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# Global, Regional and Local Perspectives on the Economies of Southeastern Europe

Proceedings of the 11th International  
Conference on the Economies  
of the Balkan and Eastern European  
Countries (EBEEC) in Bucharest,  
Romania, 2019



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Persefoni Polychronidou ·  
Anastasios Karasavvoglou  
Editors

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# Preface

This volume consists of papers presented at the 11th International Conference “Economies of the Balkan and Eastern European Countries”—EBEEC 2019. This scientific event was organized in Bucharest, Romania, between May 11 and 13, 2020, by the International Hellenic University, Department of Accounting and Finance (Kavala, Greece), The Bucharest University of Economic Studies—the Faculty of International Business and Economics and the Center of Research in International Business and Economics, and the Romanian Academy of Sciences, through the Institute for Economic Forecasting and the Center for Financial and Monetary Research “Victor Slavescu.” The EBEEC conference is a well-known scientific event that offers academics and researchers the opportunity to present, discuss and validate their research results on the economic and financial challenges in Eastern Europe and the Balkans. The 2019 edition of the EBEEC conference hosted the presentation of more than 120 papers with more than 150 authors from 16 countries from the region, but also from other European countries and all over the world.

The proceedings of the EBEEC 2019 conference shed light on the microeconomic and macroeconomic developments in the Eastern European and Balkan countries, but also considering the broader regional and global factors that impact these developments. As such, the papers included in the proceedings address specific topics in business, finance, macroeconomics, government performance, globalization, tourism, consumer analysis, cross-border cooperation, economic integration, international trade, regional economics, higher education and health care, along with the application of econometric models and machine learning algorithms.

We have prepared these proceedings with the aim of presenting the readers with a wealth of ideas and proposals for an improved understanding and further development of private and public entities in the Eastern European region. At the same time, the papers included in the proceedings show how the decisions and the performance of the economic, social and political actors in the region are intertwined with the wider regional and global events and phenomena. Ultimately, the research results presented here demonstrate that Eastern Europe and the Balkans is a

dynamic region that has encompassed many challenges in the past, but is nowadays evolving in the European economic integration framework and the global effervescent economy.

Bucharest, Romania  
Sibiu, Romania  
Serres, Greece  
Kavala, Greece

Alexandra Horobet  
Lucian Belascu  
Persefoni Polychronidou  
Anastasios Karasavvoglou

## About the Conference

The proceedings is one of the publications of the 11th International Conference “Economies of the Balkan and Eastern European Countries” (EBEEC)—Bucharest, May 2019, and offers readers a wealth of ideas on the economic development of Eastern European and Balkan countries, understood in a regional and global framework. The volume includes 23 papers selected from the papers presented at the 11th EBEEC Conference.

There were 161 papers proposed for the 11th EBEEC Conference, of which 124 were presented at the conference. After the conference, the papers were divided into two categories. The first category was formed of the papers to be published in the Conference proceedings, while the second category included 11 papers to be published as a Springer volume book. All the papers proposed for the proceedings have been peer-reviewed and edited. The selection process was confidential and careful. The editors of the volume have considered all papers and decided together on the selection of papers to be included. The criteria used for including a paper in the proceedings were the quality of research, the overall paper quality and the contribution significance for the domain development.

The EasyChair system was used for paper submission at the conference. The system ensures the confidentiality and the transparency of all submission and evaluation procedures. The authors were asked after the conference to submit camera-ready versions of their papers that have been uploaded in the same EasyChair system. All the uploaded papers were included in the blind peer-review process and reviewers prepared their evaluation reports online. The evaluation was formed of an overall assessment of the paper, reviewer’s recommendations for paper improvement and a recommended decision, on a scale from “strong reject” to “strong accept” (specifically, reviewers had to choose the following decisions: reject, weak reject, borderline paper, weak accept, accept, strong accept). The overall evaluation provided a detailed review of the paper, including scores’ reasoning. Reviewers were required to provide both a score and a review text, as well as their level of expertise regarding the topic of the paper being reviewed: expert, high, average, low and non-expert. All reviewers had at least an average level of expertise in the reviewed fields.



The number of papers evaluated with “weak reject” or “strong reject” is very small. The remaining papers were evaluated with “accept” and “strong accept.” The latter reviews were sent to authors, and the final decision of acceptance of a paper has been taken only after all concerns raised by reviewers were considered by authors. Next, the authors were asked by the volume editors to apply the Springer editorial standards to be found at the following links: [https://www.springer.com/cda/content/document/cda\\_downloadaddocument/manuscript-guidelines-1.0.pdf](https://www.springer.com/cda/content/document/cda_downloadaddocument/manuscript-guidelines-1.0.pdf) and [https://www.springer.com/cda/content/document/cda\\_downloadaddocument/Manuscript+Key+Style+Points?SGWID=0-0-45-1410203-p175157688](https://www.springer.com/cda/content/document/cda_downloadaddocument/Manuscript+Key+Style+Points?SGWID=0-0-45-1410203-p175157688).

All the 23 papers proposed for the Springer proceedings were made ready for publication according to the above-mentioned standards.

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The Editors  
Alexandra Horobet  
Lucian Belascu  
Persefoni Polychronidou  
Anastasios Karasavvoglou

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# The Publicly Declared Customs Union Between Albania and Kosovo (1244 Security Council Resolution)



Victoria Pistikou

**Abstract** Leaders of Albania and Kosovo have publicly declared that they plan to create a customs union in order to abolish the traditional borders between them. They also claimed that the abolition of borders will inevitably occur with the accession of Albania and Kosovo to the EU. The aim of the paper is to examine whether such a union is possible and assess if this move primarily reinforces economic integration or it is the means of fulfillment of foreign policy objectives. Testing the validity of the theoretical framework, according to which regional trade agreements and even more bilateral free trade areas allow stronger states to further influence weaker states, I examine the case of the creation of the customs union between Albania and Kosovo (under the 1244 Security Council Resolution). First, I analyze the economic conditions under which the potential customs union is going to be made and to what extent basic principles of the background theory is satisfied for a successful endeavor. More precisely, I use and analyze macroeconomic indicators and bilateral economic relations. In addition, I analyze the economic and political motives of the creation of the customs union through a quantitative and qualitative analysis. I conclude, that the creation of the customs union between Albania and Kosovo is more the first step for the fulfillment of Albania's foreign policy goals rather than an effort of the economic upgrade of a Balkan country which struggles to become a member of the EU.

**Keywords** International economic relations · Economic integration · Customs union · Albania · Kosovo

**JEL Classification** F15 · F52 · F53

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# 1 Introduction

The aim of the paper is to examine the potential creation of customs union between Albania and Kosovo. The main argument is that the motives are rather political than economic and additionally, promote Albania's nationalistic aspirations in the region. The paper contributes to the customs union literature by assessing whether political motives may become the overarching factor in motivating an (customs union) initiative in an otherwise rather fragile and weak economic environment, such as the case of the Western Balkans and more specifically between Albania and Kosovo. By analyzing the economic and political dimension of a potential customs union in a case which has not been analyzed yet this paper attempts to justify the reasons that such an agreement may be the first step for altering the balance of power in the Balkans as a means of irredentism, similar to the German-Austrian customs union project of 1931 (Stambrook 1968).

In theory, according to Gilpin (1981), those who agree with the argument that today's economic interdependence has changed the environment and the nature of international politics, should be more skeptical, since groups and states have managed to increase their gains through economic growth and international cooperation, since economic interdependence and mutual gains has not yet diminished state's efforts for promoting their national interests against the others. Mastanduno's argument in "Economics and Security" (1998) is that economic policies are supportive of security issues and therefore, economy is a tool of foreign policy which should be used according to state's strategic principles.

The analytical framework aims to show the correlation between political and economic motives of the potential customs union between Albania and Kosovo. Determinants such as foreign policy objectives, bilateral economic relations as well as macroeconomic indicators are used in order to show the economic compared to the political aspect of this initiative (customs union). In particular, indexes such as GDP, GDP growth, GDP per capita, GNI per capita, HDI and bilateral economic relations, such as trade and foreign direct investments define the economic environment under which a preferential trade agreement, in this case a customs union, is going to take place. In addition, foreign policy objectives and state's international economic relations define the political motives.

Last but not least, the analytical framework is implemented in the case of Albania and Kosovo. The publicly declared customs union between Albania and Kosovo was selected for the following reasons: First, it is interesting to examine why a state like Albania, who wishes to become a member-state of an economic union like the EU and at the same time joins a regional trade agreement (CEFTA), wants to create a separate customs union with Kosovo which has not recognized as a state and faces security challenges. Second, this case includes both political and economic motives which allow the comparative approach of the issue and third, because this case is highly correlated with the status-quo and the balance of power in the region of the Western Balkans, therefore it is significant to examine the role of customs union in an unstable political environment.



## 2 Theoretical Framework: The Economic and Political Aspect of Regional Trade Agreements

International Political Economy focuses on the interaction between state and non-state actors in global level, regarding economics. As Cohn mentions, “*It is difficult to separate economics from politics, because governments may intervene in the market in efforts to improve economic performance, ensure that wealth is distributed more equitably, or correct for market failure.*” (Cohn 2016). The dependency path is the most significant factor in International Political Economy since it shows the causal effects, which sometimes are ignored in the analysis. Since the end of World War II, a new global economic order established under the principles of trade liberalization and economic integration. In 1944 the creation of International Monetary Fund and World Bank and in 1947 the General Agreement on Tariffs and Trade was the beginning on a new era in international economic relations. The liberalization of trade was also reinforced by Regional Trade Agreements. According to Ravenhill (2017: 141), “*one-half of world trade is now conducted within these preferential trade agreements*”. Preferential Trade Agreements consist of several types, such as Free Trade Area (FTA), Customs Union (CU), Common Market (CM) and Economic Union (EU) which may lead to a Political Union (PU), which is now a challenge for the European Union. However, based on the dependency path, the reasons for creating such agreements are both economic and political.

