Number of objects	Area			
		In thousand hectares	In percent	In % of total area of the country	Per capita in m^2
All protected areas total		10,167.0	100.0	32.5	2645
National parks	23	315.1	3.1	1.0	82
Nature reserves	1493	168.3	1.7	0.5	44
Landscape parks	122	2518.3	24.8	8.1	655
Protected landscape areas	385	6997.5	68.8	22.4	1821
Documentation sites	167	1.0	0.0	0.0	0
Ecological areas	7205	53.0	0.5	0.2	14
Landscape-nature complexes	343	113.8	1.1	0.4	30

[a]Excluding areas within the Natura 2000 network
Source: Central Statistical Office (2017)

documentation sites, ecological areas, landscape-nature complexes, plant, animal and fungi species protection. From the point of view of tourism development, national parks and landscape parks are of particular importance. All national parks are included in the European Ecological Network Natura 2000.

In Poland national park covers an area of outstanding value for the environmental, scientific, social, cultural, and educational, with an area of not less than 1000 hectares, which is the protection of the whole nature and qualities of landscape. The national park created to preserve biodiversity, resources, objects, and elements of inanimate nature and landscape values, restoring proper state of natural resources and components and reconstruct distorted nature habitats, plants, habitats of animals and habitats of fungi (The Protection of Nature Act 2004). National parks are supervised by a minister responsible for environmental issues.

All the Polish national parks comply with International Union for the Conservation of Nature (IUCN) requirements: 15 parks were assigned to the second category, two parks (Ojcowski and Wigierski) were awarded fifth class, and 6 newest parks (Biebrzański, Bory Tucholskie, Gór Stołowych, Narwiański, Magurski and Ujście Warty) have not been classified by IUCN—WCU yet and. National parks in Poland have a high international status (Central Statistical Office 2017):

- Nine national parks UNESCO has acknowledged as biosphere reserves: Babiogórski, Białowieski, Bieszczadzki, Bory Tucholskie, Kampinoski, Karkonoski, Poleski, Słowiński, Tatrzański, whereas Białowieski National Park has been recognized as world heritage site
- Seven parks have been covered by RAMSAR convention (a convention on wetlands of international significance, especially the ones which fulfill the role of a living environment for waterfowl): Biebrzański, Narwiański, Karkonoski, Poleski, Ujście Warty, Słowiński and Wigierski

National parks have a rich and diverse tourist potential (natural and cultural), which means that in the majority of them tourism can be a leading, complementary, or additional field of economic activity. One of the key resources of protected areas in Poland is the high biological diversity at the landscape, ecosystem, species, or genre level that allows the creation of unique and competitive tourism products (not only on the domestic market, but also international). Some national parks in Poland constitute specific "banks of genes and species" on a European scale, because they contain the largest, and often are the only, European refuge locations for many species. Poland is one of the European countries with the highest biodiversity index. Biodiversity in the future may constitute a branded tourism product of Poland that creates its positive image in the world as a country that protects the "natural heritage of Europe" (Foundation of Environmental and Natural Resources Economists 2005). A good example is Bialowieza National Park. The Bialowieza Forest includes the last primeval forest fragments at the Central European Plain; hence it represents the model object for forest ecosystems of Poland and Europe. The woodland of the Forests includes mixed, multilevel, and centuries-old stand. The natural and cultural heritage of the region and, above all, the rich and unique tourist attractions of the forest environment constitute a great potential to create new products. Forest and its functions (promoted by various forms of education concerning the environment and forestry) may be the core of the integrated tourist product of the Bialowieza Forest—"Forest Heritage of Europe." In 2015, within the framework of the implementation of the "Bialowieza Forest—Forest Heritage of Europe" program (involving the State Forests, the National Fund for Environmental Protection and Water Management, Bialowieza National Park, and local governments), a concept of such a product was developed, consisting of a wide variety of "tourism products" (mainly in the segment of environmental-educational tourism). The idea is to create new partial products, which will be linked thematically by a common idea (Kiryluk 2016).

Natural landscapes and biodiversity are becoming more and more appreciated by tourists. This causes tourism growth in protected areas, both in Poland and around the world. In 2016, Polish national parks were visited by about 13 million tourists (Table 2; Fig. 2), including the largest number in such parks as: Tatrzański (3.6 million), Karkonowski (2 million), Woliński (1.5 million), Wielkopolski (1.2 million), and Kampinowski (1 million) (Table 2).

4 The Primary Barrier to the Tourism Development in Protected Areas

Tourism in protected areas, on the one hand, can provide an opportunity for socioeconomic development and, on the other, it can be a threat (Fig. 3) and cause degradation of the natural environment. This leads to the loss of the value of natural values and landscape values, for the protection of which the parks have been established.

Table 2 Tourism in national parks in Poland in 2016

	Tourist routes in km		The number of tourists	
National park	Total	For renovation	In the thousands	Per 1 h
Total	3741.3	246.3	12,900.2	1636.7
Babiogórski National Park	49.0	–	114.0	34.0
Białowieski National Park	44.3	–	163.4	15.6
Biebrzański National Park	498.9	68.0	41.0	0.7
Bieszczadzki National Park	465.0	30.0	487.0	16.7
National Park "Bory Tucholskie"	93.0	5.4	34.5	7.5
Drawieński National Park	241.3	–	16.0	1.4
Gorczański National Park	169.0	2.5	80.0	11.0
National Park Gór Stołowych	109.0	–	286.0	46.0
Kampinoski National Park	550.0	58.7	1000.0	29.5
Karkonoski National Park	121.0	34.0	2000.0	336.0
Magurski National Park	94.0	–	50.0	2.6
Narwiański National Park	55.0	–	20.0	0.3
Ojcowski National Park	37.4	2.5	428.0	199.5
Pieniński National Park	35.0	1.5	931.0	393.0
Poleski National Park	114.0	–	44.0	4.5
Roztoczański National Park	29.3	–	186.7	22.0
Słowiński National Park	165.7	25.0	323.4	15.0
Świętokrzyski National Park	41.0	8.0	144.0	18.9
Tatrzański National Park	275.0	10.0	3683.1	174.0
National Park "Ujście Warty"	16.7	–	43.2	5.3
Wielkopolski National Park	215.0	–	1200.0	158.0
Wigierski National Park	272.6	–	125.0	8.3
Woliński National Park	50.1	0.7	1500.0	137.0

Source: Central Statistical Office (2017)

The primary barrier to the development of the tourist function in protected areas is the natural resilience of the natural environment to anthropogenicity. It depends on the potential of the individual environments and determines the amount of their use and tourism development. The resistance of the environment to anthropopressure is most often determined in Poland on the basis of vegetation, and mainly forest communities. Forest communities belong to the most sensitive links in the natural system and have a priority role in shaping and protecting biodiversity (e.g., due to the diversity of habitats, the function of a refuge for many species, an important link connecting other ecosystems). The admissible thresholds of tourist use in Poland are determined by means of two indicators of natural absorptivity and tourism capacity.

The challenge is the sustainable exploitation of biodiversity in protected areas and the fair distribution of benefits resulting from the use of its resources. It is therefore important to plan and manage tourism in protected areas that will reduce the negative effects of tourism development in the long term. The main objective of tourism management in protected areas in relation to the environment is to regulate the

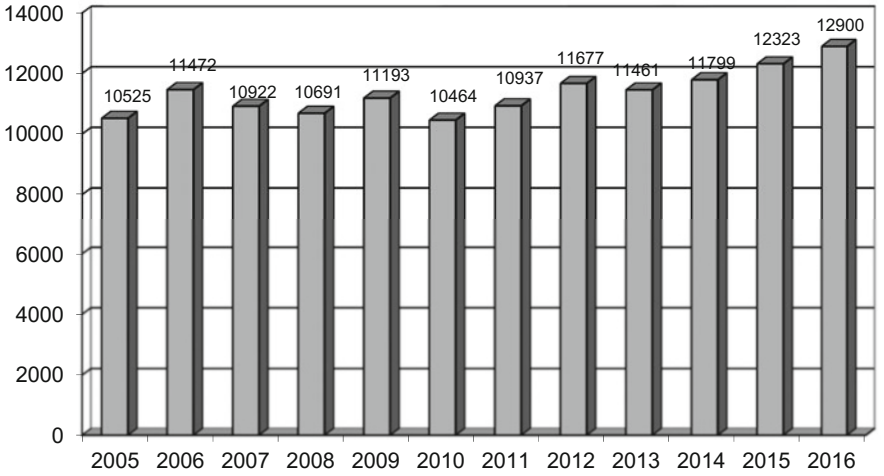

Fig. 2 Tourist traffic in national parks in Poland in years 2005–2016 (in the thousands). Source: Author's own study based on data of the Central Statistical Office (2017)

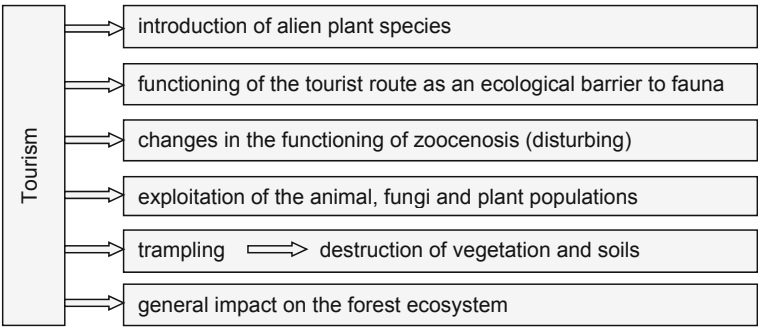

Fig. 3 The models of tourism impact on nature. Source: Author's own study based on Pawlaczyk (2002)

touristic use of these areas in quantitative, qualitative, spatial, and temporal terms. The protection of biodiversity resources and sustainable exploitation is an important challenge not only for managers of protected areas, but also for the tourism sector (CBD 2007).

The main problems of tourism development in protected areas in Poland include:

- Excessive pressure of tourism on the most attractive ecosystems causing degradation of nature and landscape, inadequacy of the forms of tourism to the existing natural conditions
- Lack of developed or up-to-date protection plans for some areas, as well as for the study of absorbability of tourist regions and their tourist capacity

- Chaos in spatial development and lack of effective instruments for shaping spatial order (e.g., established architectural norms)
- Unsatisfactory organization of tourist activities in parks, lack of specialized units dealing with tourism monitoring in parks, lack of effective supervision and control over compliance with applicable regulations
- Location of parks within many administrative units with different management methods and the lack of a coherent development strategy of the integrated tourist product of the area
- Social conflicts resulting from the divergence of objectives and interests of different groups of users of protected areas (e.g., strong conflict in Białowieza Fores), low acceptance of the local community of protective activities
- Lack of developed economic instruments that will compensate for "costs" related to maintaining tourist values of protected areas and strengthen interest in the protection of local communities and motivate economic entities to economically manage natural resources and values
- Absence, low standard, or improper location of tourist infrastructure (insufficient infrastructure that can drain tourist traffic, poor equipment of routes regarding sanitary, technical and informational infrastructure), too few created characteristic regional and local tourist products
- Too little promotion of the sustainable tourism model, lack of professional marketing of pro-ecological forms of tourism
- Limitation or lack of financial resources (especially local capital) for investments related to the development of tourism
- Insufficient scope of cooperation for the sustainable development of tourism (management of parks, territorial self-governments, forest inspectorates, entities of the tourism industry)
- Low level of ecological awareness and "tourist culture" of the Polish society

Sustainable tourism development in protected areas will require overcoming many existing development barriers, primarily infrastructural, organizational, information, financial, environmental, and social barriers. In the minds of the Polish society, the view is quite common that precious natural values constitute a burdensome heritage limiting development opportunities.

Success in the development of tourism is not only influenced by tourism resources (natural or cultural heritage), but social factors: having a leader capable of mobilizing the community around the vision of sustainable tourism development. Key factors for development are: network development, innovation, creation of integrated tourism products, building competitive advantages.

The important role in stimulating the development of tourism in the region is territorial self-governments. The extent and scale of tourism change depends largely on local and regional tourism policies developed by local governments. In present socioeconomic reality, marketing approach to protection and enrichment of environmental assets of a particular area, as well as its promotion for tourist, plays crucial role. Preparation and then implementation of unified strategy of asset promotion may help to create unique image of a particular area, and raising its competitive skills, as

consequence. Local government has a high potential to coordinate the cooperation of entities and projects implemented in the region and to take action concerning tourist the promotion of the region. One of the important principles of sustainable tourism development is the deep involvement of all stakeholders in the tourism economy (including local communities), the decision-making process, and the practical implementation of this concept.

Local communities play an important role in the sustainable development of tourism. This role can be considered in three basic aspects. Firstly, the attitudes and behaviors of the inhabitants of protected areas and their economic activities have a significant impact on the quality and protection of local natural and cultural values. Secondly, the local community is a direct recipient of positive and negative effects of tourism development in protected areas (social, economic, and ecological). Thirdly, the local community is an important element of the complex tourist product of the area. It contributes to the tourist attractiveness of the place and tourist image of the area. Therefore, a friendly attitude of the inhabitants towards tourism and nature protection is very important. Positive attitude of inhabitants stimulates development initiatives, while negative attitude often constitutes a barrier to development.

5 Conclusion

The development of tourism in protected areas requires changing the current model of tourism in favor of sustainable tourism. Sustainable tourism can be a tool for active nature conservation and sustainable stimulator of the development of protected areas. The complexity and multifaceted nature of tourism makes it possible to achieve benefits in various spheres: social, cultural, economic, environmental, spatial, and institutional. Economic, social, and environmental sustainability are the key factors that affect the well-being of the people as well as the creation of jobs and the preservation and enhancement of natural and cultural attractions.

Protected areas in Poland have great development potential for the development of the tourist function. This potential allows for the creation of unique, attractive, and competitive tourist products, competing on a European scale. The main element of this competitiveness is high biodiversity at the landscape, ecosystem, and species level. Biodiversity in the future may constitute a branded tourism product of Poland that creates its positive image in the world as a country that protects the "natural heritage of Europe."

Utilizing this potential requires appropriate action in the sphere of tourism development, organization, and management of tourism, both by local governments and the management of protected areas. It is important to plan and manage tourism in protected areas that will reduce the negative effects of tourism development in the long term. It is necessary to strive for broad cooperation and coordination of the actions of many regional actors and the local tourism economy.

Sustainable tourism development in protected areas will require overcoming many existing development barriers, primarily infrastructural, organizational, information, financial, environmental, and social barriers (e.g., in the process of using the

benefits, differences in the interests of different groups often lead to the emergence of various social conflicts).

The main challenges of tourism in protected areas are: the need to raise public awareness about the contribution of sustainable tourism to the development of regions, the need to monitor the impact of tourism on the economy, societies and environment of protected areas and assess the sustainability of tourism; the need to create integrated, innovative and competitive eco-friendly tourism products.

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The Role of State Regulation and Policy in Tourism Development: The Case of Georgia

Nana Katsitadze and Ia Natsvlishvili

Abstract Countries with different levels of development show great interest in tourism, which is caused by high economic performance of the tourism industry. The chapter shows the importance of state policy, which supports tourism development in the countries with rich natural and cultural tourism resources but have weakly developed tourism industry, weak economy, and imperfect mechanisms of state regulation. After transition to market economy and losing traditional markets, Georgia quickly recognized the importance of tourism and immediately started to implement various types of activities in this direction. In 2012 Georgia declared tourism as a priority sector. This was followed by legislative changes and boom of foreign investments in hotel constructions. High-class hotels provided the opportunity for the development of new tourism directions, which are less dependent on seasonality. The government has been promoting tourism among the skeptical local population. Georgia faces problems related to improper application of tourism regulatory instruments. Tourism consumes products and services that are not directly part of the tourism sector, but have a significant impact on its development. Therefore, development of tourism industry requires implementation of the united state policy. The state policy needs to be based on the principles of sustainable development so that all the interested parties in tourism—tourists, business, state, local communities—get benefit.