Regarding the first type, states of the Free Trade Area, such as NAFTA or ASEAN, eliminate trade tariffs among them however they maintain their tariff policies in commercial relations with no partners. In economic terms, a Free Trade Area widens trade in goods and services and increases distribution of production. In political terms, a Free Trade Area is not a threat for national sovereignty, especially for states with fragile political relations, meaning that regional partners maintain their right not to share their gains resulting from economic relations with no partner. For example, Mexico, which is in NAFTA, has trade agreements with more than 30 countries.

In Customs Union, partners not only do they eliminate tariffs among them but also, they adopt a common customs tariff against non-partners. In economic terms, all partners rely upon a common external tariff, so they are obliged to harmonize their national rules and regulations. This may also have distributing effects depending on which products are included in the common external tariff. It is also possible to gain more due to completeness and economies of scales. In political terms, there is a higher level of economic interdependence than in FTA's, since regional partners lose control on imposing tariffs according to their interests and their needs on non-partners. Consequently, they cede their autonomy in the exercise of foreign economic policy. For example, United Kingdom was not willing to sacrifice its privileges resulting from the Commonwealth. However, it joined the EU only when it raised its commercial relations with Europe. Customs unions, according to Cooper and Massell (1965) were created for political not economic reasons and according to Hirschman's argument, domestic policies play crucial role in supporting the creation of a customs

union, especially “*from those who expect to benefit from trade diversion*” (Cai 2010: 10).

Common Market presupposes the previous characteristics plus the free labor and capital mobility. In economic terms, partners of common market tend to create similar economic structures, such as the E.U. and in political terms, Common Market eliminates the national boundaries for labour. However, it is difficult for governments to lose their autonomy in exercising their own economic policy, that’s why it takes years of negotiations, until the involved states reach an agreement, like in the European Union, for example.

Economic Union maintains the characteristics of the previous types of regionalism plus the harmonization of industrial, regional and monetary policies as well as transportation and fiscal policies. In addition, the Political Union is more a federal political system rather than an agreement among sovereign states, since it maintains all the above elements plus common foreign and defence policy (Salvatore 2016; Ravenhill 2017; Cohn 2016).

However, the answer to the question why regionalism is attractive to states is that they have both economic and political motives joining such groups. Regarding the political motives, states use economic sources in order to achieve a political goal. Enhancing security, upgrading their bargaining power, enhancing their reliability on reforms to foreign investors as well as the fact that negotiations within a regional trade agreement is much easier than those within the WTO (Ravenhill 2017), are some of the political motives which explains why states promote regionalism.

More specifically, security is the major determinant which defines for state’s survival, given that the international system is anarchic, meaning that there is not a superior authority which can impose norms or policies over states or define their behavior. In addition, economic policies are supportive of security issues, since economy is a tool of foreign policy. As Mastanduno (1998) mentions, the state’s strategic principles are primarily based on three variables. The first is the structure of the International System, the second is the role of policy-makers and the third is the state’s position in international economic competition.

However, on one hand, economic cooperation is limited between states, since it creates asymmetric gains for each partner, therefore states care more about relative gains (Grieco 1988) than absolute gains and on the other hand, regional trade agreements do not guarantee state’s security. According to Gilpin, those who agree with the argument that today’s economic interdependence has changed the environment and the nature of international politics, should be more skeptical, since groups and states have managed to increase their gains through economic growth and international cooperation. When the levels of economic interdependence start rising, states become more suspicious regarding the loss of their autonomy and the costs involved, as the result of interdependence. This is due to the fact that societies care more for their gains and they are not willing to sacrifice their welfare in favor of interdependence. The raising levels of economic interdependence make states more anxious about preserving their autonomy, their access to foreign markets and valuable raw materials as well as the cost that economic interdependence entails (Gilpin 1981).

However, a regional trade agreement becomes a useful tool of economic diplomacy in security issues, since it can be used as reward especially from the great powers. For example, the United States in order to reward Israel as a security partner they negotiated their first regional trade agreement in 1985 (Ravenhill 2017) and after the terrorist attacks in 9/11 the Bush administration negotiated RTA's with countries of high strategic significance. Australia and Japan is also one more example (Higgot 2004; Kelton 2008; Ravenhill 2017; Capling 2008; Wesley 2008)

In addition, RTA's can also operate as bargaining tool, since many countries wanted to enhance their bargaining position against transnational corporations. Especially less developed countries not only do they use RTA's in order to secure foreign aid from donor countries but also to create coalitions with other less developed countries and strengthen their negotiating position, achieving goals which would not had been achieved if they had acted individually. Nevertheless, given that power defines negotiations, less powerful states have to face unequal bargaining (Ravenhill 2017; Drahos 2003).

Moreover, FTA's affect state's reliability for inward investments, since they guarantee the implementation of domestic reforms. In particular, compared to WTO, within an FTA less countries are involved therefore, it is easier for them to monitor a state and if this state deviates from its commitments then it will face direct retaliation from other regional partners.

Regarding the economic motives of regionalism, one aspect is that weak producers can be protected and further strengthen in regional level, because they wouldn't survive in international competition. In addition, regionalism creates the necessary conditions for deeper integration. In particular, for some states, regionalism is the opportunity they need in order to secure the implementation of an agreement. For example, in WTO would be more difficult for states to reach a consensus, due to bigger diversity, than in regional level. The reason for this is that some states are willing to proceed in deeper integration including more sectors that the removing of tariff barriers (Ravenhill 2017). In that way, states will achieve the creation of a competitive economic environment under equal terms.

Another economic motive is that through regionalism the creation of bigger markets and the raise of foreign direct investment (FDI) is a realistic goal for the following reasons. First, a regional trade agreement can widen domestic markets because of economies of scale, under the condition that the size of the market is capable of supporting economies of scales. Second, FTA's can increase foreign direct investments because of their impact on the cost of production. That is to say that maybe is more attractive for a company to take advantage of the labour cost within the regional market than before. For example, FDI in Mexico increased from 8 billion USD in 1990 to 14 billion USD in 1997, as well as in ASEAN. This enables governments to advance their economies and become regional hubs. Attracting more companies (Ravenhill 2017).

However, this does not mean that there are no costs in regional trade agreements. Two of the most significant disadvantages are the trade creation and the trade diversion (Viner 2014). The former occurs when imports from a regional partner with higher production cost replace those products which are produced domestically, in

lower cost. To put it simple, when the domestic production is replaced by imports. The later occurs when regional imports from a regional partner replace those imports of a non-regional partner. Due to the common external tariff, imports from a non-regional partner are no longer price competitive (Cohn 2016; Ravenhill 2017).

However, up to now, RTA's seem that they increase the value of trade among regional partners as well as foreign direct investments and it is rather vague that they have significantly affect trade diversion, nevertheless it seems that they have small impact on prosperity.

### 3 Analytical Framework

The academic discussion on Regional Trade Agreements not only does it focus on economic aspects but also underlines the political aspect of foreign economic policy. In particular, there are many scholars who argue that Regional Trade Agreements are used in order to promote political goals or as a political support among strategic allies. The creation of the European Union is a good example. The outbreak of the Cold War after the end of World War II, emphasized the importance of economic diplomacy in foreign policy. The Marshall Plan was the first program of foreign aid that was implemented in Europe, serving both an economic and a political goal: the economic goal was the economic recovery of European countries and the political was the creation of a field of containment of the Soviet influence (Ravenhill 2017; Cohn 2016).

In addition, European leaders also supported the idea of creating a western alliance against the Soviet Union, however, technological superiority of the US and Japan was an important determinant which led to the Treaty of Maastricht for further economic integration within the EU (Cohn 2016; Salvatore 2016; Baldwin 1997).

According to Moravcsik (2013), European integration is the result of interstate cooperation among states which act rationally in order to promote their economic interests and not the initiative of supranational institutions, such as the European Commission or the European Court (Ravenhill 2017; Baldwin 2008). Moreover, the regionalization process in East Asia, despite the fact that it was initiated autonomously by market forces, it was then institutionalized due to the greater interstate involvement (Cai 2010).

According to Rosen (2004), the US-Israel and US-Jordan FTA's support political and not economic goals, since US political interests in Israel and Jordan are much more important than economic ones. As he mentions "*The United States' foreign policy interests in these countries and the region are much more significant than its economic interests. Although the agreements serve several objectives, the primary reason the United States entered into them was to pursue foreign policy goals.*" (Rosen 2004: 51). The author analyses the strategic goals for the partners involved in the agreements and then focuses on US-Israel and US-Jordan bilateral trade. He concludes that "*Both the US-Israel and US-Jordan agreements unambiguously exemplify the use of free trade agreements as tools of foreign policy. In each case,*

*the foreign policy objectives far outweighed the economic objectives as the United States entered into the agreement.”* (Rosen 2004: 73).

In addition, Feinberg mentions that *“as the US has engaged in FTA negotiations, it has aggressively pursued a variety of US interests”* (Feinberg 2003: 1019). Examining NAFTA and FTAA analysis the motives of the US administrations to conduct these agreements. The author concludes that *“US diplomats and firms did perceive a plethora of advantages in hemispheric commercial integration, in the economic, political and foreign policy realms, advantages that were both instrumental and strategic in nature”* (Feinberg 2003: 1027–1028).

Weintraub (2004), examined the case of RTA between Chile and Singapore based on the key elements of the agreement as well as the motives which led the two countries to conduct this agreement. The author concludes that RTAs are more likely to remain in bilateral than in global level and cause further discrimination instead of ending it.

Taking the above into consideration, most of the scholars use foreign policy objectives as the dependency path in order to interpret the causes of the creation of an FTA and trade volume between the partners of the regional trade agreement. In this paper the analytical framework is the following:

First, according to the theory, I consider states as the dominant actor and in order to show the causal effect in dependency path I focus the foreign policy objectives and economic diplomacy which is used a tool in order to serve these objectives. Besides, economic diplomacy is the use of economic means for the achievement of political goals. In this way I highlight the framework under which economic tools are in line with political goals.

Second, as another determinant I use macroeconomic indicators in order to show the economic balance of power in relation to the dependency path and then I analyze the main principles of the regional trade agreement between the two partners in order to show the correlation between economic and political motives. However, in this case there is not yet a final agreement, since it has only been declared publicly, therefore we focus only on the fact that it concerns a customs union, that is a common external tariff, between a state and a disputed area.

In addition, it is also important to take into consideration indexes, such as Gross National Income per capita as well as the Human Development Index, since the latter emphasizes people's capabilities in development measuring three key dimensions: a long and healthy life, being knowledgeable and having a decent standard of living. These two indicators will help us create a more accurate view about the potential dynamics that can be developed by the two economies, since customs union by itself is not a panacea for a state's economy and development, since great economic powers existed before the creation of customs union or other form of regionalism. Of course, customs unions and other regional trade agreements promote trade, contribute to the creation of bigger markets and the raise of foreign direct investments, however, economic growth and development depends on many other factors as well as the distributional effects.

Therefore, customs union does not guarantee state's economic growth and development, either among developed or developing countries and there are several examples which support this view. Indicatively, after the formation of the EU-Turkey customs union, there were many tariff losses for Turkey due to trade deflection, there was no significant raise of foreign direct investments (Togan 2015) and the custom union “*has only partially helped Turkey's exporting performance.*” (Akkemik 2011: 273).

Another example is the Southern African Customs Union (SACU), which established in 1910, and consists of Botswana, Lesotho, Namibia, South Africa and Eswatini (formerly known as Swaziland). According to the World Bank (2019d), Lesotho and Eswatini are lower middle-income economies and Botswana, South Africa and Namibia are upper middle-income economies, while their top import and export markets are strong global actors such as the EU, the US and China (SACU 2019). However, according to Table 1, these countries are classified between low and middle HDI. This suggests that the customs union has not critically affected economic growth and development.

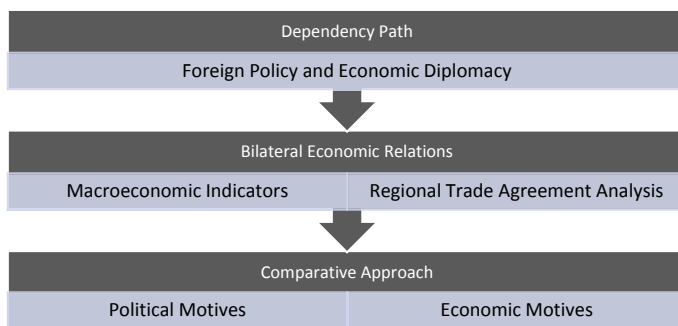
Another example is the Economic and Monetary Union of Central Africa (Communauté Economique et Monétaire de l'Afrique Centrale (CEMAC), which established in 1994 and consists of Cameroun, Central African Republic, Congo, Gabon, Equatorial Guinea and Chad. Central African Republic and Chad are low income economies, Congo and Cameroon are lower middle-income economies and Equatorial Guinea and Gabon are upper middle-income economies (World Bank 2019d). As it is illustrated in Table 1, despite the fact that some countries have raised their GNI per capita after the formation of the custom union, they remain at the lowest levels regarding development. According to the Human Development Index, CEMAC countries are classified between low and middle HDI, except Botswana

**Table 1** Development indexes

Country	GNI per capita (2017) <sup>a</sup> , USD	HDI (2018)/Rank <sup>b</sup>
Botswana (SACU)	6.730	0.717/101
Cameroun (CEMAC)	1.370	0.556/151
Central African Republic (CEMAC)	390	0.367/188
Chad (CEMAC)	640	0.404/186
Congo (CEMAC)	1.430	0.606/137
Equatorial Guinea (CEMAC)	7.050	0.591/141
Eswatini (SACU)	2.950	0.588/144
Gabon (CEMAC)	6.650	0.702/110
Lesotho (SACU)	1.210	0.520/159
Namibia (SACU)	4.570	0.647/129
South Africa (SACU)	5.430	0.699/113

<sup>a</sup>Source World Bank (2019d)

<sup>b</sup>Source United Nations Development Programme (UNDP) (2019)



**Fig. 1** Analytical framework

which is among countries with high HDI (more than 0.712). Also in this case, the regional trade agreement did not affect significantly its member states, in order to achieve higher rates of economic development and growth.

Third, I follow a comparative approach in order to conclude whether economic, or political or both economic and political objectives are better achieved, in order to conclude which objective, economic or political is better achieved. The analytical framework is illustrated below in Fig. 1.

## **4 The Publicly Declared Customs Union Between Albania and Kosovo (1244 Security Council Resolution)<sup>1</sup>**

### ***4.1 Foreign Policy and Economic Diplomacy: The Political Motives***

The case of the creation of customs union between Albania and Kosovo is peculiar. Up to now, all regional trade agreements was among states, however, this future agreement will be between a state (Albania) and an area (Kosovo) which is a disputed territory and partially recognized as a state. In the current paper, Kosovo is considered as a disputed area and not as a state.

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<sup>1</sup>

This resolution provides a framework for the resolution of the conflict in Kosovo by authorising the deployment of an international civilian and military presence that would provide an international transitional administration and security presence that would oversee the return of refugees and the withdrawal of military forces from Kosovo. The resolution also states that the international civilian presence will facilitate a political process to determine the future status of Kosovo. (United Nations Peacemaker 2019)

The political objective which defines Albania's economic diplomacy with Kosovo is the unification between them. Albania has close ties with Kosovo, due to the Albanian population living there, and according to polls, many Albanians are in favor of unification (Sulçebe 2014; Balkan Insight 2019). In addition, both leaders promote unification by 2025. According to the Albanian Prime Minister Edi Rama, Albania and Kosovo need *"to begin working on a common strategic draft that will unite Albanians by the year 2025"* (Greek Reporter 2019). Of course, Albania supported and recognized from the beginning the independence of Kosovo, characterizing it as the *"right decision, which ensures long-term peace and stability in the region."* (Ministry for Europe and Foreign Affairs 2019a).

Albania became a NATO member in 2009 and in June 2014, was awarded candidate status by the EU hoping to become a full member of the European Union with the rest of the Western Balkans. However, Croatia was the only state of the Western Balkans which managed to become the last member of the EU in 2014 and it is rather unclear whether the European enlargement will finally be completed (Vachudova 2019; Ker-Lindsay et al. 2017; Kellermann 2016).

Albania's regional policy is formed in order to increase security, prosperity and economic growth and supports regional cooperation process as well as the European and Euro-Atlantic integration, however, European integration is a common objective for Albania and Kosovo. Thus, Albania helps Kosovo with the establishment of European integration institutions. (Sulçebe 2014). In addition, Albania supports free movement of factors of production, such as labor and capital as democratization, peace and stability (Ministry for Europe and Foreign Affairs 2019a) and it is also member of regional organizations, such as the Adriatic Ionian Initiative, the South-East European Cooperation Process (SEECP) as well as the Regional Cooperation Council (RCC).

On the other hand, economic diplomacy, serves Albanian interests in multilateral and bilateral level. In multilateral level, Albania along with the rest Western Balkans, also known as *"WB6 Contracting Parties"* (Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro and Serbia) established the Western Balkans Fund in order to *"boost cooperation between its members, to strengthen relations and regional cohesion and to advance integration into the European Union."* (Ministry for Europe and Foreign Affairs 2019b). In addition, Albania is also a founding member of the Organization of the Black Sea Economic Cooperation (BSEC). This organization aims to enhance cooperation among member states in several economic sectors, such as transport and communication infrastructure, economic and trade information, energy, tourism, agriculture, science and technology, etc. Moreover, Albania, Bosnia and Herzegovina, Croatia, Kosovo, North Macedonia, Moldova, Montenegro and Serbia established in 2006 the Central European Free Trade Agreement (CEFTA 2019; Ravenhill 2017) in order to promote *"economic development and the EU accession agenda in the region"* (CEFTA 2019).

Of course, we have to mention that Albania's relations with Kosovo also include the cultural dimension, in order to create *"a common cultural "Albanosphere"* (Sulçebe 2014: 8). In addition, common educational programs also reinforce the achievement of this objective, since Albania and Kosovo have agreed to common



school textbooks and try to promote further Higher education and scientific research as well as the teaching of Albanian language, in order to create a common national identity. Needless to say, that all the above can only be supported by strong economic ties.