Keywords Tourism · Georgia · State regulation · State policy

N. Katsitadze (✉) · I. Natsvlishvili
Faculty of Economics and Business, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia
e-mail: nana.katsitadze@tsu.ge; ia.natsvlishvili@tsu.ge

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1 Introduction

By implementing economic policy of the country through various mechanisms, special forms and methods, the state plays a crucial role in promoting and regulating economic development of the country. Economic policy is part of a general policy. The majority of researchers consider tourism policy to be a part of the national economic policy (World Tourism Organization 1997). Therefore, it should be in compliance with the general policy of the country. Tourism policy of the developing countries, which strive to become modern, democratic states, and are willing to develop tourism sector should be based on sustainable development principles.

Tourism has developed as one of the most powerful economic sectors throughout the world. Its impact on the world economy, as well as on the economy of the regions of individual countries is steadily increasing. Despite its high sensitivity to economic instability, tourism has maintained stable growth rates worldwide over the past decade. The macroeconomic indicators of the growth in this sector are as follows: in 2017 international tourist arrivals amounted to 1322 million people. The direct contribution of Travel and Tourism to GDP was USD 2570.1 bn (3.2% of total GDP) in 2017, and is forecast to rise by 4.0% in 2018, and to rise by 3.8% pa, from 2018 to 2028, to USD 3890.0 bn (3.6% of total GDP) in 2028. As Table 1 illustrates, total contribution of Travel and Tourism to GDP was USD 8272.3 bn (10.4% of GDP) in 2017, and is forecast to rise by 4.0% in 2018, and to rise by 3.8% pa to USD 12,450.1 bn (11.7% of GDP) in 2028 (World Travel and Tourism Council 2018).

The tourism industry has a huge potential to improve the economic structure of the country, create jobs, and attract investments. This is also proved by the statistics provided by the World Travel and Tourism Council. In particular, in 2016, the total contribution of Travel and Tourism to employment, including jobs indirectly supported by the industry, was 9.6% of total employment (292,220.000 jobs). This is expected to rise by 1.9% in 2017 to 297,896.000 jobs and rise by 2.5% to 381,700.000 jobs in 2027(11.1% of total) (World Travel and Tourism Council 2017).

Travel and Tourism investment in 2017 was USD 882.4 bn, or 4.5% of total investment. It should rise by 4.8% in 2018, and rise by 4.3% pa over the next 10 years to USD 1408.3 bn in 2028 (5.1% of total) (World Travel and Tourism Council 2018). In addition to its high economic indicators, the interest of the states in tourism industry is deepened by its close relation with and impact on the protection and promotion of environmental and national values, and the teaching and educational impacts, which also represent a set of tasks to be resolved by the state. In developed countries, the state intervened in good time to improve the tourism system and to develop certain regulations that have significantly enhanced the tourism industry and today these countries receive considerable revenues from tourism. Therefore, state intervention in tourism industry both in terms of development of certain regulations or legislature is very important (Ansell and Gash 2007).

Tourism industry, as one of the main drivers of creative economy, gains more importance in growth policies both at the national and regional levels. Local

Table 1 Defining the economic contribution of travel and tourism

Estimates and forecasts	Georgia 2016 USD mn	Georgia 2016 % of total	Georgia 2017 Growth %	Georgia 2027 % of total	Other Europe 2016 % of total	Other Europe 2027 % of total	Worldwide 2016 % of total	Worldwide 2027 % of total
Direct contribution to GDP	1158.2	8.1	10.1	10.6	2.6	3.0	3.1	3.5
Total contribution to GDP	3871.8	27.1	9.4	34.5	8.4	9.6	10.2	11.4
Direct contribution to employment	122	6.8	5.9	9.2	1.8	2.4	3.6	4.0
Total contribution to employment	420	23.4	5.0	30.7	6.6	8.3	9.6	11.1
Visitor exports	2349.9	38.9	10.9	41.4	7.0	9.3	6.6	7.2
Domestic spending	747.6	5.2	7.4	5.7	3.4	3.4	4.8	5.4
Leisure spending	1912.1	5.0	9.4	6.3	2.1	2.4	2.3	2.7
Business spending	1185.4	3.1	11.1	4.2	0.5	0.6	0.7	0.8
Capital investment	164.9	3.5	7.8	4.3	4.5	5.1	4.4	5.0

Source: World Tourism and Travel Council (2017)

creativity is identified as a major source of productivity and is of substantial importance in a locality's global competitiveness. Creative act is a social process and may include tourists as active contributors. Creativity may contribute to the development of entrepreneurship, enhance an innovative environment, and lead to a higher productivity. In this context tourism has a unique and little explored position as one of the main drivers of creativity in the economy. New tourism policy should increase the competitiveness of the local through supporting quality of experience and promoting innovations in tourism services (Kumral and Ozlem 2012).

Therefore, due to high socioeconomic importance of tourism, theoretical and practical issues of this industry are of great concern. However, in scientific literature the role of the state in tourism industry is not highlighted. Due to the lack of international and national regulations in tourism and sometimes contradictory and conflicting contents of laws and normative acts, most of them cannot be implemented. Taking all the above mentioned into consideration, we consider that research and discussion in this direction should continue.

2 Tourism as the Object to Be Managed by the State

Implementation of tourism policy without a single national mechanism is impossible on the modern stage. The UN World Tourism Organization recommends that the state should plan and implement the policy of the industry as private sector cannot invest in basic elements of tourism infrastructure (resorts, roads, communications, etc.). The economic policy, which affects exchange rates, employment policy, taxes and other factors, affects the tourism as well. In addition, international practice proves that the private sector cannot deal with the noncommercial advertisement of the country. Creation of an image of an attractive country for tourists is a task to be performed by the state.

When discussing the importance of tourism policy it is pointed out (Goeldner and Ritchie 2012) that the primary goal of tourism policy is to integrate the economic, political, cultural, intellectual, and social well-being that tourism creates for people. Thus, tourism policy should be considered as part of the general policy of a state and as an activity, which is related to economics, social field, culture, ecology, promotion of national values, protection of environment, educational and other important issues of society. For determining the state policy and governance of tourism development, first of all, the essence of tourism and its potential both in positive and negative context should be considered. Development of proper attitudes to tourism as subject to state policy and governance is complicated by the contradictions in understanding the essence of tourism.

The definition of tourism by the United Nations World Trade Organization (UNWTO 2017a) focuses on the consumer; therefore, this definition discusses tourism in terms of demand. In economic literatures there are other approaches as well, which consider tourism as a sector that is subject to being influenced by the state. This implies combination of enterprises, institutions, and organizations

belonging to both tangible and intangible production field which ensures production, distribution, exchanging and consumption of tourist products, utilization and usage of tourism resources, development of technical and material basis of tourism. Such approach makes emphasis on the complexity of tourism as tourism consumes the products and services produced by the sectors that are not direct part of the tourism sector (banking, insurance, medical and other sectors) but have great influence on its development.

There is another considerable view, which defines tourism as the processes, activities, and outcomes arising from the relationships and the interactions among tourists, tourism suppliers, host governments, host communities, and surrounding environments that are involved in the attracting and hosting of visitors (Goeldner and Ritchie 2012). This definition makes emphasis on the stakeholders of tourism sector (tourists, businesses providing tourism products and services, government of a host country, host society) and the necessity of taking into consideration the interests of all the stakeholders for proper development of the sector. To this end, the existence of single development policy for the sector with its appropriate mechanisms is essential.

This view is further enhanced by the definition provided by Global Code of Ethics for Tourism (at General Assembly of the World Tourism Organization, Santiago, Chile, 1 October 1999) (UNWTO 1999). According to this definition tourism is a vehicle for individual and collective fulfillment; a factor of sustainable development; a user of the cultural heritage of mankind and contributor to its enhancement; a beneficial activity for host countries and communities (UNWTO 2001). The above definition emphasizes the global significance of tourism and sustainable development, which is unimaginable without the state at the national level and without common efforts by the participant countries on the global level.

In addition to economic parameters, the study and analysis of the effectiveness of the tools and methods used by the state to impact tourism is also very important for evaluating state policy of tourism. The tools and methods the state uses to impact tourism are described in various laws and normative acts. The tools the state uses to regulate tourism are normative acts, encouraging instruments, financial stimulus, stability of economy, creation of a physical environment, formation of public attitudes (Ramsey 2010). Other scholars believe that the state regulation theory needs to be specified in terms of the essence of regulation, its forms and methods. Such basic forms as lawmaking activity, support, stimulation, legalization, regulation, coordination, and informing should be noted separately (Sukhenko and Voronin 2007).

Different main types of tourism regulation by the state can be identified. These are legal, administrative, budgetary, tax, and customs regulations. Each of the above methods has its own peculiarities, circle of relations and tools, through which it effectively affects the bodies of the tourism industry. There is a great diversity of political measures (legislation, rules, directives, goals, strategies) that have a significant impact on the success of tourism and tourist destinations and that cannot be controlled by tourism sector. From this perspective, such tools as passport and visa regimes, taxation, bilateral air agreements, environmental policy, currency policy,

foreign investments policy, infrastructure policy, education policy, national local policy concerning funding of the key local facilities (stadiums, museums, parks, etc.) and legal system in general are of high importance.

Hall (1994) provides an example of tourism policy of Great Britain, which can serve as a chrestomathy example for the countries whose governments are highly interested in the development of this sector and consider it to be a social-political part of the country. According to him, following are the mechanisms that the state uses to impact tourism: (1) Improving tax balance and currency reserves through attracting foreign tourists in the country. In addition, increasing the number of domestic tourists and encouraging them to spend their holidays in the country, so that less currency flows outside the country; (2) Promotion of tourism development at regional level; (3) Diversification of national economy; (4) Increasing public revenue through taxes and fees; (5) Increasing income of the population; and (6) Creation of new jobs (Hall 1994).

Tourism crosses the borders of the countries; it is a single system within its administrative boundaries and beyond its boundaries, combination of the bodies of internal and external environment which participate in the formation, development and realization of the tourism product. Thus, tourism as a significant component of the country's economy, international trade or business activities requires a special legal regulation, which should be in a harmony with international regulations. Although there are a number of international acts that cover important topics for tourism, there is no single regulatory document in international law.

The objectives of the World Tourism Organization, an intergovernmental institution in the United Nations system, are to promote and develop sustainable tourism to contribute to economic development, international understanding, peace, prosperity and universal respect for, and observance of, human rights and fundamental freedoms for all. With the purpose to achieve this goal, the organization pays special attention to the interests of developing countries in tourism (UNWTO 2017b). The International Recommendations for Tourism Statistics (IRTS) provides a comprehensive methodological framework for collection and compilation of tourism statistics for all countries, determines key concepts, definitions, and classifications (United Nations 2010). The organization recommends introduction of Tourism Satellite Account (TSA) which serves to study the influence of tourism on the economy.

The Council of Europe in 2013 developed European Tourism Indicators System (ETIS) and the guideline for the implementation of this system (developed in 2016), which serves for development of sustainable tourism in the European Tourism Indicator System (European Commission 2016). These recommendations are particularly important for developing countries so that they can better plan their tourism policies and effectively implement them. This document is recommendatory. This organization has no obligatory legal regulations to comply with, which would impose any responsibilities to its member states. Although tourism is an international phenomenon, international normative acts, in general, that regulate tourism policy are still scarce. Implementation of a single policy in international tourism is hindered by differences among countries that lead to the incompatibility of interests as well as

differences between internal policies and approaches to tourism and social policy. Tourism policy is part of the country's social, economic, and political measures that govern and direct functioning of the whole society. Therefore, it is better to see the destination from a single viewpoint. This can be implemented through using the mechanisms and tools available to the state.

Sustainable development of tourism would be impossible and application of homogenous approaches would be ineffective in terms of tourism development without state policy of tourism and common state mechanisms of this policy. The realization of sustainable development potential of tourism sector will require government intervention, providing adequate investments and policies, supporting appropriate planning and development strategies. Making tourism greener might involve strong linkage with the local economy and local natural and cultural heritage. Increase in purchasing directly from local businesses, recruiting and training local staff, improving the local natural and cultural environment might be an example of the above. Green economy provides new opportunities for business, especially in the period of multiple global crises such as financial crisis and increase of food prices coincided with increased concerns of environmental issues. Green economy is identified as "win-win" solution to the problems and the way of supporting economic development as well as addressing environmental degradation and issues of socioeconomic inequality. Many businesses try to use opportunities emerging in green economy: development of new goods and services, greening existing business practice that delivers enhanced brand image. Such opportunities are emerging to the tourism sector (Newton 2015).

Tourism is recognized as a key economic sector in the transition to a green economy because it relies on high quality of natural resources and climate stability. When adequately planned and managed in terms of environmental protection, tourism provides economic sustainability for future generations. Education and raising awareness have a key role in the rationale for the use of environmental ethics. Convincing people to change their approach to environmental surroundings requires them to perceive themselves as a part of nature and not as separate from ecological systems. Such paradigm shift is essential to mitigate negative environmental impacts caused by tourism sector, for example to minimize the impacts of "casual flying" (Holden 2015).

Rural tourism is often used as a tool to help develop and redevelop different regions. Sometimes different niche tourism offerings are developed and promoted by different regions and regional governments in attempts to differentiate themselves within the highly competitive global tourism market (Dashper 2014). Rural tourism offers possible solutions to some of the problems associated with lost economic opportunities and population decline. Many governments and local authorities consider rural tourism as an opportunity to bring new money into rural region, stimulate growth, provide employment opportunities, and try to stop rural decline. Rural tourism offers many opportunities such as accommodation and other service provision, showcasing of local culture and heritage, offering countryside visits as move away from mass tourism products and a consumer desire for more niche and tailored offerings (Dashper 2014).

The incorporation of tourism in development policy and poverty reduction strategy has special focus for less developed countries where natural resources exist to support a tourism industry and where there are limited development alternatives. As a potentially significant source of economic growth in developing countries, tourism may play a major role in poverty reduction under the right circumstances. The linkage of tourism to poverty reduction has arisen for a variety reason: the growth in international tourism to less developed countries has been higher over the last decade than for other regions of the world despite the fact that less developed countries' share of the world market remains comparatively small (Holden 2013).

Tourism impacts are multifaceted and difficult to plan for and manage. The process of tourism planning is not simple but it follows the systematic approach. In many developed and some developing countries the tourism planning follows a number of stages (Mason 2016): identification of a need for tourism plan and strategy, setting objectives and goals for a specific planning strategy, study of existing data, implementation of new surveys, analysis of secondary and primary data, initial policy and plan creation, recommendation of the plan, implementation of the plan, monitoring, evaluation and reformulation. The planning team should contain physical planners, economists, market planners, social scientists, environmental scientists, engineers, draftsman, and legal experts (Mason 2016).

3 Peculiarities of State Policy and Regulations in Tourism

New countries are improving their positions on international market. Tourists' interest in these countries is conditioned by a number of characteristics of the changed values of the modern society, such as: treating nature with growing consciousness and search for something real and authentic. The latter resulted in the development of new motives in tourists' behavior to see and discover something new, travel in exotic countries, see untouched nature. Such needs provide good possibilities for the countries with weak economies where such resources are more available to get engaged in international trade. It is also noteworthy that mainly the basis for tourism development, especially in developing countries, is to gain great economic benefits as quickly as possible. Such approach creates threats in terms of sustainable development. The existence of improper policy for tourism development may, with boomerang effect, bring unexpected and unwanted impact on the whole economy of the country, as well as negative social and ecological effects. Moreover, in most countries tourism is still a new type of activity and there is lack of experience and professionalism in both state and private sectors. The tools for avoiding these problems are available only for the state and are based on the implementation of the proper policy.

From this perspective, we consider the study of tourism development in Georgia to be interesting. In 2012, the government of Georgia declared tourism as a priority and still recognizes its priority status. In addition, it has an ambitious intention to

turn the country into regional tourism hub. The possibility of implementation of the above goal is based on rich tourism resources, geographical and geo-political location of the country, and most importantly, the proper state policy.

Georgia is located at the crossroads between Europe and Asia. Covering territory of only 69,700 km^2, the country is renowned for its history, majestic Caucasus Mountains, the Black Sea coastline, curative climate, healing mineral waters, UNESCO Heritage Sites. Georgia has seamlessly integrated aspects of various cultures, while at the same time retaining its own unparalleled identity. It is a country where subtropical marshes and semi-deserts can be found within a hundred kilometers of alpine zones and snowy peaks. The average temperature in summer ranges from 32 °C to 35 °C, and in winter—from 1.5 °C to 3 °C (Georgian National Tourism Administration 2015).