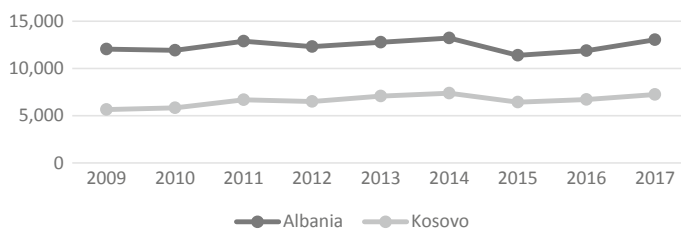
## 4.2 *Bilateral Economic Relations: The Economic Motives*

In order to analyze bilateral economic relations, I focus on economic power of each partner in order to define the context under which the regional trade agreement, in this case the customs union, is going to take place. Then I analyze the economic interdependence between the two partners in order to examine the economic dimension, that is to say, the necessity of this agreement. In the case of Albania and Kosovo there are only trade relations and complete absence of foreign direct investments in bilateral level. Therefore, I only examine bilateral trade. Regarding macroeconomic indicators, I focus on GDP, GDP growth, GDP per capita, GNI per capita and Human Development Index.

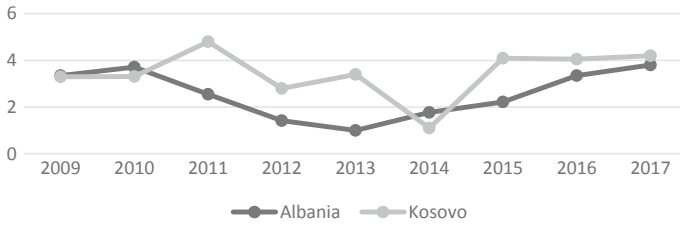
Regarding GDP, as it is illustrated in Fig. 2, Albania's rates are higher than Kosovo's, not only because of differences in economic structure but also due to population. In particular, Albania's GDP was raised from 2009 to 2017 by 8.2%, reaching 13.039 billion USD. On the other hand, Kosovo's GDP was also raised during the same period by 28.1%, reaching 7.245 billion USD. In absolute numbers, Albania's nominal GDP is higher, however, Kosovo's GDP was raised more compared to Albania's GDP. This is also noticeable focusing on the GDP growth in Fig. 3. More precisely, Kosovo has higher rates especially in the period between 2010 and 2013 and from 2015 onwards. Albania on the other hand, from 2010 to 2013 had a significant decline however, the rest of the years managed to recover. Nevertheless, Albania's GDP growth remains lower than that of Kosovo.

As far as GDP per capita is concerned, according to the data in Fig. 4, it slightly raised for both Albania and Kosovo. More specifically, in 2009, Albania's GDP per capita was 4.114 USD, while Kosovo's was much lower, 3.209 USD, approximately.

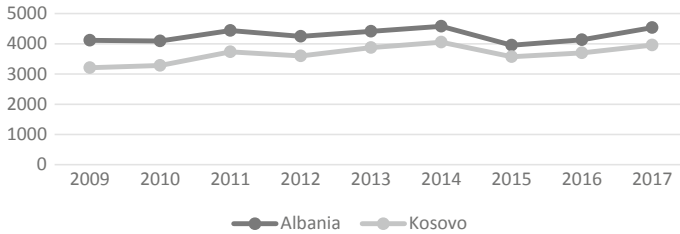
Five years later, in 2014, there was a slight increase with the highest rates for both partners. In particular, for Albania, GDP per capita reached 4.578 USD and



**Fig. 2** GDP, billion USD (2009–2017). *Source* World Bank (2019a)



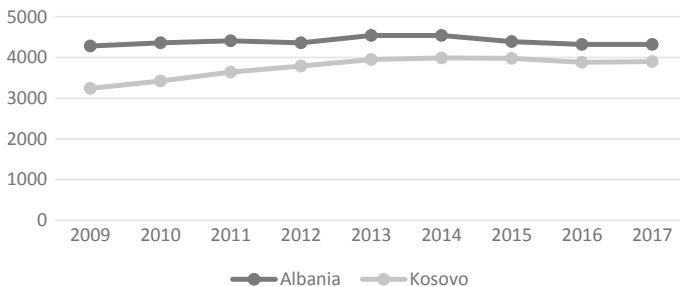
**Fig. 3** GDP Growth (annual %). *Source* World Bank (2019b)



**Fig. 4** GDP per Capita (USD). *Source* World Bank (2019c)

for Kosovo 4.054 USD. The next years after some fluctuations, Albania’s GDP per capita reached in 2017 4.537 USD, while Kosovo’s GDP per Capita reached the same year 3.957 USD. Therefore, within eight years, Albania’s GDP per capita increased only by 10.2% and Kosovo’s increased by 23.3%.

Regarding Gross National Income in Fig. 5, Kosovo is classified among lower middle-income economies, with a GNI per capita between 996 and 3,895 USD and Albania among upper middle-income economies, with a GNI per capita between 3.896 and 12.055 USD (World Bank 2019d). According to the available data, in 2018 HDI for Albania was 0.785 (United Nation’s Development Programme 2019) and in 2016 the HDI for Kosovo was 0.741 with “poor performance of the private sector in



**Fig. 5** GNI per capita (USD). *Source* World Bank (2019e)

*job creation and the strong link between unemployment and socio-economic exclusion*” (United Nation’s Development Programme 2016: 14) meaning that Albania ranked in the 68th and Kosovo in 85th globally.

These two indexes reflect not only the current situation of the two economies but also their potential dynamics. In one hand there are two weak economies with low GDP, GNI and HDI rates and on the other hand, Kosovo receives foreign aid for state-building and peace-building in order to address security issues and poverty.

In particular, in bilateral level, Kosovo has received from USAID, 157 million USD and sectors such as Government and civil society, Business, Banking, Education, Conflict Peace and Security absorbed most of the aid, meaning that these sectors are top priorities (USAID 2019). In multilateral level, the EU Institutions are the top donors for Kosovo, spending 156.5 million USD for the years 2016–2017 (OECD 2019). Albania also receives foreign aid. In multilateral level Albania received from the EU institutions 86.2 million USD and in bilateral level received from Germany 60.32 USD (OECD 2019).

As far as economic diplomacy is concerned, Albania and Kosovo have strengthened their economic ties. Kosovo is Albania’s one of the most important export partners, however, their bilateral economic ties concern only trade and their partnership through CEFTA, since there is absence of foreign direct investments.

In particular, as it is illustrated in Fig. 6, the trade balance between Albania and Kosovo is positive, since Albania’s exports are much more than imports, especially from 2015 onwards, which reached 270 million USD. Imports, on the other hand, also raised from 28.6 million USD in 2015 to 89.9 million USD, however, Kosovo is not a significant import partner for Albania.

As it is illustrated in Table 2, Kosovo is significant mainly for Albanian exports, since from 2009 to 2018 is in top 6 export partners. Regarding import partners, Kosovo, from 2009 to 2015 was in 24th and 25th place respectively and only the years from 2016 to 2018 was in 17th and 16th place respectively.

In the first places is mainly Russia, France, Spain and the USA. This makes sense because, usually, developing economies trade more with developed economies while developed economies trade more with each other. Thus, international trade is



**Fig. 6** Albania’s trade in goods with Kosovo, 2009–2018 (mil. USD). *Source* International Monetary Fund (2019)

**Table 2** Kosovo ranking place as Albania's import and export partner

Year	Imports	Exports
2009	24	3
2010	27	2
2011	24	2
2012	27	4
2013	25	6
2014	24	5
2015	25	5
2016	17	2
2017	15	2
2018	16	2

Source International Monetary Fund (2019)

dominated more by North-North and North-South relations rather than South-South relations.

## 5 Conclusions

The aim of the paper was to examine the potential creation of customs union between Albania and Kosovo. The main argument that the motives are rather political than economic seems to be confirmed, because the economic dimension does not support this initiative. More specifically, Albania and Kosovo are already members of a free trade agreement (CEFTA), however, their economic ties have not been developed and only concerns trade relations, while the absence of foreign direct investments is noticeable. Therefore, if their economic capabilities have not been improved through a free trade area, a customs union, by imposing a joint external tariff will not make a difference.

Regional Trade Agreements can be used for political objectives, either to enhance a country's bargaining power or to contribute to security issues, especially from the great powers. US, in particular, conducted preferential trade agreements with countries strategically significant for their interests, such as Jordan or Israel. That is to say, that although states have both political and economic motives in order to join a regional trade agreement, the limits of economic cooperation resulting from the relative gains, strengthen the political dimension of RTAs.

In addition, the effectiveness of customs union and thus the impact on economic growth and development, depends on the economic environment in which takes place. In particular, there are many less developed countries which join customs union or other forms of regional trade agreements, however, the rates of economic growth and development remain low. In the case of Albania and Kosovo, as the

economic analysis showed, they are both weak economies with low national income and production and at the same time Kosovo highly depends on foreign aid, due to the fact that lacks social and economic structures to further support economic activity. Moreover, the adoption of a common external tariff in goods or in goods and services will rather deteriorate Kosovo's weak economy due to trade diversion, since Albania has a continuous and raising trade deficit from 1995 (Trading Economics 2019). This shows that Albania depends more and more in imports, making its production cost higher than others. Consequently, Kosovo cedes its ability to exercise an independent external economic policy, on the contrary, it is further dependent to the weaknesses and vulnerabilities of the Albanian economy.

Third, both Albania is candidate and Kosovo potential candidate for joining the E.U., after they complete the necessary reforms (European Commission 2019). This means that the perspective is to become members of a common market, joining all the benefits with other states. However, Albania and Kosovo tend to create a subsystem which, potentially, is going to competition in the region or cause more instability in an already vulnerable area. The fact that Albania and Kosovo want to create a closer economic cooperation outside CEFTA shows that the two partners are not willing to share their gains. This comes in contradiction with "*economic development and the EU accession agenda in the region*" as it is mentioned (CEFTA 2019). Again, economic data do not support the creation of customs union and as a result, the political cost will be higher than the economic gains. In addition, customs union raises the trade barriers within a region and among its members. However, in this case, Albania and Kosovo seem to use the customs union to impose barriers against others in the region, escalating, thus, the competition.

Last but not least, members of customs union enhance their bargaining power, since they have common interests and they have harmonized their policies. In this case, Albania and Kosovo have the opportunity to negotiate as a unit in international level, using customs union as a soft power in order to promote their interests. This will enable Albania to promote the political and then territorial unification with Kosovo, since there are more factors which support this development, such as the Albanian population living in Kosovo and the common language and national identity. Therefore, the potential creation of a customs union will rather fulfil Albania's political than economic motives, by promoting Albania's foreign policy objectives, since their bilateral economic cooperation is based primarily on "territorial unification" and secondarily on economic issues.

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# Building Resilience Through Cross-Border Cooperation Romania, Moldova, and Ukraine. A Comparative Analysis Between Euroregions “Upper Pruth” and “Lower Danube”



Anatolie Cărbune

**Abstract** An assessment of economic and social potential of Euroregions “Upper Pruth” and “Lower Danube” reveals a wide spectrum of opportunities for cooperation, which would boost regional development and build resilience. However, there still exist several obstacles, which should be tackled in order to reach the desired goals. The aim of this article is to identify the opportunities and the obstacles that reduce the efficiency of cross border cooperation initiatives between Romania, Moldova and Ukraine. The passivity of Moldavian side could be explain by several factors, such as the inefficiency of administrative - territorial structures in creating and promoting own projects, lack of strategies and plans for regional integration which would exploit the benefits of CBC, insufficient allocation of money on a local level, as well as corruption. Within this paper, the concept of resilience will be used to assess and to identify the risks and vulnerabilities of both Euroregions and their impact on cross border cooperation. The research method is non-participatory observation. In addition, we use quantitative variables to assess and to compare the economic potential of both Euroregions. The conclusions of our study is that institutions and administrative management play a major role in cross border cooperation, and their lack of efficiency will lead to rather weak outcomes and less resilience. In addition, there is a tendency towards ignoring cross-border cooperation when discussing about building resilience within EU’s neighbourhood, therefore our study aims at filling this gap.

**Keywords** Cross-border cooperation · Resilience · Regional development · Institutions · Opportunities

**JEL Classification** O1 · R1 · F5

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# 1 Introduction

In such a dynamic and complex international system as we have nowadays, cross-border cooperation has become a tool for overcoming historical barriers. Cross-border cooperation is a concept initiated by the EU in order to encourage and increase the cooperation between the states with common borders. In the case of the European Neighbourhood Policy, cross-border cooperation represents a key priority for the EU, since it seeks to secure its external borders. A special focus is given to cross-border cooperation between Romania, Moldova and Ukraine. Despite the geographical proximity between the three countries, there are still many issues from the economic, social and political point of view for regions near common borders. Therefore, cross-border cooperation is seen as an important tool for regional development and for promoting common interests within common initiatives. Taking into account that the common border between Romania, Moldova and Ukraine represents also the dividing line between EU space and non-EU space, approaching relations in this case through cross-border cooperation is even more important. Furthermore, as Moldova and Ukraine are often prone to external pressure from Russia, a wide range of risks and vulnerabilities affect their security and their economic development (Barbulescu et al. 2016). Within this context, cross-border cooperation should be approached through the lens of resilience, as Eastern part of Europe is insecure due to the current geopolitical implications and internal instability. Furthermore, it is important to understand how barrier effect creates obstacles to cross-border cooperation and how good governance could be achieved by creating network on a democratic governance basis (Anderson et al. 2002). When discussing about cross-border cooperation, Euroregions represent the structures that link local entities, in order to build territorial synergy and promote their mutual interests. Participating as a member within Euroregions has positive implications on political cross-border cooperation, which throughout time could create spillover effect in terms of policy cooperation initiatives (Svensson 2015). Within our paper, the Euregions Upper Pruth and Lower Danube will be analysed, since they represent an interesting case for studying cross-border cooperation between Romania, Ukraine and Moldova.

Our paper strives to examine, on the one hand, the opportunities of cross-border cooperation in both Euregions (Upper Pruth and Lower Danube) and on the other hand, the obstacles that reduce the effectiveness of projects and joint initiatives between the actors involved. The trilateral framework of cooperation requires a greater attention on differentiations between the regions from social, economic and political point of view (Barbulescu et al 2016). Therefore, the policies should be approached according to distinct priorities on a local level. The cooperation between the EU and its partners is highly important, in order to highlight their advantages, through an effective coordination of resources, in particular to support cross-border cooperation (European Parliament and the Council of European Union 2014).

Work of many scholars provides relevant findings regarding issues and challenges related to cross-border cooperation. Economic, social and geopolitical are the most common arguments used by the authors. According to Lepik (2009), the

most common obstacles when discussing about cross-border cooperation are the following: level of trust coming from national institutions, limited financial resources and lack of qualified staff. Bufon and Markejl (2010) identified several weaknesses of cross-border development: ineffective institutional management, passivity of partners, pursuing individual interests rather than looking to the needs of the broader population, competition between local administration, rather than sustainable cooperation. The obstacles should be approached by considering the barrier effect, which has created obstacles for cooperation at institutional, cultural and economic level (Medeiros 2014).

Despite a rich body of academic literature comprised of articles, studies and reports related to cross-border cooperation between Romania, Moldova and Ukraine, there are still many issues and aspects that should be brought into discussion. The role of Romania is not only limited to a partner within CBC initiatives as an EU member, Romania has the responsibility to support the implementation of policies under European Neighbourhood Policy. The conceptual basis of Neighbourhood Policy is the resilience concept, which brought a conceptual vitality within academic literature. However, in the current context, there is a tendency towards ignoring cross-border cooperation when discussing about building resilience within EU's neighbourhood. Therefore, our study aims at filling this gap. Furthermore, in the light of the events which took place in Eastern Europe throughout the last decade (such as the war in Georgia in 2008) and in recent times (the Ukrainian crisis), cross-border cooperation has important geopolitical implications which used to be ignored in the past by scholars.

Taking into account the aforementioned arguments, the Euroregions "Upper Pruth" and "Lower Danube" will be analyzed in order to highlight the obstacles and opportunities of cross-border cooperation, considering the influence of geopolitical realities. Within this analysis, the resilience concept will be used to assess the nature of opportunities and obstacles in order to identify the vulnerabilities and risks of both Euroregions. Therefore, we want to highlight the idea that it is not necessary only to be prosperous, open and efficient, but also to be resilient.

The paper has three parts. The first section of the article gives an overview on the specificities and the differences existing between the Euroregions Upper Pruth and Lower Danube. The second part reveals the most common obstacles in cross-border cooperation between Romania, Ukraine and Moldova. Finally, the third part assesses the opportunities and potential of both Euroregions within several fields of cooperation.

## **2 An Overview on Specificities and Differences of Euroregions "Upper Pruth" and "Lower Danube"**

European Union has actively supported cross-border cooperation, which has throughout time became an important mechanism for deepening and developing

relations with non-EU members within neighbourhood, through the establishment of Euroregions (Scott 2015). As Euroregions operate under an institutional framework and benefit from their own financial resources, a variety of issues can be approached, such as environment protection, trade, security issues, research and development, transport infrastructure (Lepik 2009). Romania, Moldova and Ukraine share a rich and complicated history and have similar institutional structures (Nastase et al. 2017). They are also actors that share important borders within the Eastern neighbourhood. Fruitful cooperation near common borders is needed more than ever, due to the present international context, which is characterized by volatility, when discussing from a geopolitical perspective. The Euroregions Upper Pruth and Lower Danube are important instruments, taking into consideration that three countries are involved. The general aim of establishing these Euroregions is represented by, but not limited to facilitating cross-border cooperation of local administration, institutions, ONGs, supporting business initiatives, increasing mobility in science, culture, sport.

An important factor that determined the formation of both Euroregions is the unitary ethnic structure. Because of historical context, the ethnic homogeneity at EU's Eastern neighbourhood is essential for keeping cohesion within Euroregions. Traditions, culture, mentality, language or historical legacy are factors that determine the homogeneity of the population and communities (CESCI 2016). Along the river Pruth, which is the basis axis of both Euro-regions, 178 settlements can be found on both sides: 99 on the right side and 79 settlements on the left side (CESCI 2016). To be more precise, the majority of the territory is comprised of Romanian population. The hydrographical axis determined the appearance of coupled settlements, like Medeleni-Medeleni or Grozesti-Grozesti (Sageata 2014).

Throughout time, certain large urban centers evolved as spatial structures, with a significant impact on cross-border cooperation: Galati, Husi and Iasi are from Romania and Cahul, Leova and Ungheni are from Moldova (CESCI 2016) (Table 1).