Nearly 40% of the country's territory is still covered in forests and large portions are untouched or strictly protected. National park (located just one and a half hours drive from the Capital city) is one of the largest parks in Europe. Experiencing variety of wines produced in Kakheti (wine-producing region), enjoying the exhilarating ski slopes or relaxing on the seaside of the Black Sea, discovering Ancient Civilization and Alphabet are part of the activities for tourists visiting Georgia. The current territory of Georgia is located on one of the most historic and ancient lands of Europe. The remains of the First European Civilization were discovered in Georgia, dating back to 1.8 million years. With this discovery, Georgia is considered the first migration place of humans from Africa into Europe. Georgia's uniqueness is deeply rooted in its memorizing history. Georgia offers a range of attractions for all types of visitors.

The country's consecutive integration into the European Union represents one of the most important directions of the nation's political and economic development. In 2014, Georgia signed an Association Agreement with the European Union and to further contribute to the nation's safety, security and integrity, the country has undertaken an initiative to become a member of NATO. Today, Georgia ranks among the most prospective countries in Europe; with the World Economic Forum Competitiveness Index 2014–2015 placing the nation 23rd out of 144 countries with the least amount of irregular payments and bribes and 37th out of 148 countries in reliability of police service. As a result, the New York Times named Georgia 25th out of 52 places in 2015. According to the World Bank 2014 rating the country ranks 15th in the world by Ease of Doing Business and referring to the Heritage Foundation ratings, Georgia holds the 22nd position according to the Index of Economic Freedom (Georgian National Tourism Administration 2015).

Currently, tourism is developing in Georgia in quite an interesting way. In 2016, the growth of tourists amounted to 6.8%. According to the UNWTO World Tourism Barometer, the dynamics of the increase in international visitors was recognized as the highest in Europe (1500.049 visitors in 2009; 4428.221—in 2015; 6345.223—in 2016). The direct contribution of Travel and Tourism to GDP was GEL 2721.9 mn (USD 1158.2 mn), 8.1% of total GDP in 2016 and is forecast to rise by 10.1% in 2017, and to rise by 6.6% during 2017–2027 to GEL 5690.1 mn (USD 2421.3 mn), 10.6% of total GDP in 2027 (World Travel and Tourism Council 2017).

In 2016 Travel and Tourism directly supported 122,000 jobs (6.8% of total employment). This is expected to rise by 5.9% in 2017 and rise by 2.5% to 165,000 jobs (9.2% of total employment) in 2027. Visitor exports are a key component of the direct contribution of Travel and Tourism. In 2016, Georgia generated GEL 5522.2 mn in visitor exports. In 2017 this number grew by 10.9% and the country attracted 2982.000 international tourists (World Tourism and Travel Council 2017). Thus, growth rate in all components of Economic Contribution of Travel and Tourism in Georgia are higher compared to the average growth rate in Europe and the whole World.

Georgia's positions in the Travel and Tourism Competitiveness Indexes provide a clear picture on the trends and level of tourism development on the international market. In the Travel and Tourism Competitiveness Reports 2015–2017, Georgia has shown the highest improvement by Business Environment and moved from 32nd to 22nd position with 5.3 scores. By Safety and Security the country moved from 32nd to 29th position with 6.0 scores and in Environmental Sustainability it moved from 53rd to 42nd position with 4.42 scores (World Economic Forum 2017). International studies show that it is important to see how the approach of the countries to the tourism sector changes from year to year and whether the issue of prioritization of tourism sector is on the agenda. Georgia's position in this component has also improved by ten positions and the country holds 41st position compared to 53rd with 4.90 scores. This success reflects the growth of state expenditure on tourism development and intensification of marketing activities carried out by the state (World Economic Forum 2017).The improvement in ICT Readiness was conditioned by Georgia's progress in such subcomponents, as the Internet use for business-to-consumer transactions and the growth of the number of people using mobile internet. Position in Environmental Sustainability has also improved; contribution of the improvement of environmental impacts and environmental legislation is very important in this regard.

The progress in the improvement of air, ground, and port infrastructure, reflected in the study, is also very important. In Georgia, there are three (one in the capital city and two in regional centers—Batumi and Kutaisi) international and two domestic airports, which fully comply with the standards of the International Civil Aviation Organization (ICAO). The government encourages new airline companies to enter the Georgian market. Budget airline companies are especially demanded. The statistical data of 2016 is as follows: number of flights—15,318 and growth—12.1%; number of passengers—2849.455, and growth—25.6% (Georgian National Tourism Administration 2017).

Despite the above-mentioned successes, overall competitiveness index of the country on the international market seems undesirable. In the 2017 Index, Georgia ranks 70th position among 136 countries with a score of 3.70 (maximum score is 7. Spain, the leading country has only 5.43 scores). It is also noteworthy that in the Eurasian region Georgia comes second after Russia and is ahead of Azerbaijan, Kazakhstan, Armenia, and Ukraine. The country has a better position in the Global Competitiveness Index, where it is ranked 59th (Georgian National Tourism Administration 2017).

Despite the sharp increase in the number of tourists visiting Georgia in recent years (more than 6 million tourists in 2016), market shares of the countries remain largely unchanged. Neighboring countries account for the most of the international arrivals 83.6% (5314.451), only 16.4% of visitors (1045.052) come from other countries, also dominated by post-Soviet and post-socialist countries regardless of geographical distance. This proves that one of the most important problems for the post-Soviet countries from the point of entering international market is low awareness of these countries and their products for the rest of the world (Georgian National Tourism Administration 2017). It is also worth mentioning that tourism belongs to the sector, whose products are more closely related to the awareness and image of the country, development of which, along with great effort, requires a longer period of time compared to any other products. Solving these problems is only possible by supporting and promoting the country and its tourism products at the state level.

Being well aware of the importance of promoting the country in terms of attracting tourists and investments, the government of Georgia is actively taking measures in various directions; in particular, the activities carried out in 2016 include 16 marketing campaigns, 99 press and introductory tours (with the participation of 590 journalists and 287 tour operators), advertising campaign on Tripadvisor.com in 12 countries. In addition, the same year Georgia became the official member of the American Society of Travel Agents (ASTA) and important international conferences were held (Wine Tourism and third Euro-Asian Mountain Resorts Conferences) in the country. Tbilisi Silk Road Forum is held every second year. It hosted 2000 delegates from different countries in 2017 (Interpressnews 2017).

In recent years, tourism policy in Georgia has also focused on the expansion of tourism products and diversification of markets. For this purpose, Convention Bureau was established in 2015 and the same year the country became the member of the International Congress and Convention Association (ICCA). Membership of such organizations is particularly important for the development of business tourism, especially for countries like Georgia from the point of establishing and coordination of international ties (Katsitadze and Natsvlishvili 2017). Georgia is a resort country with its natural tourism resources and history, but according to the World Travel and Tourism Council (WTTC) data, nowadays, business tourism growth rate is very high and significantly exceeds the average indicators of Europe and the world in general in this component (see Table 1 above).

The share of business tourism in Georgia's tourism is quite significant. In particular, leisure travel spending (inbound and domestic) generated 61.7% of direct Travel and Tourism GDP in 2016 (GEL 4493.4 mn) compared with 38.3% for business travel spending (GEL 2785.6 mn). In 2016, Georgia was ranked sixth among the top 10 countries. At the Buying Business Travel Awards ceremony 2016, Georgia was named as the best business tourism (MICE) destination (Ipress 2017). Changes in demand of tourism market requieres changes in supply of MICE tourism products too. Possibilities of using demand changes on MICE tourism market highly increase MICE product competitiveness of the country. In case of Georgia it implies existence of tourist-recreational resources offering MICE tourists more than MICE products (MICE + wellness products + leisure + recreation or

entertainment). This gives advantage to Georgia related to the countries which do not have such resources and rest upon only standard MICE products or very high comfort associated with it that in overall makes tour very expensive (Katsitadze and Natsvlishvili 2017).

This reflects the success of Georgia in terms of diversification of tourism proposals, which enable the country to take its niche on the international tourism market and become competitive (Ipress 2017). A real boom of hotel construction has been evident in Georgia in recent years. In the capital city and regions already exist such high-class hotels as Radisson, Marriott, Sheraton, Holiday Inn, Citadine, Cron Palace, Best Western, Mercure, Hotels and Preference Hualing, Hilton, The Biltmore.

Currently, construction of a number of accommodation facilities is planned and being implemented in Georgia. In Tbilisi, construction of such hotels, as Hilton Garden Inn, Park Inn by Radisson, Ramada Encore, Rixos Tbilisi, Hyatt Regency, Moxy Marriott, Intercontinental, Radisson Blu Telegraph, Golden Tulip, Marriott Autograph Collection—Panorama Freedom Square, Marriott Autograph Collection—Panorama Sololaki, Pulman Hotels and Resort, and Tabori Ridge Recreation and Golf Resors. As for the regions, Rooms Hotel (Batumi), Babylon Tower (Batumi), Porta Batumi Tower, Courtyard by Marriott, Best Western VIB, Le Meridien, Swissotel, Twin Tower, Wyndham Hotels and Resort will be built in Batumi (Black Sea resort city), Radisson Blu Gudauri will be built in Gudauri (Mountain ski resort), Best Western Hotels and Resorts will be built in Kutaisi (Central city of Western Georgia), etc. is planned (Georgian National Tourism Administration 2017). Already existing high-class hotels have created a good starting position for the development of business tourism in the country, as they have proper infrastructure and comfort for conferences. In addition, the existence of high-class hotels in the regions provides opportunities for the development of business tourism, which is very important for the development of resort sites and increasing their awareness. Development of the sector in this direction contributes to making the tourism products of Georgia more complex, which ultimately leads to increasing their competitiveness and development of tourism centers in the regions.

In addition to positive tourist image of the country, construction of hotels in Georgia has been encouraged by liberalization of tax policy and creation of a favorable investment environment for investors. Normative acts based on the Tax Code of Georgia provide regulations for the status of micro and small businesses, which determine preferential tax regimes, including for the people working in tourism sector. There are no special taxes directly for the tourism industry (tourism fees or city taxes for tourists) in Georgia. In addition, the Tax Code provides certain preferences for tourist facilities. In particular, the Tax Code determines the status of a tourist enterprise (including apart hotels, residential houses of hotel type) based on which individual taxable transactions are carried out by special regime. The tax code also provides preferential tax conditions for the entrepreneur entities operating in tourism zones. According to the Law of Georgia on Supporting the Development of Free Tourism Zones, investors operating in free tourism zones get construction permits under simplified procedure and are exempted from property and profit tax by the period defined by the law (15 years) and the construction permit fee (Law of

Georgia on Supporting the Development of Free Tourist Zones 2010). According to the Tax Code of Georgia, bringing of tourists to tourist sites in the territory of Georgia in an organized manner and delivery of tourist service packages to them in the territory of Georgia by tour operators is exempted from the VAT (Law of Georgia on Tax Code of Georgia 2010). Tax incentives that ease the tax burden to achieve some goal turned out to be a good practice for Georgia's reality from the perspective of attracting foreign investments; in addition, it has provided good stimulus for local population to be courageous to start business in tourism sector and to gain experience in this field.

The government has played a major role in promoting tourism as a beneficial and prestigious sector for the country among the people with skeptical attitude toward that sector. This encouraged usage of the reserves owned by the population, especially in mountainous regions, where, in the wake of tax incentives, the residents renewed their ancestors' houses and invested in building of new ones. At present, tourist accommodations in mountainous regions are mainly presented by guesthouses. This also had a significant impact on solving the demographic problems and stimulating development of peasant farms that ultimately resulted in recovery of depressed regions and economic growth. With the purpose to regulate and support investment activities, the Law of Georgia on State Support for Investments determines special norms and additional support measures to encourage investments of special importance. The law equally applies to local and foreign investor (Parliament of Georgia 2006).

4 Challenges

Although currently tourism growth rate in Georgia is quite high and the activities of the government in this direction seem to be quite effective, there are still a number of issues that require timely solutions. Under Georgian legislation, in tourism sector, there are very few or no regulation instruments, such as standardization, licensing, and certification. The lack of the above tools has led to a number of negative consequences like the quality and consumer security-related problems. Ensuring the quality of services and protection of consumer rights is one of the key priorities and a decisive factor of competitiveness for tourism development.

Today, contribution of tourism in Georgia's GDP does not comply with the growth rate of the number of tourists in the country. This indicates that it is necessary to work on determining specific taxes or fees for the tourism sector based on European experience, so that, such taxes and fees do not become a heavy burden for taxpayers. Tax revenues can be used at the local level and encourage strengthening of municipal services, which is also very important for regional tourism development. Eco-taxes, which encourage innovations and promote effective use of natural resources is a good practice that will reduce harmful effects on the environment. Such approaches are particularly relevant for the country, where the number of tourists is twice as large as the local population and does not ensure

management of tourist flows in destinations; and has some problems in legislative regulation for environmental protection.

Due to the lack of an appropriate accounting system and regulatory mechanisms, revenues from renting accommodation in resort areas by individuals cannot be recorded. This problem can be solved by implementing statistical studies recommended by the UN World Tourism Organization and the Council of Europe. Implementing statistical studies and analysis in good order largely determines proper planning and effective implementation of tourism policy. Removal of some barriers for starting business in tourism sector at the initial stage of development encouraged the population to get actively involved in tourism business. Particularly good results were observed in depressed regions with regard to family business development. Further steps may include implementation of an appropriate legislative reform based on the study and assessment of accommodations and catering facilities to identify the minimum quality control mechanisms for which the sector is ready. Special licensing or other prerequisites may create certain barriers for starting tourism-related activities. Therefore, at the current stage of tourism development only special registration procedures can be obligatory. This will facilitate creation of possibilities for developing more specific programs for quality improvement and planning appropriate reforms.

The state policy, which was focused on creating conditions for free activities for the entrepreneurs and was based on significant tax incentives and restrictions of the use of regulatory instrument such as licensing, standardization, and certification, contributed to significant increase in the activities in this sector on the initial stage of tourism development. The existing regulations may become a hindering factor for the development of the sector in the long run, the signs of this are already visible (the quality of the product, consumer security, low revenues from the sector in state budget, difficulties in making statistics, etc.). The democratic principle of the development of the sector implies meeting the interests of all tourism stakeholders—tourists (get higher benefit, diverse and high-quality products), tourism businesses, state and the community without damaging interests of any party. This can be achieved through sustainable development of tourism, which is the sphere of the state activities.

5 Conclusions

The analysis of modern views on the impact of the state on tourism shows that there is no common opinion about the concepts that reflects the role of the state in tourism development. Tourism policy might be understood as promoting the development of tourism by the state through influencing its key elements and directions. Selecting the directions of tourism policy and the ways for the policy implementation is based on what the state considers to be priorities. The objectives of the tourism policy are related to the specific economic and historical level of the country's development. This implies that while establishing tourism in the country and entering international

markets specific objectives are prioritized, which may be quite different from the objectives prioritized while achieving high level of tourism development. Therefore, state regulation of tourism business (methods and instruments) should be adequate to the constantly changing needs of the environment. State regulation of tourism activities is an essential necessity for improving competitiveness of tourism industry and increasing revenues. In order to bring benefits to all interested stakeholders—tourists, tourism businesses, state, and the society (local communities), the state policy of tourism should be based on the principles of sustainable development. Finally, in the process of entering international tourism market, the effort of the state to gain recognition and create image of the country and its tourism products is crucial.

New trends in tourist demands create possibilities for the developing countries to be competitive on international market. To this end, each of them chooses main characteristics by which they will be promoted on target market. For being successful on tourism market, tourism resources are not so important for small economies as competence and application of creative and innovative approaches in management. Tourism development practice in developing countries has shown that they mainly focus on getting revenues from tourism rapidly based on the increase in the number of tourists and the maximum utilization of tourism resources. This is substantiated on the example of Georgia. As a result of such approach to tourism, a number of countries have lost just what made them attractive for tourists, which was followed by the ending of a destination life cycle. Therefore, for developing countries, for which tourism has become an important source of income, this sector should be subject to priority state interests, should be based on the principles of sustainable development and meet the interests of all parties (tourist, business, state, community). This issue is fundamentally important for developing countries.

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Part VIII
International Trade

Relationship Between Foreign Trade and Tourism: An Empirical Study on Mediterranean Countries

Sevgi Sezer

Abstract In the present study, relationships between tourism and foreign trade in France, Greece, Italy, Spain, and Turkey were investigated by using new generation panel data analysis methods for the 1995–2015 period. The presence of cross-section dependency was tested by LM, LMS, CD, and LMBC tests and cross-section dependency was determined. The stationarity of the series was examined by CADF and it was found that the series were I(1). The existence of co-integration relationship between the series in the models was investigated by Durbin-H test, and it was found that the series were co-integrated. Co-integration coefficients were estimated by the CCE method and when the number of tourists who visit the country increased by 1%, Turkish exports increased by 0.25%. In France, imports increased by 0.18% on average, when the number of tourists going abroad rose by 1%. Exports increased by 0.43% in France, 0.63% in Greece, 0.60% in Spain, and 0.93% in Turkey when exports increased by 1%. It was determined that the increase in imports increased the number of tourists going abroad in France and Spain, and decreased the same figure in Greece. In the causality test, no strong causal relationship between foreign trade and tourism was determined.

Keywords Number of tourists · Export · Import · New-generation panel data analysis

1 Introduction

Foreign trade deficit and current account deficit are among the most important economic problems in several countries today. The current account deficit, one of the most fundamental reasons for Turkey's economic crises in 1994 and 2001,

S. Sezer (✉)
Burhaniye School of Applied Sciences, Balıkesir University, Balıkesir, Turkey
e-mail: sevgi.sezer@balikesir.edu.tr

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reached its highest level in history, at 9.9% of GDP in 2011.[1] This situation has brought the country to the threshold of an economic crisis and this rate was reduced by 5% as a result of the measures taken. However, the threat is not over yet. Since Turkish manufacturing and exports are largely dependent on imported intermediate goods, any policy that aims to increase economic growth is accompanied with an increase in the current account deficit. Greece is struggling with long-term internal and external debt, and France, Italy, and Spain were not able to overcome stagnation and other economic problems since the 2008 global economic crisis.

In such an environment, tourism is a prominent industry were considerable revenues are possible with relatively lower investment. Tourism, also referred to as smokeless industry, is a sector that could generate higher revenues with less capital investment. Countries with low capital stock can attract foreign tourists with limited tourism investment and increase foreign exchange revenues and balance foreign trade and current account deficits (Ferro Luzzi and Flückiger 2003).

Thus, it would be beneficial to make the most of the national tourism potentials and to create additional tourism areas in locations where the current potential is not sufficient. One of the best examples of the approach is Dubai. Officials in Dubai, observing the depletion of oil reserves in 2001 and finalizing in 2016, have been struggling to create new income areas. As a result of the research they conducted, it was concluded that the country should be transformed into a tourism and trade center. Thus they targeted to increase the number of total visitors, which was 5.5 million in 2004, to 15 million by 2010. However, it was observed that the 72 km coastline of the country was not sufficient to serve that many tourists, and the idea of artificial islands at sea was introduced. Dubai's coastline was increased by 2118% to 1500 km thanks to Dubai Palm Island (3 units) built between 2001 and 2008 and Dubai World Island. Mass tourism was also targeted with events such as The Dubai Shopping Festival, The Desert Classic Golf Tournament, The Dubai Summer Surprises, and The Dubai World Cup.

Mutual visa exemption agreements between countries can affect tourism and foreign trade concurrently. Furthermore, the individuals who visit a country could visit a nation for trade and business connections, not only for holidays. This increase in the number of tourists would also increase the foreign trade in the country (Socher 1986). For example, it is a known fact that certain tourists visiting Turkey from Russia conduct what is called the shuttle trade in Istanbul Laleli neighborhood. There is simultaneity between the decrease in the number of tourists coming for this purpose and the decrease in Turkish export data.

Would improving foreign trade also increase tourism revenues? Or how the foreign trade in a country is affected by the increase in the number of tourists visiting

[1]Dornbusch and Fischer (1990) and Freund (2000) stated as a threshold value that ratio of the current account deficit to GDP is 4 and 5%, respectively, and considered exceeding this values as a crisis signal. According to Labonte (2005), in developing countries such as Mexico, Turkey, East Asia, Brazil, Argentina, major current account deficits are the most important leading indicator for financial and foreign exchange crises. The current account in these countries is very important in terms of sustainability of economic stability (Labonte 2010).

the country? The present study aimed to answer these questions. All countries included in the analysis carry a foreign trade deficit. These countries need tourism revenues in order to balance the foreign trade deficits.

In the present study, the correlation between tourism activities and foreign trade in France, Greece, Italy, Spain, which are European countries with Mediterranean Sea coastline, and Turkey, which is an EU candidate, will be investigated with panel data analysis method using the 1995–2015 data. The African and the Middle Eastern countries on the Mediterranean were not included in the analysis due to the Arab Spring and political disorder in this region. The main question to answer in the study was: whether there was an association between the number of incoming and outgoing tourists in the said countries and the exports and imports of these countries. The study which includes panel causality and panel co-integration tests will be finalized with regression analysis.

We expect to conclude that the increase in number of tourists would increase the foreign trade of the countries by improving international connections. On the other hand, improved foreign trade will increase the number of tourists visiting the country as a result of the sympathy created by the products of this nation sold in other countries. Furthermore, it was considered that some of the incoming tourists would not visit the country just for holidays and fun, but also to conduct business negotiations and establish commercial connections, which would also affect the foreign trade. It is expected that the present study would contribute to the literature by introducing a different perspective for the scholars and policy makers who are interested in foreign trade and tourism.

2 Tourism and Foreign Trade Approaches in the Relevant Countries

Tourism revenue has an important role in economies of European countries on the Mediterranean Sea, namely France, Greece, Italy, Spain, and EU member candidate Turkey. Especially during the times of decreasing industrial production and increasing foreign trade and current accounts deficits, tourism revenue has become much more important. France, Greece, Italy, and Spain cannot somehow resolve the debt crisis (European sovereign debt crisis) that they had accumulated due to the 2008 global economic crisis and stagnation. Greece is one of the most indebted economies in EU with a public sector external debt stock exceeding 181% by the end of 2016 (IMF 2017) and can maintain its economic activities only through subsidies it receives from EU. Tourism revenues have vital importance for Greece where the industrial sector is underdeveloped. And the Turkish economy barely evaded an economic crisis with the current accounts deficit reaching 9.9% of GDP in 2011 and still tackles with the current deficit problem. When Turkey, with a substantial dependence of production, export and economic growth on imported intermediate good, begins to increase its economic growth, foreign trade deficit and current deficit

Table 1 Tourism statistics (2015)

	Number of tourist arrivals (million)	Number of tourist departures (million)	Tourism receipts (billion US dollar)	Tourism expenditure (billion US dollar)
France	84.4	26.6	54	46.8
Greece	23.6	6.2	17.3	3.5
Italy	50.7	29	39.4	24.4
Spain	68.2	14.4	56.4	17.3
Turkey	39.4	8.7	35.4	5.6

Source: World Bank (2017a, b, c, d)

Table 2 Foreign trade statistics (2016)

	Exports of goods and services (billion US dollar)	Imports of goods and services (billion US dollar)
France	725.6	768
Greece	58.6	59.9
Italy	554.7	490.6
Spain	407.4	371.5
Turkey	189.2	214.6

Source: World Bank (2017e, f)

would increase automatically. Turkey, where the foreign trade deficit cannot be narrowed by increasing exports, needs tourism revenues to decrease current accounts deficit to compensate for the adverse effects. For example, Turkey reduced its current accounts deficit to $32.5 billion by covering the $8.5 billion of $41 billion with net service export (EDDS 2017). When tourism revenues increase, it would be possible to pull this current accounts deficit down considerably. The tourism data for France, Greece, Italy, Spain, and EU member candidate Turkey are presented in Table 1.

Based on the data presented in Table 1, the most attractive country for tourists was France. On the money the citizens of a country spent in tourism, France was again on top with $46.8 billion. While Spain acquired the highest tourism revenue, France followed Spain. It was also interesting to observe that Italy had the most tourist departures with 29 million people. Turkey was prominent with attracting a high number of tourists while sending only a few. But Greece, despite its significant need for tourism revenues, could neither attract tourists nor produce a high income in this industry. The foreign trade data on these countries are presented in Table 2.

Based on the data presented in Table 2, France had the highest imports and exports. Italy and Spain followed France. It was observed that Greece had the lowest foreign trade volume. Again, in the table, it is interesting to observe that most of these countries carried a foreign trade deficit. The country with the lowest foreign trade deficit was Greece. These countries needed tourism revenues to balance their foreign trade deficits.

3 Literature Review

There are limited number of studies in the literature, on the analysis of the correlation between the number of tourists and foreign trade, and a brief review of selected studies is presented here in order of the date of publication.

Kulendran and Wilson (2000) used HEGY regression method to analyze the correlation between international trade and international travel in Australia and its tourism and foreign trade partners the USA, the UK, New Zealand (NZ), and Japan between 1982:Q1 and 1997:Q4. Analysis results showed a two-way causality between total travel and exports in the USA and Japan, between total travel and import in the UK, between total travel and total trade in the UK, NZ, and Japan, between business travel and export in the USA, NZ, and Japan, between business travel and import in the UK, between business travel and total trade in the USA, the UK, NZ, and Japan, between holiday travel and export in the USA, NZ, and Japan, between holiday travel and import in UK and between holiday travel and total trade in the UK and Japan.

Shan and Wilson (2001) analyzed causal relations between trade and tourism in China using the Toda and Yamamoto method based on the VAR method for the period 1987: M01–1998: M01, and found that there was a two-way causality relationship between international trade and international travel. Aradhyula and Tronstad (2003) investigated the impacts of touristic visits for business on border trade between the US state of Arizona and Sonora City in Mexico and found that touristic visits had a significant impact on trade between these cities.

Khan et al. (2005) studied the correlation between foreign trade and tourism in Singapore based on causality and co-integration. They found a strong correlation between business trips and imports, due to the necessity to visit the host country to conduct exports. Businessmen generally go abroad in order to sell but not to buy. That is why there was causality from business arrivals to imports, but not to exports. They also found no causality between the integrated countries, as they were not considered partners.

Katircioglu (2009) analyzed the relationship between tourism, foreign trade, and economic growth with the bounds test for co-integration and Granger causality for Cyprus and found co-integration between tourism, foreign trade, and real income. In the study, it was also found that tourism and foreign trade stimulate economic growth. Similarly, foreign trade was stimulated by tourism. Finally, real imports were found to increase real exports.

In their study, Hanafiah et al. (2010) analyzed the relationship between tourism, which is the second largest foreign exchange sector in Malaysia and a significant source in the country's national income, and foreign trade balance for 1997–2008. It was found that the main determinants of tourism between Malaysia and Asia were foreign trade volume between countries, population, income, tourism prices, and geographical distance.

In a study investigating the effects of foreign trade on tourism demand in Portugal for the period of 1995–2006, Leitão (2010) used income, foreign trade, general price

levels, and geographical distance as explanatory variables. As a result of the analysis, it was found that two-way trade, migration, common border, and geographical proximity were the main determinants of tourism demand in Portugal.

Santana-Gallego et al. (2011) analyzed the correlation between tourism and trade in OECD countries using dynamic heterogeneous panel data method. The study findings revealed a statistically significant correlation between tourism and trade since international trade requires international flow of goods, tourist arrivals and departures. The results also suggested a short-term correlation between tourism and trade, implying that the variables were co-integrated.

Tsui and Fung (2016) analyzed the causality between business travel and trade volumes between Hong Kong and Mainland China, Taiwan, and the United States using the Engle–Granger autoregressive model for 2002:Q1–2012:Q4. Analysis results determined that the series of business travel and trade volumes in Hong Kong and the USA were co-integrated and there was a two-way causality between business travel and trade volumes in the USA. In mainland China and Taiwan, one-way causality from business travel to trade volume was identified.

Santana-Gallego et al. (2016) estimated that the possibility of trade and trade volume is increased by tourism. The relationship between international trade and tourism flows, using the 2012 data for 195 countries, has increased in that study conducted with the extension gravity model. In the study, it was also stated that tourism has the effect of reducing the cost of foreign trade.

In studies in the literature, tourism demand, in general, was used as a dependent variable and the studies focused on whether foreign trade was a determinant of tourism demand. In the present study, exports and imports were analyzed along with tourism demand, to contribute to the literature.

4 Econometric Analysis

4.1 Data Set

In the present study, the relationship between the number of tourist arrivals and the foreign trade volume in France, Greece, Italy, Spain, and Turkey were analyzed using 1995–2015 data. In this context, the following parameters were used in the analysis.

Tourist Arrivals (TA) Number of individual arrivals was used. The series was transformed into *LogTA* by logarithmic transformation. This data (International tourism number of arrivals) was obtained from the World Bank (2017a). In such studies, it is more accurate to use business travelers instead of total number of tourists, but since it was not possible to access this data set, total number of tourists was used in the study.

Tourist Departures (TD) It refers to the number of departures from the host country to other countries. This variable was transformed into a *LogTD* series by logarithmic transformation. This data (number of departures) was obtained from the World Bank

(2017b). Similarly, the number of tourists was used in the present study since the number of individuals who left the country for business purposes could not be determined.

Exports (X) As exports, goods and services exports were used. Since tourism is considered service exports, it was preferred to use exports of goods and services (current US $), not just merchandise exports, to be able to include sales of services to tourists arrived in the country for touristic, health etc. purposes. This variable is converted to *LogX* by logarithmic transformation. The data was obtained from the World Bank.

Imports (M) As imports, it was preferred to use imports of goods and services (current US $) to be able to represent tourism and health services etc. purchased abroad. The series was converted into *LogM* via logarithmic transformation. This data was obtained from the World Bank.

Consumer Price Index (CPI) The Consumer price index (2010 = 100) was also included in the analysis because one of the main factors that tourists consider when choosing the target country is the prices of the consumer goods in the destination country. This variable is converted to *LogCPI* by logarithmic transformation. This data was obtained from the World Bank Consumer Price Index.

Real Effective Exchange Rates (REER) Real effective exchange rates, which cover the effects of the nominal exchange rate and the difference between general level of prices between countries, are included in the present study since they indicate competitiveness of nations in foreign trade. When real effective exchange rate rises, the competitive power of the country is considered to be declining in foreign trade, and in such cases it is expected that exports will decrease and imports will increase. The data was variable and is transformed into *LogREER* by logarithmic transformation. This data is available at Bruegel Datasets (Real Effective Exchange Rates for 178 Countries: A New Database). This data set is based on Darvas (2017).

4.2 Model

Models created based on those developed by Tsui and Fung (2016), Santana-Gallego et al. (2016) to reveal the correlation between foreign trade and tourism spending are:

$$\text{Model 1} : \text{Log}X_{it} = \alpha_{0i} + \alpha_{1i}\text{Log}TA_{it} + \alpha_{2i}\text{LogREER}_{it} + e_{it} \quad (1)$$

$$\text{Model 2} : \text{Log}M_{it} = \beta_{0i} + \beta_{1i}\text{Log}TD_{it} + \beta_{2i}\text{LogREER}_{it} + \varepsilon_{it} \quad (2)$$

$$\text{Model 3} : \text{Log}TA_{it} = \gamma_{0i} + \gamma_{1i}\text{Log}X_{it} + \alpha_{2i}\text{LogCPI}_{it} + \epsilon_{it} \quad (3)$$

$$\text{Model 4} : \text{Log}TD_{it} = \delta_{0i} + \delta_{1i}\text{Log}M_{it} + \delta_{2i}\text{LogCPI}_{it} + \omega_{it} \quad (4)$$

The first model aimed to determine whether the tourist arrivals increase the exports by increasing the recognition of the products of a particular country or negotiating the purchase of goods with the domestic businessmen. In other words, when a higher volume of tourists arrive at a country, does the increase in the familiarity of the tourists with the goods produced in this country increase the exports of this particular country to the countries where the tourists came from? Or are there businessmen among the arriving tourists and do they establish trade connection with the businessmen in the host country? Thus, is there a correlation between the increase in number of tourists and exports? The present study would attempt to determine the answers for the abovementioned questions. The coefficient of the number of tourist variable would be positive, and the coefficient of the real effective exchange rates variable in the host country would be negative.