As is shown within the Table 2, there are more border points within Upper Pruth—9, while in the Lower Danube there are only 4. Geographical factors have determined a more accentuated density of crossing points in the Upper Pruth Euroregion, despite the fact that Lower Danube region has a larger territory and a larger population. The dynamic of interactions between cross-border regions in the case of Upper Pruth is the result of regional network interactivity and geographical connectivity determined by proximity. In addition, Lower Danube involves the maritime factor, which limits the territorial interactivity to a certain extent. A more accentuated accessibility through crossing points has several implications: on one hand, it might allow the propagation of external shocks, while also it might be practical in achieving a faster recovery (Osth 2018) (Table 2).

In this case, river Pruth is not only a natural border, but also it is also a dividing line with important geopolitical implications. Therefore, as mentioned above, the border between Romania on one side and Moldova and Ukraine one another side represent EU's external border. In this context, Romania has an important responsibility of securing the border by managing efficiently people mobility and commercials fluxes coming from non-EU space.

**Table 1** Basic information about Upper Pruth and Lower Danube Euroregions (Adapted after Roscovan et al. 2010)

	Upper Pruth	Lower Danube
Historical background	The creation of the Euroregion: 22 September, 2000	The creation of the Euroregions—14 August, 1998
General characteristics	The members of the Euroregion are: Moldova—Balti, Briceni, Edinet, Rascani, Glodeni, Falesti, Sangerei, Donduseni, Ocnita; Romania—Botosani and Suceava; Ukraine—Cernauti region	Moldova—Cahul, Cantemir Romania—Braila, Galați, Tulcea Ukraine—Odessa
Organizational Structure	The Euroregions have the following organizational structure: The Council of the Euroregion, the President of the Council, the Secretary of the Council, Work Commissions of Euroregion	The Euroregions have the following organizational structure: the Council of the Euroregion, the President of the Euroregion, the Vicepresidents of the Euroregion, commissions on specific fields, Centre for Coordination
Main goal and common fields for cooperation	<i>The main goal:</i> extending the existing sub regional links in order to support the cooperation of administrative territorial units <i>Common fields for cooperation:</i> economic relations, development of cross-border infrastructure, ecological security and environmental protection, cooperation within educational, scientific and cultural fields, protection of population's health, development of tourism	<i>The main goal:</i> the promotion of CBC in the lower basin of Danube <i>The main objectives:</i> organization and coordination of actions in order to stimulate economic, cultural, ecologic and educational cooperation <i>Common fields for cooperation:</i> economic cooperation, ecology, infrastructure projects, demography, education, mitigation of natural hazard, fight against organized crime

Taking into consideration the events that have occurred in Eastern European (the political crisis in Ukraine, the war in the Eastern part of the country, the conflict between Russia and Ukraine, the frozen conflict in Transnistria or the unstable political situation in Chisinau), it becomes necessary to reconsider the framework of cross-border cooperation within the context of European Neighborhood Policy guidelines and provisions.

**Table 2** Border-crossing points at Romania's Eastern frontier (Adapted after Sageata 2011)

Custom point	Connection to	Passage to	Transport regime	Traffic regime	County	Euro-region
Galati	International waters		Port free zone	International	Galati	Lower Danube
	Girgiule sti	Moldova	Road railway			
Izvoarele Sucevei	Sept(Sipot)	Ukraine	Road	Small border traffic	Suceava	Upper Pruth
Oancea	Cahul	Moldova	Road	International	Galati	Lower Danube
Racovat	Diakivtzi	Ukraine	Road	Small border traffic	Botosani	Upper Pruth
Radauti-Prut	Lipcani	Moldova	Road	International	Botosani	Upper Pruth
Sirct	Porubne	Ukraine	Road	International	Suceava	Upper Pruth
Stanca	Costesti	Moldova	Road	International	Botosani	Upper Pruth
Suceava	International airport		Air flights	International	Suceava	Upper Pruth
Sulina	International waters		Port free zone	International	Tulcea	Lower Danube
Tulcea	International airport		Air flights	International	Tulcea	Lower
	Ismail	Ukraine	Port	International	Tulcea	Danube
Ulma	Rusca	Ukraine	Road	Small border traffic	Suceava	Upper Pruth
Vicovu de Sus	Krasnoilsk	Ukraine	Road	Small border traffic	Suceava	Upper Pruth
Viscani	Vadu Siret	Ukraine	Railway	International	Suceava	Upper Pruth

### 3 Obstacles and Risks in Cross-Border Cooperation Within Upper Pruth and Lower Danube Euroregions

Despite a rich amount of studies conducted on cross-border cooperation between Romania, Moldova and Ukraine, there was a tendency to ignore the nature of threats and risks from a multidimensional perspective and their potential negative impact (Vasylova 2012). Therefore, a broader picture of current situation by highlighting the obstacles, risks and vulnerabilities is needed. In this section, we aim to highlight the idea that, due to numerous negative factors that slow the cooperation between the three countries, regions near the common borders need to be resilient. The resilience has become an important concept for policy-makers, considering that it might be an effective measure to the uncertain and insecure environment that characterizes human societies nowadays (Giacometti et al 2018).

In the recent times there has been a growing interest of researchers on resilience, focused on communities and regional development (Bristow and Healy 2014; Keck

and Sakdapolrak 2013; Bene et al. 2014; Huggins and Thompson 2015). Numerous studies have highlighted the need for deepening the research on resilience from a multidimensional perspective. As resilience was included as one of the top priorities of EU Global Strategy (2016) and of the Review of the European Neighbourhood Policy from 2015, there is a need to see its practical impact. Cross-border cooperation comprises a wide source of opportunities for partners; however, the realities show that the results did not fulfill the expectations. Regions near common border are affected by a wide variety of factors belonging to different categories. In addition, risks and shocks might originate from both external and internal generators. Before the 2008 financial crisis, studies were focused more on the internal sources of risks. The present international context requires a closer look to external disturbing factors, such as economic crisis or events with profound geopolitical implications. In particular, this is a relevant argument for cross-border cooperation in the case of Romania, Moldova and Ukraine.

When discussing about strengthening cross-border cooperation between the three countries, political stability is one of the most important factors (Barbulescu et al. 2016). Any political instability at central level has an influence on decisional processes at regional level. Corruption, internal political battles and tensions are endemic characteristics of the political environment in Moldova and Ukraine. In particular, political unrest affects regional stability, which has a negative impact on cross-border cooperation. Romania, Moldova and Ukraine present different political landscapes, which in turn provide different views on cross-border cooperation in this case. Therefore, at the moment of the establishment of the Euroregions, the three states expressed divergent visions concerning cross-border cooperation. As an EU member, Romania is supporting the accession within Euro-Atlantic institutions; therefore, its role is to promote the principles of cross-border cooperation as part of European integration framework (Roscovan 2003).

The volatile political environment and frequent counterproductive changes have a negative influence on bilateral and multilateral cooperation, as there is a visible lack of synchronicity and divergent objectives between central and regional authorities. In particular, political instability is determining a different level of involvement of partners within projects. Internal battles between parties, divergent political ideologies and different attitudes towards external partners have shaped a rather negative image of Moldova in the realm of foreign involvement. Thus, as external priorities of partners involved are different, it is difficult to reach a common agreement towards several projects. For example, the agreement between EU and Moldova, which was signed in June 2014, implies the reform progress. The implementation process of political and economic reforms has been undermined by political instabilities and structural vulnerabilities of institutions.

Issues within the realm of politics have significant tangents with administrative management. Since there is a lack of support from central government, local and regional authorities have a higher pressure in order to meet the expectations as part of CBC initiatives. Another issue is the lack of communication, which leads to inefficient collaboration and a lower administrative transparency, since the staff within the administrative structures lacks specific communication and negotiation skills. In

addition, both Euroregions lack specific strategic framework in order to lead convergent efforts, overcome divergences and to support an efficient policy making process (Roscovan et al. 2010). Disputes between institutions represent an endemic characteristic of the political environment in Moldova. For instance, there are frequent tensions and disagreements between the State Chancellery and other ministries regarding the management of external funds (Barbulescu et al. 2016). Moreover, due to the frequent political changes in Moldova, the staff within authorities responsible for projects management is often changed as well; thus, the effectiveness of the implementation process is highly affected. It should be mentioned that at the beginning of cross-border cooperation, Moldova has shown a high interest, since many economic advantages and opportunities appeared; nonetheless, the enthusiasm of central authorities has not in practice remained at the same level. The passivity of the Moldovan authorities is the result of several factors, which have their roots in the political, economic and geopolitical realms. The administrative structures from Moldova, which are involved within cross-border cooperation projects, lack the capacity of self-organization and efficient promotion of their initiatives.

Another important issue is the low level of promotional activities related to cross-border cooperation. Within the administrative structure within the both Euroregions there is no specific system for sharing and informing local administrative-territorial units about all the opportunities related to cross-border cooperation. As it can be seen in the Table 3, overall, the element related promotional activities is important, since it might lead to an intensification of the regional development in the context cross-border cooperation and it will enrich and enlarge the existing social-networks between partners, associations, administrative units or economic agents.