Model 2 aims to analyze whether the imports of the host country increase due to the recognition of the products of other countries by outgoing tourists or trade agreements signed with those countries. We expect the findings of the present study would demonstrate that the coefficient of the number of the tourist variable would be positive, and the coefficient of the real effective exchange rates variable in the host country would be.

Model 3 aimed to reveal that when a country sells a high number of goods, does it create sympathy for the originating country among the citizens of the receiving country? And does this contribute to the tourist arrivals in that country? We expect the findings of the present study would demonstrate that the coefficient of the exports variable would be positive and the coefficient of the consumer prices index in the host country variable would be negative.

Model 4 aimed to respond to the question: whether imports from a country improve the recognition about this particular country among the citizens of the receiving country? And does this contribute to the direction of tourism activities toward that country? We expect the findings of the present study would demonstrate that coefficient of the import variable would be positive and the coefficient of the consumer prices index in the host country will be negative. Because when the consumer prices index variable in the host country, the purchasing power and disposable income of the citizens decreases, reducing the travel to other countries for touristic purposes.

While it was possible to include national income and population variables in these models, they were excluded since the focus of this study was to reveal the correlation between foreign trade and tourism activities.

4.3 Method

The existence of cross-section dependency between the countries in the panel was tested by Breusch and Pagan (1980) LM test, Pesaran (2004) LM_S test, Pesaran (2004) CD test, and Baltagi et al. (2012) LM_{BC} tests. Stationarity of the series was investigated by Covariate Augmented Dickey–Fuller (CADF) panel unit root test developed by Pesaran (2006a). The presence of co-integration relationship between

the series was tested by Durbin-H test developed by Westerlund (2008). Co-integration coefficients were estimated by Common Correlated Effects (CCE) method developed by Pesaran (2006b). Causality between the series was analyzed by Dumitrescu and Hurlin (2012) test.

4.4 Cross-Section Dependency Test

Countries included in the analysis were likely to have cross-section dependency, due to the fact that the countries involved in the analysis were alternative for each other in tourism (Santana-Gallego et al. 2016) Thus, in the present study, the presence of cross-section dependency was initially tested between the countries included in the panel data. If there was no cross-section dependency between countries, then first-generation, and if there was, second-generation panel data analysis methods should be used.

Breusch and Pagan (1980) LM test was the first test developed to test the cross-section dependency. This was followed by Pesaran (2004) LMS test, Pesaran (2004) CD test, and Baltagi et al. (2012) bias corrected LMBC test. Null hypothesis of these tests was there was no cross-section dependency. These four tests were conducted in the study and the findings are presented in Table 3.

Based on the results presented in Table 3, there was cross-section dependency between these countries. Thus, second-generation panel data analysis methods should be used in the study. Furthermore, while these countries developed tourism policies, it would be beneficial for them to consider the practices that the other countries were involved in the analysis.

4.5 Panel Unit Root Test

Stationarity levels of the series are important in panel data analysis. Since cross-section dependency was estimated between the countries, the stationarity of the series was tested by second-generation unit root test; the CADF method developed by Pesaran (2006a). This test can take into account cross-section dependency and common factors between the countries and it can generate test statistics for each cross section and panel in general. Tests null hypothesis was the "*presence of a unit root in the series*." Pesaran (2006a) takes the arithmetic average of the individual test statistics in order to obtain the test statistic for the panel at large (CIPS). The formula used for this purpose is as follows:

$$\text{CIPS} = \frac{1}{N}\sum_{i=1}^{N}\text{CADF}_i \tag{5}$$

Table 3 Results of cross-section dependency test

	LM	LM_S	CD	LM_{BC}
LogX	202.74*** (0.00)	41.98*** (0.00)	14.23*** (0.00)	41.85*** (0.00)
LogM	192.81*** (0.00)	39.76*** (0.00)	13.87*** (0.00)	39.63*** (0.00)
LogTA	170.10*** (0.00)	34.68*** (0.00)	13.02*** (0.00)	34.55*** (0.00)
LogTD	122.61*** (0.00)	24.06*** (0.00)	10.96*** (0.00)	23.93 *** (0.00)
LogREER	115.42*** (0.00)	22.45*** (0.00)	10.15*** (0.00)	22.33*** (0.00)
Log CPI	151.72*** (0.00)	30.57*** (0.00)	12.21*** (0.00)	30.44*** (0.00)
Model 1	131.78*** (0.00)	26.11*** (0.00)	4.04*** (0.00)	–
Model 2	41.75*** (0.00)	5.98*** (0.00)	0.55 (0.57)	–
Model 3	97.42*** (0.00)	18.43*** (0.00)	5.06*** (0.00)	–
Model 4	60.52*** (0.00)	10.18*** (0.00)	2.24** (0.02)	–

Note: Parentheses are the probability values
*** and ** indicate the presence of cross-section dependency between countries at the significance level of 1% and 5%, respectively
Source: Own calculations

In the study, the CADF panel unit root test was conducted and results obtained are presented in Table 4.

As can be seen in Table 4, the series were not stationary at level values, but are stationary when their first difference is taken. In this case it was decided that the series are I(1). Since the series are not stationary at the level, it is decided that the shocks on these series are permanent. In addition, since the series are not stationary at the level values, the model estimations to be made with the level values of these series may create spurious regression problem. For this reason, it is necessary to investigate the existence of the co-integration relationships between the series in models.

4.6 Panel Co-integration Test

Since cross-section dependency was determined between the countries, the presence of co-integration between the variables in the models was tested by Westerlund (2008) Durbin-H method, a second-generation panel co-integration test, that takes cross-section dependency into consideration. The null hypothesis of this test was "There is no co-integration between the series."

In Westerlund (2008) Durbin-H method, the existence of co-integration was tested separately in group and panel dimensions. In Westerlund (2008) Durbin-H panel co-integration test, the autoregressive parameter is assumed to be the same for all sections. Under this assumption, when the null hypothesis is rejected, it is decided that there is co-integration between all cross sections. In Westerlund (2008) Durbin-H group test, the autoregressive parameter is allowed to vary between cross sections. In this test, the rejection of the null hypothesis implies the *presence of a co-integration at least between some sections* (Di Iorio and Fachin 2008). In this

Table 4 Panel unit root test results

	France	Greece	Italy	Spain	Turkey	Panel
LogX	−3.01	−1.62	−4.04	−3.72	−2.51	−2.98
ΔLogX	−6.48***	−3.90**	−4.29**	−5.08***	−3.90*	−4.29***
LogM	−2.53	−1.52	−2.98	−1.01	−1.19	−1.85
ΔLogM	−4.94**	−3.96*	−3.99**	−3.91*	−4.18**	−4.20***
LogTA	−3.77	−0.5	−1.76	0.007	−1.02	−1.41
ΔLogTA	−4.24**	−3.69*	−3.81*	−4.78**	−3.71*	−4.05***
LogTD	−5.18	−0.54	−1.59	−2.56	−3.25	−2.62
ΔLogTD	−4.57**	−4.02**	−3.58*	−3.66*	−3.59*	−3.88***
LogREER	−2.39	−1.98	−4.6	−4.5	−2.3	−3.15
ΔLogREER	−4.51**	−4.08**	−3.81*	−4.28**	−3.57*	−4.05***
LogCPI	0.043	0.42	0.06	−0.37	1.92	0.41
ΔLogCPI	−4.47**	−3.71*	−4.04**	−3.75*	−4.09**	−4.01***

Note: For CADF, critical values at 1%, 5%, and 10% significance level from Pesaran (2006a) p. 276 Table Ic are −4.97, −3.99, and − 3.55, respectively. For CIPS, the critical values at the 1, 5, and 10% significance levels from Pesaran (2007), p. 281 Table IIc are −2.60, −2.34, and − 2.21, respectively

*, **, and *** indicate that the corresponding series are stable at 1, 5, and 10% significance levels, respectively

Source: Own calculations

Table 5 Westerlund (2008) Durbin-H test results

	Durbin-H group statistics	Durbin-H panel statistics
Model 1	3.113*** (0.001)	4.868*** (0.000)
Model 2	11.965*** (0.000)	32.101*** (0.000)
Model 3	0.747 (0.228)	2.177** (0.015)
Model 4	4.277*** (0.000)	10.693*** (0.000)

Note: ** and *** indicate the presence of co-integration at significance level of 5 and 1%, respectively, in the relevant model

Source: Own calculations

study, Westerlund (2008) Durbin-H panel co-integration test was conducted and the results presented in Table 5 were obtained.

When the test results presented in Table 5 were examined, it was observed that there was co-integration between the variables in the first, second, and fourth models at 1% significance level and at 5% significance level in the third model. In this case, estimates of co-integration coefficients with level values would not contain spurious regression problem.

4.7 Estimation of Co-integration Coefficients

Since cross-section dependency was detected between the countries in the panel, estimation of co-integration coefficients should be conducted with one of the

methods that consider cross-section dependency. For this purpose, Common Correlated Effects (CCE) Estimator method developed by Pesaran (2006b) was used in this study. This method is an estimator that can produce consistent and asymptotic normal distribution results and can calculate co-integration coefficients separately for cross-section units. It is also a robust predictor of heteroscedasticity and autocorrelation problems (Pesaran 2006b). In his study, Pesaran (2006b) calculated the overall results of the panel by taking the arithmetic average of the individual co-integration coefficients, and called it the Common Correlated Mean Group Effects (CCMGE) Estimator. CCE and CCMGE estimates were applied in the study and the results are presented in Table 6.

The findings presented in Table 6 demonstrated that, in Model 1, the number of tourist arrivals in the country positively affected exports only in Turkey. Based on these findings, when the number of tourists arrivals in Turkey increases by 1%, exports would increase by 0.25% on average. The increases in the real effective exchange rate, which are caused by the decrease in the nominal exchange rate, the increase in the general level of domestic prices, or the decrease in the general level of foreign prices, Greece reduced the exports in line with the economic theory and France increased the exports contrary to the economic theory. The cause of the result in France was possibly due to the fact considered that the demand for high-tech products and cosmetics products exported by this country was independent from the changes in the real exchange rate.

The impact of the number of tourists traveling abroad on imports in Model 2 was positive as expected in France and negative in Spain against the expectations. It was observed that when the number of tourists traveling abroad in France increased by 1%, imports increased by 0.18% on average. The impact of the increases in the real effective exchange rate on imports was positive, consistent with the economic theory in France, and negative in Greece and Italy, contrary to the expectations based on the economic theory.

It was determined that the increase in exports in Model 3 positively affected the number of tourist arrivals in all countries as anticipated. The number of tourist arrivals increased by 0.43% in France, 0.63% in Greece, 0.60% in Spain, and 0.93% in Turkey when exports increased by 1%. The impact of increase in the CPI on the number of tourist arrivals was also negative in general, parallel to our expectation. However, only the values for Spain were statistically significant. In order to attract more tourists to Spain, it is beneficial for the government to take measures to lower the general price levels.

In Model 4, it was determined that the increase in imports increased the number of tourists traveling abroad in France and Spain, and decreased the same figure in Greece. The increase in the CPI was determined to reduce the number of tourists traveling abroad in France, and increase the same figure in Greece and Italy. The reason behind the decrease in number of tourist traveling abroad in France when CPI increased was the fact that disposable income and the share of the income that could be spend on vacation decreased. The increase in the number of tourists traveling abroad in Greece and Italy with the increase in CPI was attributed to the desire of the people to spend individual vacations in cheaper locations when compared to their own countries.

Table 6 Co-integration coefficients estimation results

		France	Greece	Italy	Spain	Turkey	CCMGE
Model 1	LogTA	−0.35 [−0.80]	0.08 [0.26]	−0.10 [−0.49]	0.008 [0.11]	0.25** [1.86]	−0.02 [−0.24]
	LogREER	0.86*** [6.97]	−1.36** [−2.05]	−0.41 [−0.66]	0.29 [1.13]	0.22 [0.85]	−0.05 [−0.12]
	Constant	13.04*** [8.46]	−4.49*** [−3.25]	10.75*** [5.67]	0.27 [0.59]	−8.55*** [−2.55]	2.20 [0.52]
Model 2	LogTD	0.18* [1.43]	0.006 [0.03]	0.006 [0.09]	−0.15*** [−2.77]	−0.04 [−0.21]	−0.0009 [−0.02]
	LogREER	0.69*** [3.49]	−1.39** [−1.81]	−0.48*** [−1.75]	−0.13 [−0.30]	−0.29 [−0.64]	−0.25 [−0.52]
	Constant	4.93*** [4.14]	−1.80 [−0.83]	5.33*** [6.46]	−4.83*** [−3.69]	−10.81*** [−4.18]	−1.43 [−0.47]
Model 3	LogX	0.43** [1.95]	0.65*** [3.72]	0.16 [1.05]	0.60*** [16.25]	0.93*** [17.20]	0.55*** [4.39]
	LogCPI	−0.55 [−0.77]	−0.57 [−1.17]	0.48 [1.25]	−0.15** [−1.71]	0.02 [0.70]	−0.15 [−0.79]
	Constant	8.90*** [3.14]	2.86 [1.23]	10.87*** [4.19]	2.53*** [2.83]	−7.05*** [−5.44]	3.62 [1.16]
Model 4	LogM	0.44*** [3.43]	−0.33*** [−3.77]	0.12 [1.18]	0.35** [1.83]	−0.21 [−1.25]	0.07 [0.50]
	LogCPI	−0.94* [−1.31]	0.70** [1.96]	1.464*** [2.99]	0.09 [0.25]	0.003 [0.08]	0.26 [0.66]
	Constant	8.95*** [3.06]	20.04*** [11.65]	7.09*** [2.55]	5.39 [1.03]	20.55*** [4.89]	12.40*** [3.79]

Note: *** and ** indicate that the relevant parameters are statistically significant at 1 and 5%, respectively. Values in square brackets are *t* statistics
Source: Own calculations

Table 7 Panel causality test results

Null hypothesis	Stat.	Stat.	Prob.
LogX ⇏ LogTA	2.06	−0.21	0.82
LogTA ⇏ LogX	1.41	−0.74	0.45
LogREER ⇏ LogX	1.63	−1.15	0.24
LogX ⇏ LogREER	3.02**	1.36**	0.03
LogM ⇏ LogTD	6.69***	6.99***	0.00
LogTD ⇏ LogM	1.89	0.95	0.33
LogM ⇏ LogREER	11.22**	2.20**	0.02
LogREER ⇏ LogM	1.57	−1.41	0.15
LogTA ⇏ LogCPI	1.99	−0.27	0.78
LogCPI ⇏ LogTA	8.50***	4.99***	0.00
LogTD ⇏ LogCPI	10.29***	11.52***	0.00
LogCPI ⇏ LogTD	3.17**	2.56**	0.01

Note: Optimum lag length is determined by using LR (Lagrange Ratio), FPE (Final Prediction Error), AIC (Akaike Information Criterion), SC (Schwarz Information Criterion), and HQ (Hannan–Quinn Information Criterion). ** and *** show causality relationship at 5% and 1% significance level
Source: Own calculations

4.8 Panel Causality Test

Panel causality tests could be used to test for the presence of an interaction between the variables. In the present study, the existence of causality between independent and dependent variables in the models were examined by Dumitrescu and Hurlin (2012) test. This method could take the cross-section dependency between the countries in the panel into account. The null hypothesis of the test is "There is no causality between the first variable and the second variable" (Dumitrescu and Hurlin 2012). Dumitrescu and Hurlin (2012) causality test was conducted in the study and the results are presented in Table 7.

The results obtained here could be more easily comprehended and traceable with the aid of Fig. 1.

Based on Fig. 1, there was two-way causality between exports and real effective exchange rates, between tourist departures and consumer prices index, in addition to the one-way causality from import to real effective exchange rates and from consumer prices index to tourist arrivals. In this analysis, no causality was found between foreign trade and tourism.

5 Conclusion and Policy Recommendations

Trade balance deficit and current account deficit are considered as the most important economic problems in several countries. The first solution that comes to mind to solve these problems is to increase tourism revenues. Current account deficit is one

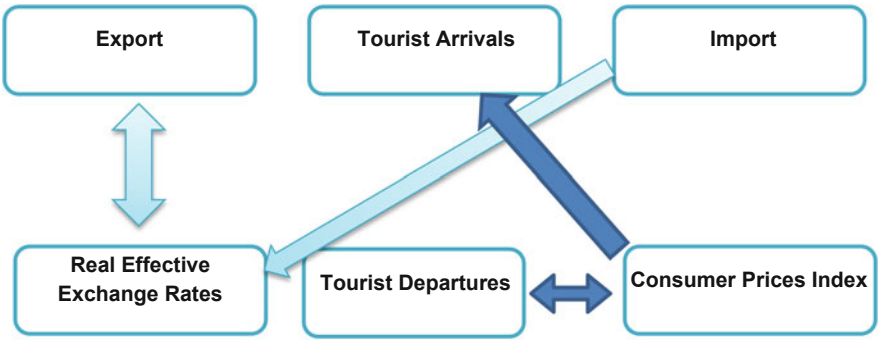

Fig. 1 Causality relationships among series. Source: Developed by the author

of the main reasons for the economic crises in 1994 and 2001; in Turkey the current account deficit reached its highest rate of 9.9% of the GDP in 2011. This nearly caused an economic crisis in the country but the rate dropped around 5% after necessary measures were taken. However, the threat still lingers on. Turkish manufacturing and exports industries depend heavily on imported intermediate goods which means that any policies that are implemented to increase economic growth also cause an increase in the current account deficit. Greece has been struggling with both internal and external debt; France, Italy, and Spain have issues of stagnation and other economic problems since the 2008 global crisis. Under these circumstances, the easiest way to increase earnings with minimum investment is through tourism. Thus, could improving foreign trade be a method for increasing the tourism income? When the number of tourist who visit the country increases, is foreign trade also affected? This study attempted to answer these questions. Most of the scrutinized countries in the present study have foreign trade balance deficits. To stabilize the deficit, the countries need tourism income.

In the present study, the correlation between tourism and trade balance deficit was analyzed econometrically for the 1995–2015 period in globally famous touristic destinations on the Mediterranean coasts: France, Greece, Italy, Spain, and Turkey. The presence of cross-section dependency between the abovementioned countries were tested with Breusch and Pagan (1980) LM test, Pesaran (2004) LMs test, Pesaran (2004) CD test and Baltagi, Feng and Kao (Baltagi et al. 2012) LM_{BC} test, and the results demonstrated that cross-section dependency exists. This means that these countries were influenced by each other in tourism and trade balance accounts. Since cross-sectional dependency was identified between countries, next steps in the rest of the analysis are conducted using with second-generation panel data analysis methods.

In this context, stationarity of the series was examined with CADF panel unit root test which was developed by Pesaran (2006a) and it was observed that series were not stationary at the level value and they become stationary, in other words I(1), when their first difference was taken. Since the series were not stationary at the level values, the model assumption with these series' level value could face spurious

regression problem. But if the series were co-integrated, there would be no such problem. That was why it was required to test the presence of co-integration between included in the models. For this purpose, Durbin-H test, which was developed by Westerlund (2008), was conducted and it was observed that the series in models were co-integrated. Co-integration coefficients were estimated with the CCE method developed by Pesaran (2006b) and it is determined that exports in Turkey increases 0.25% when number of tourists increases 1%. In France, when the number of tourists traveling abroad increases 1%, imports increases 0.18% on average. When exports increase 1%, it was observed that the number of tourist arrivals in the country increase 0.43% in France, 0.63% in Greece, 0.60% in Spain, and 0.93% in Turkey. It was determined that the increases in imports would increase the number of tourists traveling abroad in France and Spain and decrease the same figures in Greece. In the conducted causality test, no causality between foreign trade and tourism was determined.

Study findings demonstrated that national tourism and foreign trade should not be considered entirely independent and it should not be forgotten that they have the potential to affect each other. It should not be forgotten that tourist arrivals or departures are economic and cultural ambassadors of nations and extensive studies should be conducted to determine tourism policies. On the other hand, impacts of tourism activities on general price levels and sensitivity of foreign trade to exchange rates and general price levels should not be ignored and policy makers should pay attention to these factors.

Policy makers should that mutual visa exemption agreements signed between countries could affect tourism and foreign trade concurrently and the efforts should be expedited on this matter. For this purpose, an attempt should be made to include the right of free movement in economic and trade cooperation agreements signed with other countries. By providing green passports, inexpensive tickets, VIP services, translator support, encouragement to attend foreign fairs etc., foreign travels should be facilitated with the visits by arriving tourists to business industrial investments and the production facilities could also be beneficial.

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The Impact of Wage Share on Exports of the European Union Countries

Janina Seputiene

Abstract Many studies have found that shrinking wage share can affect aggregate demand both positively and negatively. There is more evidence in the literature that the impact on domestic demand (consumption expenditures) is negative whereas the influence on foreign demand (exports) is positive. In the case of overall positive impact, the aggregate demand regime is profit-led; otherwise, it is wage-led. The nature of demand regime depends on the relative shares of the domestic and foreign demand in total demand. The consumption, investment, and exports sensitivity to the wage share changes is another crucial factor shaping demand regime. We can assume that changes in wage share make a more significant impact on the exports of those countries where foreign demand's share in GDP is relatively large. Decreasing wage share is related to the lower labor costs which in turn stimulates export competitiveness. If foreign markets are less important for countries' economy and exports' share in GDP is relatively small, this might weaken the relationship between wage share changes and export competitiveness. This study aims to assess whether the effect of a decrease in wage share on exports (foreign demand) depends on countries' share of exports in GDP. Using a panel of 28 EU countries over a 20-year period (1995–2015), I found that in countries where exports' share in GDP is relatively large, exports' sensitivity to the wage share changes is higher.

Keywords Wage share · Export · Functional income distribution · The European Union

1 Introduction

The wage share (or the labor share) is the part of national income accruing to labor. For many years there was an agreement among economists that labor and capital shares in national income are stable. Though research revealed that in most countries the wage

J. Seputiene (✉)
Institute of Regional Development, Siauliai University, Siauliai, Lithuania

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share has been on a downward trend in recent decades (Bassanini and Manfredi 2014; Guerriero 2012; Gollin 2002). This fact renewed the interest in the analysis of factor shares. Some researchers are interested in the causes of the falling wage share, and others center attention on the consequences. The empirical literature on the analysis of consequences has focused on the impact, which declining wage share has on aggregated demand. Two aggregate demand regimes are possible—wage-led and profit-led. Commonly it is considered that falling wage share has a negative impact on consumption expenditures but a positive influence on investment and exports. If the total effect on aggregate demand is negative, this implies that demand regime is wage-led. In case of positive effect—demand regime is profit-led. The empirical determination of demand regime is mostly based on the model presented by Bhaduri and Marglin (1990). This model introduced the possibility that demand may be either wage- or a profit-led and inspired variety of empirical research, which has been done to determine demand regime in various countries. Results of these research confirm that in the majority of countries domestic demand is wage-led, while small and open economies are profit-led when the reaction of international trade to changes in income distribution is considered (Hein and Vogel 2008; Stockhammer and Ederer 2008; Stockhammer and Wildauer 2016; Onaran and Obst 2016). We can find ambiguous empirical results whether various countries have wage-led or profit-led demand regime. For example, Naastepad and Storm (2007), Onaran and Obst (2016) conclude that aggregate demand in the Netherland is wage-led, while Hein and Vogel (2008), Kiefer and Rada (2015), Stockhammer and Wildauer (2016) confirm profit-led regime.

Such a contradiction in results suggests that for demand regime determination is crucially important to understand all factors, that can make an influence on exports sensitivity to wage share changes as on it depends whether wage-led domestic demand will switch to profit-led total demand.

This study aims to assess whether the effect of a decrease in wage share on exports (foreign demand) depends on countries' share of exports in GDP. It is well understood that exports' share in GDP and exports' sensitivity to wage share plays a role in determining demand regime. However, little attention is paid to the factors affecting exports reaction to wage share changes. The novelty of this study is that it tests the hypothesis that the wage share changes make a greater impact on the exports when foreign demand's share in GDP is relatively large. If international markets are less important for countries' economy and exports' share in GDP is relatively small, this might weaken the relationship between wage share changes and export competitiveness. The explanation is that wage share changes might occur in sectors less involved in international trade. Thus, these changes can have less or no influence on exports in other economic sectors where wage share remains stable. Covi (2017) results provide empirical support for this hypothesis. He tested the demand regime in the Euro area's trade surplus and trade deficit countries, grouped into the northern and southern region. Econometric evidence clarifies that the 5 year cumulative impact on net exports of an SD wage shock in the northern region (which is much more reliant on foreign demand than the southern region) is twice as big as an SD wage shock in the southern region. It was concluded that in the northern region the demand regime is profit-led, while it is wage-led in the southern region.

Another explanation of obtaining both profit- and wage-led demand in the same country may arise from differences in the analysis period. Blecker (2016) argues that mixed results can be related to the period of analysis. It is expected that investment and exports will respond to changes in income distribution mostly in the short run, while the effect on consumption is likely to be stronger in the long run. Only a few empirical studies report the results obtained by analyzing different time periods. Considering this, the second contribution of this study is that it estimates exports elasticity for wage share changes over different time periods.

The third contribution is related to estimation methodology. Majority of empirical research determine demand regime by analyzing time series data for individual countries, and only a few more recent studies (Hartwig 2014; Kiefer and Rada 2015; Stockhammer and Wildauer 2016; Tamasauskiene et al. 2017) have employed panel data models. Hartwig (2014) is the first who tested distribution of income effects on demand using data for the panel of almost all OECD countries. The results indicated that economy in an average OECD country is wage-led. Contrary, Kiefer and Rada (2015) obtained profit-led aggregate demand in the panel of 13 OECD countries. Stockhammer and Wildauer (2016) confirm Hartwig's (2014) results, relying on the panel data of 18 OECD countries, and conclude that the average demand regime in this panel is wage-led. Tamasauskiene et al. (2017) find that domestic demand in the average EU country is wage-led.

The data in this study covers a panel of 28 EU countries over a 20-year period (1995–2015). Results show that in countries where exports' share in GDP is relatively large, exports' sensitivity to the wage share decline is higher. The remainder of the chapter is structured as follows. Section 2 describes what effect redistribution of income toward profits has on exports. Section 3 presents the research methodology, and Sect. 4 compares whether the impact of the wage share changes depends on countries' exports share. The chapter ends with conclusions.

2 The Impact of the Wage Share's Decline on Exports: Estimation Strategies

Various methodologies are applied to identify the wage share's influence on international trade. Hein and Vogel (2008), Nikiforos and Foley (2012) estimate net exports (in percent of GDP) as a function of wage (or profit) share and other control variables.

Stockhammer and Ederer (2008), Stockhammer et al. (2009, 2011), Onaran et al. (2011), Onaran and Galanis (2014), Onaran and Obst (2016) model the effects of income distribution on exports using a stepwise approach. They estimate exports as a function of domestic prices, import prices, or relative prices of exports to imports, while domestic and export prices are thought to depend on unit labor costs, which in turn are closely related to wage share. Stockhammer and Ederer (2008), Stockhammer et al. (2009) apply two regressions for prices. In the first regression

dependent variable is export prices, explained by domestic and import prices. The second model estimates domestic prices as a function of nominal unit labor costs and other control variables. Stockhammer et al. (2011), Onaran et al. (2011), Onaran and Obst (2016) include real unit labor costs as an explanatory variable in the export prices equation.

Naastepad (2006), Naastepad and Storm (2007), Hartwig (2014) estimated the effects of real unit labor costs growth directly on exports growth. Stockhammer and Wildauer (2016) directly include wage share in the exports equation. Not only estimation strategies and control variables, but also different statistical measures for the wage share can be found in the empirical studies. By Naastepad and Storm (2007), Stockhammer and Ederer (2008), Onaran et al. (2011), Stockhammer et al. (2011), concepts "real unit labor costs" and "wage share" are used synonymously. Naastepad and Storm (2007), Stockhammer and Ederer (2008) define labor costs (or wage share) as real wage costs divided by real productivity (value added). Onaran et al. (2011) measure the wage share as one minus the gross profit share (Gross Operating Surplus/GDP). Hein and Vogel (2008) calculate profit share as one minus wage share. Onaran and Obst (2016) calculate labor costs as wage share multiplied by GDP at factor costs divided by GDP at market prices.

Blecker (2016) provides some arguments as to why the impact of a fall in wage share on exports is likely to be higher in the short run. A country's competitive advantage and exports will increase if it succeeds to lower unit labor costs relative to its competitors. In the longer term, several adjustment mechanisms can come into play and offset this improvement. First, rising exports can foster domestic employment, which in turn leads to higher wages, thereby offsetting the initial decrease in unit labor costs. Second, growing exports may lead to an appreciation of country's currency, what in turn results in lost export competitiveness. Even if these adjustment mechanisms do not work, the other countries may react and offset this achieved improvement in competitiveness. Trying to restore lost competitiveness foreign countries can implement wage moderation policies (wage share decreases) and thus eliminate the home country's initial gains in exports. If the wage share declines simultaneously for many trading partners, the competitive benefits of decreasing labor costs would be canceled out. The abovementioned adjustment mechanisms and responses from other countries need some time to diminish competitive gains from the initial fall in the wage share. Thus, a country may benefit from the redistribution of income toward profits, and increase its exports in the short run, but this gain will diminish and possibly disappear in the longer term.

Nevertheless, this long run perspective seems to be ignored. For a long time, governments have been implementing wage moderation policies trying to increase their exports (Kiefer and Rada 2015). This kind of strategy was supported by the European Commission (EC). In Communication to the Council and other institutions, EC states that wage moderation lowers inflation expectations, facilitates competitiveness adjustment, and is essential for the economic recovery (European Commission 2007). The recommendation to restrict wage growth has ignored the possible effects of a simultaneous change in the wage share in European economies. European economies are integrated, and a much greater proportion of the EU

member states' total trade is with partners inside the EU. When the decrease in the wage share is implemented simultaneously in a variety of trading partners, this reduces the effects of a fall in the wage share on exports, as all countries reduce their unit labor costs, and no one gets a competitive advantage.

We lack an empirical evidence regarding how various market adjustment mechanisms change the influence of income distribution on demand and its components. Onaran and Obst (2016) estimated a multicountry demand-led growth model. They assessed the sensitivity of consumption, investment, and net exports to wage share changes for 15 EU countries, then calculated the impact of a simultaneous fall in the wage share. In the latter case, the positive influence on exports is lower than estimated in each country in isolation.

Blecker (2016) pointed out that effects of lower wage share on aggregate demand are likely to be stronger in the short run; nevertheless, only a few studies present the regression results for different time periods (Stockhammer et al. 2011; Hartwig 2014). Despite applied different methodologies and different measurement of wage share, studies provide consistent results that decrease in unit labor costs (wage share) has a positive effect on exports. It is true for different countries and different time periods. However, there is a lack of empirical support regarding how the elasticity of exports to wage share varies across time and countries with high and low reliance on international trade.

3 Data and Methodology

The dataset covers 28 European Union member countries from 1995 to 2015 on an annual basis. Exports (X) are estimated as a function of real GDP growth of main trading partners (Y_f), adjusted wage share at factor costs (WS), and real effective exchange rate (REER) or relative export and import prices (terms of trade TOT). The data source for WS, REER, and TOT is AMECO database. Y_f has been calculated as the trade-weighted growth of real GDP (index 2010 = 100) of the ten most important trade partners. Export partners shares in total exports have been calculated using data from Eurostat database, real GDP (GDP at constant prices)—from World Bank World Development Indicators database. All variables are in real terms.