A diversity of risks and obstacles implies the geopolitical dimension. Due to the ongoing conflict in Ukraine and because of Russia's hybrid wars on post-soviet countries, EU's Eastern Neighbourhood became increasingly insecure. The geopolitical realities have important implications on cross-border cooperation, as Moldova and Ukraine are within the common neighbourhood between EU and Russia, being under the so-called "Russia's sphere of influence". Despite this fact, the priorities for cross-border cooperation within the Euroregions Upper Pruth and Lower Danube were not adapted according to the current context. In addition, it is important to highlight that geopolitical events have shown a differentiate influence on specific countries or regions. An important element is the proximity. Therefore, the Southern dimension of cross-border cooperation seems to be more exposed to geopolitical risks than the Northern one. A relevant example to support this argument is represented by the conflict between Ukraine and Russia within Black Sea in November, 2018. As Russia captured its ships, Ukraine decided to introduce the Martial Law, which included the regions from Eastern part of the country, and Odessa—as a member within Lower Danube Euroregion—was one of them. The pressure of the events amplified the people's fears, authorities' concerns, and poses serious challenges to cross-border cooperation mechanism. These events have also a negative impact on the processes related to projects implementation. Therefore, Ukrainian authorities are more focused on security issues, rather than on cross-border cooperation initiatives (Barbulescu et al. 2016).

**Table 3** Risks and obstacles associated to cross-border cooperation between Romania, Ukraine and Moldova (Author's own representation)

Typologies	Risks/obstacles	Examples	Solutions/resilience drivers
Economic	Economic crisis, lack of investments, limited funds	Low competitiveness of goods and services, over dependence of agricultural sector	Promoting and Supporting business initiatives
Social	Poverty, income disparity, unemployment, marginalized population, lack of knowledge		Investments in tourism, agriculture, organisation of cultural events, festivals, etc.
Environmental	Floods occurrence, loss of aquatic biodiversity, pollution	Floods from July–August 2008	
Political Administrative	Political instability, lack of communication, weak governance and weak institutions, low level of promotional activities, corruption, mistrust among regional actors, disruptive policies, organized crime: Administrative: lack of consistent national regulations towards CBC(in die case of Moldova and Ukraine); weak fiscal bases of counties, unstable relations between national and local governments; The period of submitting and contracting projects is to lone	Centralized behavior (Cemauti and Odessa) of local authorities in Ukraine determines delays in decision making processes (Barbulescu et al. 2016)	Harmonization of die legislation, implementing EU reforms, intensification of promotional activities related to CBC opportunities, consolidation of cooperation framework between legions, involvement and support civil society
Geopolitics 1	Hybrid war, propaganda, differences between countries (divergent political views)	Russian pressure on countries from Eastern Europe, Ukrainian conflict	



## 4 Opportunities

In this section, our aim is to highlight the opportunities of cross-border cooperation, by assessing the unexploited socio-economic potential within the Euroregions Upper Pruth and Lower Danube.

Both Euroregions possess an enormous potential for socio-economic development. Despite an obvious large amount of opportunities, in two decades of cross-border cooperation between Romania, Moldova and Ukraine, the situation has not improved significantly. As we already identified, there are several categories of obstacles, which reduce the effectiveness of policies. However, the process of identifying opportunities with transparency and efficiency is also very important when it comes to policymaking initiatives.

Despite the fact that both Euroregions-Upper Pruth and Lower Danube were established by the same actors, their situation is quite different, considering the cooperation framework and the interests of partners (Roscovan 2003). Within Lower Danube Euroregion, Galati county has dominated local activity, which gave more opportunities for the Romanian side. However, within the Upper Pruth Euroregion, Ukrainian side has shown high interests, as it has important implications for its development to the West. Weak governance, small incentives, passivity of partners and lack of funds are only few negative factors that affected the process of identifying the opportunities, which would allow a more efficient exploitation of them. Between Romania, Moldova and Ukraine, there are a wide range of opportunities in tourism, economy, agriculture or culture, which would boost cooperation between regions, cities, local communities, businesses and universities.

Within both Euroregions there is significant potential for developing the agricultural sector. It should be noted that, in order to achieve tangible results, there is a need for investment in infrastructure and human resources. In this context, the promotional activities such the organization of fairs, business forums, exhibitions or seminars are important in order to inform the population about the available opportunities. The development of agricultural sector will boost regional economy and will offer new opportunities for local producers. The Euroregions possess important land resources, pastures, hayfield and forestry resources (Voicilas 2017). Increasing the connectivity and the dynamics of regional economy will result in a denser network and stronger partnerships.

A great potential for development exists within the tourism field, which is one of the top priorities of cross-border cooperation between Romania, Moldova and Ukraine. Tourism activities generate investments in infrastructure, develop business within the tourism field, and create new jobs (Batyk and Semenova 2013). As the labor cost is cheap and it is flexible, the integration of local population would bring benefits for their life. In particular, there are great similarities between the Euroregions Upper Pruth and Lower Danube in terms of natural diversity, historical heritage and climate conditions. Therefore, tourism opportunities might be approached in a similar way. However, Lower Danube has a greater potential for tourism development, as it is closer to the Black Sea. An assessment of local tourist resources within cross-border

**Table 4** Projects submitted by type of institution from Moldova (Adapted Roscovan et al. 2010)

Joint Operational Prooranyiie Romania-Ukraine-Republic of Moldova 2007–2013		
Priority	Type of institution	Projects (number)
Priority 1: Towards a more competitive border economy	NGO	5
	Public administration	10
	Public institution	5
	Research institutions and education	4
Priority 2: Environmental challenges and emergency preparedness	NGO	3
	Public administration	11
	Public institution	4
	Research institutions and education	1
Priority 3: People to people co-operation	NGO	36
	Public administration	23
	Public institution	10
	Research institutions and education	4
Total		106

area shows that there are several opportunities for developing historical or cultural tourism. For an efficient exploitation of these resources, innovative marketing and management actions are required in order to stimulate local entrepreneurship and attract tourists.

The famous wine industry, unique natural sites, local products and a promising network set by roads and railways indicate a real potential for tourism (Roscovan et al. 2010). Furthermore, the rich diversity of local resources such as traditions, cultural habits, clean and rich environment or even fishing and hunting are opportunities for developing the rural tourism. Near cross-border areas, there is a lack of specific infrastructure for tourism; and as can be seen in the Table 4, little cooperation is made between central and local authorities in order to support tourism initiatives, while NGOs are the most active actors.

Within the above tables we can observe that most of the projects proposals were submitted within the *Priority 3—People to People Cooperation*. Undoubtedly, this is positive aspect, which has important implications on building social connectivity and spreading information about cross-border opportunities. However, despite this, within the *Priority 1 towards a more competitive border economy*, there were implemented much less projects, which translates into less opportunities exploited, which in turn has insignificant impact on regional development and cross-border cooperation.

Within this context, we assume that creating new opportunities would increase regional resilience. Spatial accessibility, geographic proximity and the dynamic of interactions between people and a more intense economic activity represent just few factors that play an important role in regional resilience. Therefore, as spatial accessibility is limited despite of the existing geographic proximity, future initiative

**Table 5** Project proposals submitted by beneficiaries from Moldova (Adapted after Roscovan et al. 2010)

Priority	Total projects	Projects proposal from Moldova	Leader partners from Moldova	Partners Moldova
<i>First call for projects proposals</i>				
Priority 1: Towards a more competitive border economy	171	55	3	7
Priority 3: People to people cooperation	156	25	9	52
<i>Second call for projects proposals</i>				
Priority 1: Towards a more competitive border economy	372(CN) 22 (CA)	98(CN) 22(CA)	3	17
Priority 3: People to people cooperation	475(CN) 35(CA)	100(CN) 26(CA)	7	21

shall be shaped according to the needs, to increase the accessibility and people interaction in order to build resilience for long term.

## 5 Conclusions

Euroregions Upper Pruth and Lower Danube are important tools under which cross-border cooperation between Romania, Ukraine and Moldova is achieved. However, several obstacles are identified that limit the effectiveness of cooperation.

The present article has aimed at analysing cross-border cooperation between Romania, Ukraine and Moldova, by underlying on one hand the main obstacles and risks and on the other hand the opportunities within the current context. In order to achieve this, we conducted a comparative analysis between the Euroregions Upper Pruth and Lower Danube, in order to highlight if there are some differences on regional level. Our study highlighted that weak administrative capacity and internal political issues represent the main obstacles, which have negatively impact on cross-border cooperation. At the same time, we assume that geopolitical risks should also be taken into account when discussing about cross-border cooperation. Therefore, our assumption is that geographical proximity of Lower Danube Euroregion to Eastern Ukraine represents a generator of a variety of risks and vulnerabilities, taking into account the conflict between Russia and Ukraine. Due to the insecure environment, Ukrainian authorities were more focused on security issues rather than on cross-border cooperation activities.

An assessment of both Euroregions revealed that there are countless examples of opportunities within different fields. Gross value added by regional economy,

tourism and mobility would result in an increase of convergence between regions and it would reduce impact of barrier effect.

The study presents several limits regarding the relevance of resilience concept regarding cross-border cooperation. Therefore, further research is expected in order to fill this gap. In conclusion, our analysis calls for more research in order to identify the nature of risks and vulnerabilities and to provide solutions, for a better understanding of cross-border cooperation from a multidimensional perspective.