Panel data models are used in this study. The first difference (FD) was applied to omit correlation between unobservable time fixed effects and error. The interaction between the wage share and country's exports share in GDP is used here because it is likely that higher reliance on foreign demand shapes the exports reaction to the wage share changes. The following equation describes FD model with an interaction variable:

$$\Delta y_{it} = \alpha + \sigma_3 td3_t + \cdots + \sigma_T tdT_t + \beta_1 \Delta x_{it1} + \beta_{1D} \Delta x_{it1} D_i + \beta_2 \Delta x_{it2} + \cdots + \beta_k \Delta x_{itk} + \Delta e_{it} \quad (1)$$

where y is real total exports in national currency, δ represents the effects that are common for all countries (as cyclical economic shocks, etc.), β_1 shows the effect of explanatory variable on the dependent variable, *td* is the time fixed effect variable, x is an explanatory variable, and e is an error term. D is dummy variable which is equal to one if the share of exports in GDP exceeds selected value (for different models this value varies 30, 35, 40, 45, 50, 55, 60, and 65%); otherwise it is equal to 0. For example, if 0 indicates that exports' share in GDP is less than 30% and 1 represents a share higher than 30%, then β_1 shows what impact the wage share has on exports in the first group of countries (exports' share in GDP is less than 30%), and β_{1D} shows the difference of x impact on y in these two groups of countries. The effect in the country group with exports' share in GDP higher than 30% is calculated as $\beta_1 + \beta_{1D}$.

In assessing the exports sensitivity to the wage share changes the following issues have been tested:

- Estimated model coefficients are compatible with economic logic.
- The model errors comply with the underlying assumptions.
- To correct for autocorrelation, the model was modified including dependent variable lagged by one period AR (1).
- The White's test was used to examine the presence heteroscedasticity.
- Chi-square statistic was applied to test the assumption that data distribution is normal.
- The variance inflation factor (VIF) was applied to detect multicollinearity.

4 Empirical Results

Table 1 presents the data on exports share in GDP and adjusted wage share for the EU countries.

International trade and development theory suggests that export growth fosters economic growth. Trying to boost economic growth many countries have employed export-led growth strategies. As we can see in Table 1, the role of export in the EU economies has grown. In 2015 compared with 1995 the exports' share in GDP increased in all EU countries except for Cyprus. The reliance on export-led growth constitutes an attempt to reduce labor costs and increase exports competitiveness. Onaran and Obst (2016) argue that wage share's decline in most of the European countries was associated to some extent with the economic growth strategy that includes wage moderation, i.e., labor productivity grows faster than real wages. In most of the EU countries, the wage share in 2015 was lower than in 1995. The average wage share for the period 1995–2015 varied between 48.28% for Slovakia and 73.67% for Croatia. The high unemployment rate in Slovakia (on the average about 14% for 1995–2015) might reduce the bargaining power of labor, and increasing reliance on exports (exports' share in GDP rose by 36.3 p. points from 1995 to 2015) resulted in low wage share. In Slovakia, only 25% of employees are

Table 1 Adjusted wage share (WS) and exports' share in GDP (*X*/*Y*)

	1995–2015		2004–2015		2015–1995	
	Average		Average		Change	
	WS (%)	*X*/*Y* (%)	WS (%)	*X*/*Y* (%)	WS (p.p.)	*X*/*Y* (p.p.)
Austria	63.26	45.25	62.09	50.92	−4.00	19.40
Belgium	67.53	71.39	66.77	77.80	−1.01	21.30
Bulgaria	56.21	51.06	56.87	52.94	5.49	21.50
Cyprus	60.75	56.95	62.11	53.80	−2.56	−1.90
Croatia	73.67[a]	36.38	71.87	39.68	n.d.	21.10
Czech Republic	51.08	51.84	52.05	65.97	2.24	40.60
Denmark	64.56	45.84	64.91	51.17	0.53	18.50
Estonia	57.52	63.80	57.38	72.90	−3.05	10.80
Finland	61.72	35.82	62.32	39.13	−0.25	0.70
France	65.27	25.14	65.59	26.99	1.51	7.30
Germany	62.67	35.25	61.76	42.16	−2.90	24.90
Greece	57.12	21.44	58.39	24.20	−0.11	17.30
Hungary	58.48	59.55	56.95	77.44	−8.12	51.10
Ireland	53.52	90.59	52.51	101.37	−17.81	51.20
Italy	60.10	24.74	60.77	26.43	−0.40	5.20
Latvia	54.20	44.39	53.73	50.13	2.52	25.70
Lithuania	54.21	52.96	52.95	63.55	1.58	38.70
Luxembourg	58.21	156.35	58.53	176.62	−0.37	120.20
Malta	57.06	124.89	56.86	138.85	−6.22	21.10
Netherlands	65.65	65.11	64.91	72.69	−2.85	25.80
Poland	59.82	34.36	55.32	40.23	−9.98	26.50
Portugal	65.42	28.23	63.59	32.07	−7.65	13.60
Romania	63.60	27.90	58.24	33.94	−19.75	15.50
Slovakia	48.28	66.09	47.76	81.37	2.27	36.30
Slovenia	71.32	56.23	70.53	65.76	−6.44	31.40
Spain	63.18	25.38	62.20	27.05	−4.92	11.00
Sweden	61.07	42.88	61.46	46.86	2.46	7.60
United Kingdom	64.96	26.43	66.52	28.27	4.42	2.20
Correlation coefficient	−0.29		−0.31		−0.11	

Note: n.d.—no data;
Source: Authors' calculations
[a]The WS data for Croatia starts from 1996

covered by collective bargaining agreements (ILO 2015). There is a positive relationship between wage share and collective bargaining coverage (correlation coefficient 0.7; calculated using data for wage share and collective bargaining coverage for 2013). These results lead to the conclusion that bargaining power of workers is one of the factors having an impact on the wage share.

Considering shorter period 2004–2015 the average wage share declined in 17 countries. There is a weak negative relationship indicating that countries with

Table 2 The impact of wage share on exports ($\Delta \ln X_{i,t}$)

	1995–2015	1995–2015	2004–2015	2004–2015
Constant	0.081^{***} (0.013)	0.082^{***} (0.013)	0.057^{***} (0.012)	0.058^{***} (0.012)
td_1998(or 2007)	-0.054^{***} (0.016)	-0.053^{***} (0.016)	-0.017 (0.013)	-0.016 (0.013)
td_2015	-0.051^{***} (0.012)	-0.052^{***} (0.012)	-0.029^{***} (0.010)	-0.030^{***} (0.001)
$\Delta \ln(WS_{i,t})$	-0.300^{***} (0.084)	-0.340^{***} (0.084)	-0.341^{***} (0.114)	-0.405^{***} (0.127)
$\Delta \ln(WS_{i,t})$ *x* $exp\_share35_{i,t}$	-0.304^{***} (0.112)		-0.364^{**} (0.184)	
$\Delta \ln(WS_{i,t})$ *x* $exp\_share60_{i,t}$		-0.379^{***} (0.130)		-0.416^{**} (0.211)
$\Delta \ln(Yf_{i,t})$	0.445^{**} (0.276)	0.428^{**} (0.258)	0.658^{**} (0.280)	0.640^{**} (0.274)
$\Delta \ln(TOT_{i,t})$	-0.220^{**} (0.124)	-0.193^{**} (0.110)	-0.280^{**} (0.174)	-0.258^{**} (0.171)
AR(1)	0.354^{***} (0.037)	0.340^{***} (0.043)	0.217^{***} (0.073)	0.199^{**} (0.078)
N	478	478	250	250
Adjusted R^2	0.62	0.63	0.74	0.74

Notes: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$; standard errors presented in brackets
Source: Authors' calculations

lower wage share have higher exports share in GDP. Studies that link movements in wage share and globalization present conclusion that growth in exports is linked with a decrease in the wage share (Lee and Jayadev 2005; Guscina 2006) as countries seek to improve trade competitiveness by lowering labor costs. Table 2 presents the results of the assessment of the impact of wage share on exports.

Table 2 presents estimates over the whole period 1995–2015 and the shorter period 2004–2015. The shorter term starts from 2004 as all 28 countries under analysis have been members of the EU since that year. Another reason for estimating WS impact on exports over different periods, as it is expected that the shorter the period under analysis, the stronger the influence WS makes on exports.

As expected, GDP growth of main trading partners (Y_f) fosters exports, while the influence of relative prices (TOT, terms of trade) is negative. The elasticity of exports to foreign demand varies from 0.428 to 0.658 and is much lower than estimated by Stockhammer and Wildauer (2016) for the panel of 18 OECD countries and by Onaran and Obst (2016) for 15 individual EU countries (estimated elasticity is above 2). Results can differ not only because they are obtained in a distinct set of countries, but also because of differences in control variables. Stockhammer and Wildauer (2016) include property prices (PP) in exports equation as PP contributes to domestic inflation and thus increases export costs. Onaran and Obst (2016) estimated exports as a function of terms of trade and real GDP of the rest of the world and do not include the wage share as an independent variable.

The exports elasticity to terms of trade is negative with coefficient varying from −0.193 to −0.280. To some extent, this comes in line with Onaran and Obst (2016) study for individual 15 EU countries, where estimated exports elasticity for relative prices varies from −0.178 in Ireland to −1.728 in Austria.

Another modification of the model was estimated using the real effective exchange rate (REER) instead of terms of trade, but REER effect on exports was insignificant. It can be explained by the fact that a great share of the EU counties' international trade in goods is with other EU member states, payments are made in euro, so the exchange rate is not so important.

The variable reflecting the interaction between wage share and country's exports share in GDP enables to confirm the hypothesis that increasing reliance on foreign demand increases the impact of WS changes on exports. When the wage share increases by 1% exports decrease by:

- 0.30–0.341% if exports' share in GDP is less than 35%
- 0.604–0.705% if the share is higher than 35%
- 0.340–0.405% if exports' share in GDP is less than 60%
- 0.719–0.821% if the share is higher than 60%

The results support the same conclusion using interactions with different exports shares (30, 40, 50, 55, 65%), but not all coefficients were statistically significant. Table 2 provides only results, which remain significant in both periods under analysis. We need a more thorough investigation on how WS impact on exports changes over time. However, results of this study confirm Blecker's (2016) idea that time dimension of the analysis might explain why different studies present conflicting results indicating both wage-led and profit-led demand regimes in the same country. It is expected that a positive effect of lower wage share on exports is likely to be stronger in the short run. Results in Table 1 confirm that exports elasticity to wage share is higher when analysis period is shorter.

5 Conclusions

It is expected that falling wage share will stimulate exports and investment, but the impact on consumption expenditures will be negative. Whether the positive effect of decreasing wage share on investment and exports overpowers the negative influence on consumption depends on the structure of aggregate demand and how sensitive are its components to the wage share changes. If income redistribution toward profits has an overall negative effect on economic growth, the demand regime is called wage-led; otherwise, it is profit-led. Wage- or profit-led nature of growth crucially depends on the foreign sector. The results from other research indicate that it is more likely that small open economies are profit-led, while bigger, less open economies are wage-led. This conclusion is based relying on the fact that in open economies exports' share in GDP is greater than the share of consumption expenditures.

Thus, the positive impact of wage share decline on exports offsets the negative impact on consumption.

Results of this research show that not only exports' share in GDP play a role, but also exports sensitivity to wage share changes is higher in more open economies. That is why more open economies have a profit-led aggregate demand regime. Despite this, policymakers should be cautious implementing a strategy that includes wage moderation as a mean for increasing export competitiveness. It is likely that this positive effect is more significant in the short run than in the long run.

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Research on Factors Affecting the Imported Online Games in China

Meijuan Li and Biying Ma

Abstract In recent years, although China's domestic online games have occupied a significant market share, foreign online games still play an essential role in China's online game market today. On the one hand, this chapter is based on the analysis of the current situation of China's online game importation; on the other hand, this chapter uses the econometric model to analyze the influencing factors of China's online game importation. The results show that the size of China's online game market is positively related to three factors which are the nominal GDP, the per capita disposable income of urban residents, and the market size of the Internet third-party payment. As we can see, with the development of China's economic base and the increasing popularity of the Internet as well as the improvement of online game related laws, China's online game import scale is expanding.

Keywords Online games · Import · China

1 Introduction

In the beginning of the twenty-first century, the game industry has become part of mainstream media culture (Williams 2002). Before the twenty-first century, single-player games occupied the Chinese game market. Further research indicated that in July 2000, King of Kings, an online game from a Taiwan company came into Chinese mainland online game market and it was the first online game operated on the Chinese mainland (Li and Li 2008). This year had become the start of China's online game industry. In July 2001, The Legend of Mir that came from South Korea with the operation agent Shanda Group opened the era of rapid development of China's online game industry. Only 1 year from 2000 to 2001, China's online game market size had exceeded the capacity it had never been before. In 2001, the total output of Chinese game industry was about 500 million Yuan, of which 3.1 million Yuan accounted for online games (IDC 2006). After that, there was a rapid

M. Li (✉) · B. Ma
School of Economics and Management, Yunnan Normal University, Kunming, China

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development for many years. In the first quarter of 2016, China's online game market size has reached 41.5 billion Yuan.

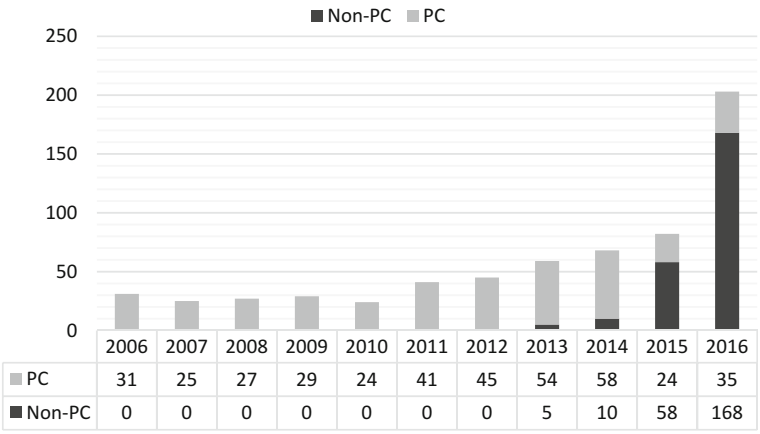
From 2000 to 2003, it was the initial stage of China's online game industry. Online games imported from outside of the country had dominated the market for a long time. At that period, China's homemade online games were in the embryonic stage and cannot compete with foreigners. Since 2004, many problems such as the contract dispute between foreign developers and local operators showed up, and those problems were really hard to solve for both side of the companies. At the same time, domestic companies had continuously been exploring game technics and building a new independent game mode. This period was considerate as the exploratory stage. A research undertaken in professional publishing showed that until 2007, China's online game market established the most critical game business mode "free game, props charges," which was created by the Giant Interactive Group Inc. and its product The Journey. The economic crisis in 2008 made great impact on foreign game companies, but during this period of China's domestic online games industry was still growing steadily. After that, in 2011 Tencent introduced the League of Legends to Chinese market which was the most popular online game in China in the following years. At that time, a variety of high-quality foreign online games came to the market also; however, in the same stage national online games had not much breakthrough innovation. In 2015, The Magic Blade Online may be considered as an attempt by Chinese game makers' to break through the bottleneck of the domestic online games industry. But it was not as successful as we expected. Until today, there are no Chinese homemade PC online games that could catch up those great imported games. China's online game market leader is still a small part of the excellent imported games.

2 The Status of Imported Online Games in China

An online game is a video game that is either partially or primarily played through the Internet or another computer network. Online games are ubiquitous on modern gaming platforms, including PCs, consoles and mobile devices, and span many genres, including first-person shooters, strategy games, and massively multiplayer online role-playing games (MMORPG). This chapter will only discuss MMORPG in personal computers. The status of imported online games in China is mainly following the below five aspects.

2.1 Increasing Number of Import

From the import trend of PC online games in Fig. 1, we found that before 2010, the number of imported PC online games in China maintained an annual import of 25 products and just had a little bit changes in different years. But since 2011, the



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
PC	31	25	27	29	24	41	45	54	58	24	35
Non-PC	0	0	0	0	0	0	0	5	10	58	168

Fig. 1 Number of imported foreign online games approved by the government. (Source: http://www.gapp.gov.cn/govservice/1981.shtml, 2012-7-11/2006-12-26)

number of imports has increased significantly, rose to around 40–50 games per year. But it suddenly decreased in 2014. There were only 24 PC online games which were imported in 2014 when 58 of non-PC games include mobile online game and online console game. In 2016, imported PC online games increased a little and non-PC games surged to 168.

The increasing number of PC online game from 2011 to 2014 may be because of the change of related regulations. The perfection and transparency of the approval process make the approval process less cumbersome than in the early years. Then define 2005 to 2008 as the development period China's online game industry, as well as the development period of China's online game regulations (Chen 2016). He pointed out that during this period, one of the primary objectives of the industrial regulatory policy was the management of the importation of the industry. When the development of the sector has become stable, and the accumulation of relevant policy management experience, to 2009, China's online game industry has entered a mature stage, industry growth tends to be flat, the relevant regulatory policy also has entered a mature period, and the government sector supervision policy is becoming more scientific and practical.

In 2015, the popularity of smart mobile devices and wireless networks had led to a rapid growth in demand for mobile games. Compared to the PC online games, the entry barriers of mobile game was lower, it was more portable, and the potential consumer was more extensive.

2.2 Quality of Imports Has Improved

The introduction of League of Legends in 2011 could be considered as a dividing line. Before 2011, China's imports of online games are mostly concentrated in the Korean RPG oriented games, for example*, the Dragon Nest,* simultaneously mixed with types of Leisure—Sports and entertaining dancing like the *KartRider Rush* and the *Audition.* These imported games, represented by Korea, have become the leaders of Chinese online game market for a long time.

In 2011, with the increasing popularity of League of Legends in China, more and more players had noticed the new game mode coined by the Western world, and China's online game market has entered a new era. In the same year, a world famous game *StarCraft2* was introduced to Chinese market also. And then the Final Fantasy14 from Japan in 2012, the Heart Stone from the United States in 2014, as well as the Diablo III and Over Watch in 2015 and 2016. All of these games are world recognized high-quality games.

2.3 Import Tends to Diversify

South Korea achieved great success in online game exporting around 2000 (Witheford and Sharman 2005). So for a long time, China's import online games have been mainly from South Korea. In 2012, from the report of State Administration of Press, Publication, Radio, Film, and Television of The People's Republic of China, 50% of 45 imported online games came from South Korea, followed by Japan and the United States, and a few from Germany and other European countries.

After one of the global game industry leaders Blizzard Entertainment achieved great success in China, other companies find the opportunities also (Golub 2010). In recent years, with more and more Chinese players playing Western games, Western game producers regard China as their primary strategic market that was entirely different when compared with the old times. In early years, due to the huge differences in culture, the acceptance of Western-made games on Chinese players group was not very high. The design of those games such as art set and plot settings were always with a certain bloody violent color, which was considered as unacceptable in Chinese culture. For example, the World of Warcraft Expansion Burning Expedition was once called a Belated Expedition in China. This is because the World of Warcraft has failed to pass the review of government agencies because of its violence and bloody elements. After several changes to this game, it finally passed the regulatory review. The entire process took about 6 months, and it delayed its time to the market for about half a year.

In recent years, Western game companies have paid more and more attention to the Chinese market. They have developed a series of programs, such as developing games with Chinese characteristic elements and seting aside a long time to deal with China's import online game approval system. The culture between China and most

of the Western world was totally different and Chinese player preferred games which had some Chinese elements (Liu 2013). This series of practices brought the results of the increasing demand for their games in the market, and thus the rising imported number of their games. China's online game market is no longer in the polarization situation of Japan and South Korea, but into diversified imports, the status of healthy competition.

2.4 Standardization of Import Process

In May 2004, the Ministry of Culture of China set up a review committee for the import of game products, which is responsible for reviewing the contents of imported online game products. After that, to strengthen the supervision, at the end of April 2005, the government promulgated a document named "the Measures of the Propaganda Department of the CPC Central Committee, the Ministry of Culture and the State Administration of Radio, Film, and Television on Strengthening the Administration of Importing Cultural Products." The document states the rigorous review of the contents of the imported online game, in particular, the review of the relevant part of the minors. In 2006, the Press and Publication Administration issued "the Eleventh Five-Year Development Plan for the Press and Publication Industry," establishing and improving the long-term regulatory mechanism, and emphasizing the implementation of the Import Records Recording System and the Publications of Import Inspection Units. In 2009, the Ministry of Culture issued "the Notice of the General Office of the Ministry of Culture on Regulating the Content of the Examination and Verification of Imported Online Game Products." The announcement aims to further the standardization of the online game import review process. In the same year, the Ministry of Culture issued "the Notice on Strengthening the Examination and Approval of Import and Export Online Games," noting that the Press and Publication Administration was the only department authorized to import online games. The government would affect the development of online game industry (Jin and Chee 2008).

2.5 Informal Imports

Due to China's strict import online game approval system and some other cost or company development strategy reasons, many foreign game makers did not formally put their products into the Chinese market. Their products were spreading through Chinese players without official approving, such as the "Grand Theft Auto 5" and the "H1Z1." The above two games are relying on the global comprehensive digital product distribution platform "Steam" to provide purchase and download services. They did not apply for China's import online game approval, but Chinese players could purchase and download them without restrictions officially. After purchasing

the game, Chinese players can only play the purchased game through the Virtual Private Network. Virtual Private Network can help users avoid Chinese access restrictions on foreign networks, which is also not allowed by Chinese law.

3 The Main Problems of China's Online Game Import

3.1 Complex Approval System

China's online game approval process has been rigorous, especially for unhealthy content and content that endanger the national security (Ernkvist and Ström 2008). Before 2009, there were many potential problems hidden in the approval system. Some government departments set up some unauthorized review processes for the applications, which led to the repeated review of the game. Those unauthorized processes caused not only adverse influence on the regular operation of the system but also brought great distress to the game producers. In response to this issue, the General Administration of Press and Publication issued a "Notice on Strengthening the Examination and Approval of Imported Online Games," which clarified that the General Administration of Press and Publication was the only department authorized to approve the import of online games.

China's most famous case of online game approval system was the "World of Warcraft" case. In 2005, "World of Warcraft" officially launched in China, and the number of players kept rising. In 2007, its agent The9 Computer Technology after full preparation planned to launch a new version of the game in the first quarter, but due to the approval, their plan delayed nine months which was called as "the delayed Crusade." In 2009, the second update of the "World of Warcraft" was still delayed 18 months due to the approval, and it even caused agent replacement.

3.2 Operational Constraints

On September 28, 2009, the government issued "the document on the strengthening of import online game approval management." The fourth article of this document claimed that foreign investors might not participate in the investment of online game operations in China. It meant that foreign investors can only find China's partners to operate their online games to provide services in the Chinese market.

Operational restrictions indicate that foreign game companies must work with companies that operate online games in China and operated by Chinese companies. This policy was made to protect domestic online game industry; however, it also brought many problems, such as the contract agreement problem, communication problem during information transformation, as well as the consumer feedback processing. One of the most severe cases is the contract dispute between Shanda Group and Actoz in 2003.

3.3 Incomplete Protection for Software Copyright

In the development of China's online game industry, the relevant laws and regulations of the software copyright protection are not perfect, leading to a problem of the illegal copy of the software in China. These unlawful copies were massive in China, and the negative impact on the legitimate rights and interests of these game developers and domestic authorized operators was enormous. This is also a significant blow to the online game industry, seriously restricting the development of the entire industry.

Later, as supervision became more stringent, more and more illegal private operators were arrested, which showed the country's determination to protect copyright, until today, those unlawful businesses have almost disappeared. But there are still some problems in the protection of software copyright, such as the extent of legal protection of copyright. What degree of imitation should be considered as illegal copying?

4 Factors Affecting the Imported Online Games in China

4.1 Living Condition Betters off

In recent years, with the improvement of living standards of Chinese residents, the level of people's needs is continually shifting upward. According to Maslow's hierarchy of needs, with the increase in income, people in the low-level needs which is safety, there will be a higher level of demand. At a higher level of demand, people's desire for self-realization increases, and network interaction is the simplest way to achieve self-value satisfaction. With a limited time and money investment, people will be able to get higher self-value satisfaction than in reality.

Therefore, the increase in income directly affects the growth in online game users. Increase in demand, increase in supply. It will attract more foreign game makers come to the Chinese market.

4.2 The Spread of the Internet

From Fig. 2, as of June 2016, China's Internet users are more than 700 million, the Internet penetration rate is as high as 51.7%. The popularity of the Internet brought more potential users of online games. The growth of Internet users made a contribution to game industry revenues (Chang et al. 2013). The network also allows players to get information about their favorite online games efficiently. Because many of the imported online games had an excellent reputation on the Internet, the popularity of the Internet had a positive impact on this. At the same time, the demand

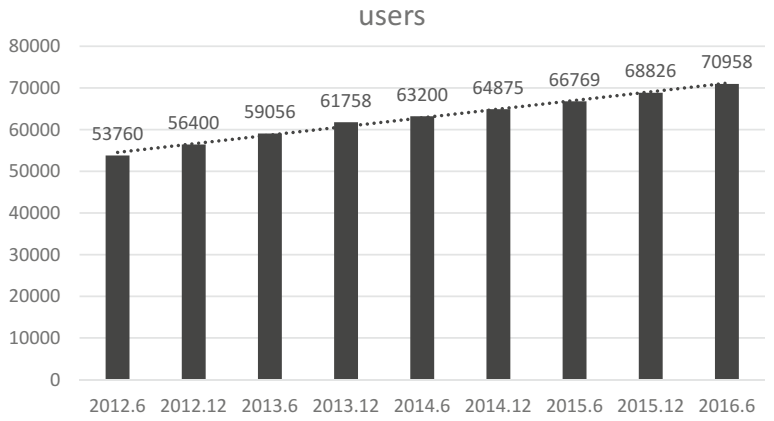


Fig. 2 China's Internet users and the Internet penetration rate. Source: China Internet Network Information Center. CNNIC 38th "China Internet Development Statistics Report" [R]. China Internet Network Information Center (CNNIC) 0.2016

for third-party Internet payments also strengthens the relationship between people's lives and the virtual world. As a form of the virtual world, online games are getting closer to people's lives. It also benefits those informal import game makers.

4.3 Legal–Political Factors

China's increasingly perfect legal system and stable regime bring positive impact on the development of the online game industry. Whether foreign game developers or domestic game operators do not have to worry about the safety of their property rights. For example, because the Chinese government has improved intellectual property protection laws and strengthened enforcement, many pirated game companies have been punished in accordance with the law. For example, the government has imposed high fines on infringers of a Chinese game Tianlong Babu. This effectively attracts foreign game developers to come to the country to earn more money.

4.4 External Factors

The online game industry was introduced to developed states much earlier than developing countries; the online game market of most of the developed countries is saturated, and highly competitive, as well as high barriers to entry. In recent years, China's online game market has been in a state of growth, and because of China's great population base, it is considered a high potential market.

5 An Empirical Analysis of the Influencing Factors of China's Online Game Import

In the empirical analysis, this chapter uses Chinese online game market revenue as the dependent variable. Due to the legal and external factors are difficult to quantify. So the analysis will just put three independent variables, which are the per capita disposable income of urban residents, constant price GDP, and the market revenue of Internet third-party payment.

5.1 Data Scope

The quarterly data of China online games revenue come from the iResearch, a company providing online audience measurement and consumer insights in China. The data of the constant price GDP and the per capita disposable income of urban residents are come from the CEInet. Besides, the market revenue of Internet third-party payment comes from the Analysis Company.

5.2 Data Description[1]

This chapter chose the data of the online game market revenue in China, the per capita disposable income of urban residents, constant price GDP, and the market revenue of internet third-party payment from 2007Q1 to 2012Q3. iResearch used two data statistics methods to calculate the data of Chinese online game market revenue. Before the third quarter of 2012, due to the low output value of mobile online games, it was not included in the statistical scope. After the third quarter of 2012, due to the increase in the size of the mobile terminal online game market, the data after the third quarter of 2012 includes the mobile terminal online game part, from the first quarter of 2010 to the second quarter of 2011, the average of two statistical scopes was selected.

[1]The main difference between the two statistical methods is whether the mobile online games included in the statistical caliber. Before 2012, the intelligent mobile terminal has just become popular, and mobile online games are still in the bud, the user experience mostly concentrated in the stand-alone mobile phone game part. Mobile network game output accounted for a low proportion, and it is not included in the statistical range. With the rapid development of mobile online games in recent years, its possession of the online game market size can no longer be ignored so that the new statistical caliber will be included in the analytical range.

Table 1 The results of the regression model

Variables	Coefficients
(intercept)	−52.7*** (−4.32)
Payment	0.0029** (2.516)
GDP	0.0008*** (7.025)
Income	0.0115*** (4.849)
Adj. R_2	0.98

Source: Own calculations
**indicate that the result reached a significance level of 0.05
***indicates that the result reached a significance level of 0.01

5.3 Analysis

This chapter will use multiple regression models based on quarterly data to analyze how factors of the per capita disposable income of urban residents, constant price GDP, and the market revenue of Internet third-party payment affect the online game market revenue in China. The basic model is:

$$Y = b_0 + b_1\beta_1 X_1 + b_2\beta_2 X_2 + b_3\beta_3 X_3 \quad (1)$$

Here b_0 is the intercept and Y is the size of the online game market in China. It is represented by online game market revenue in China. We use the per capita disposable income of urban residents represents X_1, constant price GDP for X_2, the market revenue of Internet third-party payment for X_3.

According to Table 1, the coefficient of nominal GDP is 0.0008, which indicates that nominal GDP has significant positive effect on online game market size. When nominal GDP increases by 1 unit, online game market size increases 0.0008 units. Therefore, when the GDP keeps rising, the market size is also expanding. China's economy is currently in a normalized period, and the GDP growth rates were 6.9 and 6.7% in 2015 and 2016. The GDP growth rates were significantly lower than the growth rates before 2010 that as high as more than 10%. And the online game market size that is positively related to the GDP may also tend to lower expansion in the coming years. Therefore, the number of imports of online games in China will also be affected.

Secondly, the coefficient of the per capita disposable income of urban residents is 0.0115, which indicates that the per capita disposable income of urban residents has significant positive effect on online game market size. When the per capita disposable income of urban residents increases by 1 unit, online game market size rises 0.0115 units. Hence, with the increase in per capita disposable income of urban residents, people's demand for imported online games is also increasing.

Finally, the coefficient of the market revenue of Internet third-party payment is 0.0029, which indicates that the market revenue of Internet third-party payment has significant positive effect on online game market size. When the market revenue of Internet third-party payment increases by 1 unit, online game market size increases 0.0029 units. Most of the profits from online games come from the consumption of online value-added products. The purchase of virtual goods requires the use of real money to exchange virtual currency for completing the transaction, such as Tencent's virtual currency Q coins. With the continuous popularization of the Internet, the Internet third-party payment platform has gradually become a necessity. The development of third-party payment platform has a positive impact on the development of the game industry, which will significantly increase the demand for online game imports.

6 Conclusion

Since the emergence of online games in China, imported online games have provided most of the Chinese online game market's output value for a long time. In the beginning, China had a poor technological condition, and when the technology improved, innovation became the most serious obstacle. A series of China's game products were always homogenous, many of them learn from excellent foreign games. In recent years, the situation has improved; more game producers focus on the game's independent research and development, but there is still a severe problem, that is, most of the game producers will only focus on the profit while ignoring the importance of the user experience. This neglect resulted in the bottleneck of the domestic online game industry. The imported online games in the Chinese market have the characteristics of good reputation, the player's evaluation of imported games is generally higher than the domestic game and the mature gaming system with high game experience, as well as fresh design. Therefore, for the imported online games there is still a considerable market potential in China.

For foreign companies who want to enter the Chinese market, it is good news that the audit mechanism is more and more transparent and standardized. This is useful for foreign game makers. But at the same time, standardization also means that substandard games are difficult to enter the market again. But compared to the cases that the World of Warcraft had suffered in 2005, 2006, and 2007 which were mainly due to the imperfect mechanism, the current audit mechanism for foreign producers have become more friendly. However, with the increasingly fierce competition in the future market, foreign game makers who want to continue to occupy the Chinese market must put more effort to meet the Chinese consumer preferences.

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