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# David and Goliath: An Investigation Between Greece–Germany Bilateral Trade for Agricultural Products



Achilleas Kontogeorgos and Fotios Chatzitheodoridis

**Abstract** This paper investigates the factors that affect the bilateral trade between Greece and Germany for specific agricultural products (Meat and meat preparations, Dairy products and eggs, Fish and fish preparations, Cereals and cereal preparations and Fruit and vegetables). Data was collected through the COMTRADE database for the period 1992–2017. An analysis of the trade flows is made for the two countries. In addition, an augmented gravity model was used to estimate the factors that affect the bilateral trade. The analysis incorporates the cost of trade between the two countries instead of the geographic distance that is usually used in the gravity model. The results showed that the GDP of both countries has a positive effect on the trade flow. Trade costs appear to have a negative effect on trade flows in sectors where the country has a competitive advantage. The paper aims to quantify trade flows and facilitate this way researchers and policymakers to address practical issues and questions when analyzing trade policies between economic giants and smaller trade partners.

**Keywords** Greece · Germany · Bilateral trade · Agricultural products · Gravity model

**JEL Classification** F11 · F13 · F19

## 1 Introduction

This paper examines the bilateral trade flows between Germany, the largest economy in European Union, and Greece a small southern eastern Country with many economic problems during the financial Crisis (Kontogeorgos et al. 2017). Bearing

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A. Horobet et al. (eds.), *Global, Regional and Local Perspectives on the Economies of Southeastern Europe*, Springer Proceedings in Business and Economics, [https://doi.org/10.1007/978-3-030-57953-1\\_3](https://doi.org/10.1007/978-3-030-57953-1_3)

in mind that exporting is a business that requires economies of scale, the comparative advantage of each country should be identified and studied. With this aim, this paper examines the Greek food and agriculture products exports in the German market during the past thirty years. Germany is, over time, the most important trading partner of Greece. Almost a third of the Greek exports to Germany are agriculture and food products. Thus, German market covers the export potential of a large number of Greek companies. However, the trade deficit skyrocketed in 2017 to a record level for the last five-year period ringing this way a bell for the Greek economy. Therefore, the bilateral trade between Greece and Germany should be further examined in order to identify the latent reasons for this increasing deficit.

Most of the Greek agri-food products trade is conducted within the EU region (about 75% of exports and 80% of imports) rather than with non-EU countries (Ghazalian 2015). There is also, a significant concentration of trade within specific countries, with the top 10 trade partners covering about 70% of both imports and exports (Magoulios and Athianos 2013; Konstantopoulou 2015). However, Greece imports more food and beverages than it exports. The leading agri-food suppliers to the Greek market are the Netherlands (\$1.1B), Germany (\$943 M), Italy (\$751 M), Bulgaria (\$688 M), and France (\$643 M). The leading markets for Greece's exports are Italy (\$1.3 B), Germany (\$926 M), the United Kingdom (\$447 M), the United States (\$409 M) and Bulgaria (\$346 M). Greece's top agri-food imports include cheese (\$430 M), beef (\$281 M), pork (\$259 M), and food preparations (\$198 M), whereas olive oil (\$636 M), cheese (521 M), and olives (514 M) dominate Greece's agricultural exports, followed by cotton (\$397 M), sea bream (\$292 M), and canned peaches (\$264 M) (Piraeus Bank 2015; ELSTAT 2017).

At this point, it must be noted that the most valuable export market for agricultural products is the Italian. However, Italy was not selected for the analysis because it belongs to the same southern European countries affected heavily by the economic crisis and even more Italy is a main destination for bulk Greek agricultural products such as olive oil.

The rest of the paper is organized as follows. Section 2 provides a short review on the Greek agricultural sector, it discusses Greece–Germany trade relationship and patterns then follows a very brief review of the gravity model. Section 3 presents the empirical evidence on Greece Germany trade flows and provides the results. Section 4 concludes on the findings and provides few points for discussion and policy making and highlights questions for future research.

## 2 Literature Review

### 2.1 Greek Agricultural Sector

Agriculture is a key sector for the Greek economy, comprising 4.1% of GDP and 14% of employment compared with an EU average of 1.6% and 4.7%, respectively

(ELSTAT 2017). Agriculture in Greece is characterized by small farms, elder farmers and low capital investment (Chatzitheodoridis et al. 2014). Greece's utilized agricultural area is close to 5 million hectares, 57% of which are in the plains and 43% are in mountainous or semi-mountainous areas (Chatzitheodoridis et al. 2016). Moreover, 76.7% of holdings have less than 5 ha and the average farm size of 6.8 ha, is smaller than the average EU-28 holding with a size of 16.1 ha. At the same time, only 5.2% of the Greek farmers are under 35 years old (EUROSTAT 2017). Thus, lower agricultural productivity in Greece, is correlated to the smaller average-size of holdings (Karanikolas and Martinos 2011). The economies of scale offered by modern farming practices have limited impact on the small plots of land typically used in Greece.

In addition, the lack of a clear agricultural strategy has led the sector since a long time ago, to rely heavily on European subsidies (Louloudis and Maraveyas 1997), incapable of exploiting the dynamics of the rapidly expanding international market. Subsidies amount to about 22% of the value of agricultural output in Greece, compared with 12%, on average, for Mediterranean countries. Greek agricultural production increased by less than 20% during the past 25 years (compared with 220% globally and 86% in Europe). In fact, Greek agricultural value added, excluding subsidies, dropped by 13% during the past 20 years, while other Mediterranean countries (Spain, Italy, France) managed to increase value added, excluding subsidies, by about 15% during the same period (Mylonas 2015). These structural deficiencies have undermined the sector's natural competitive advantages and have crippled its export capacity. A trade deficit of €1.2 bn, is observed in Greece compared with a cumulative surplus of €18 bn for other European Mediterranean countries (Mylonas 2015). Moreover, the food supply chain has a relatively small manufacturing component (adding just 40% to the agricultural production versus 70% in Western Europe), as most Greek agro-food products are consumed or exported in bulk form (Konstantopoulou 2015).

## 2.2 Greece–Germany Trade

It has been already mentioned that Germany is, over time, one of the most important trading partners of Greece. Figures 1, 2, 3 and 4 are revealing and indicative of this bilateral relationship. Greece imported products from Germany valued 5.3 billion euros in 2017, raising over € 3 billion the Greek trade deficit with the Germany. According to the latest aggregate data on bilateral trade relations between the two countries, Greece's imports from Germany in 2017 increased by 7.4% while Greece's exports increased by 4, 9% over € 2 billion. Thus, the volume of bilateral trade in 2017 grew by 6.7% to 7.3 billion euros against 6.9 billion in 2016 (see Figs. 1 and 2).

The imports by exports index in 2017 decreased slightly from 39.9 to 39%. Germany holds the largest share of the total volume of trade and imports of Greece, i.e. 9.3% and 10.5% respectively. As far as exports are concerned, Germany is ranked





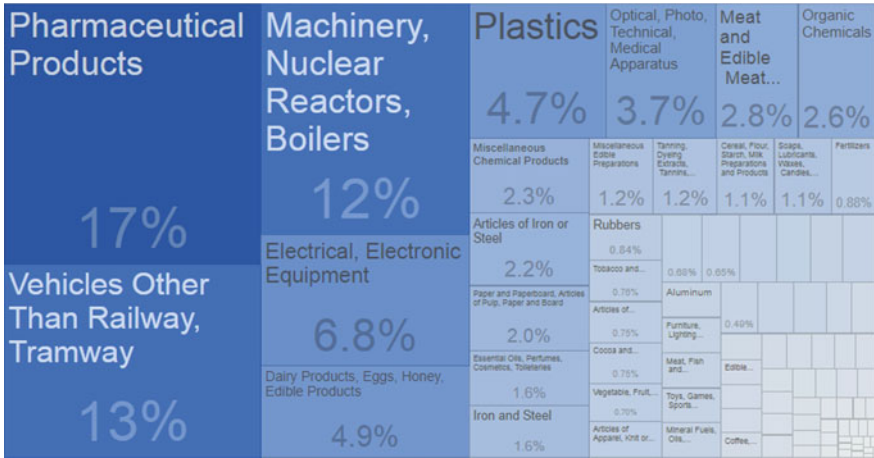


Fig. 4 Greek imports from Germany. Source [tradingeconomics.com](http://tradingeconomics.com)

second with a 7.1% share, after Italy, since Germany absorbs 10.6% of the Greek exports.

Greek exports to Germany include mainly food products, which in 2017 accounted for 32% of the total Greek exports. Aluminum products hold a share of 10.5%, followed by pharmaceuticals, with a share of 10.4%, machines and accessories (mainly wires), with a share of 8.3%, dairy products (7.4%), vegetable and fruit preparations (7.3%), fruit (6.8%) and apparel with a share of 4.5%, etc. On the other hand, the main imported products from Germany include medicines, passenger cars, mechanical equipment, plastics, dairy products, medical machinery and instruments, meats and sausages, cosmetics, organic chemicals, chemicals (see Figs. 3 and 4).

German Market is by far, the largest market in the European Union, with 83 million consumers, mostly of high incomes. The German market is a field of intense competition (due to its size, high per capita income and geographical location) and is considered particularly demanding. Germans consumers present a conscious behaviour using almost in total the price/quality ratio as a key element in their behaviour. Even more the development of consumer-friendly environmental standards (increasing consumption patterns in environmentally-friendly products—covering the entire spectrum of economic and commercial activity such as packaging, etc.), the public health sensitivity, the high propensity to consume organic products, etc., require serious and consistent business strategies to gain market access and retain significant market shares.

Therefore, Germany imports over \$55 billion to meet a growing demand for food products. The demand for organic, healthy, innovative, welfare and luxury products are constantly increasing. However, Greece is ranked in a very low position among Germany’s suppliers for most of the imported products. Greek exports to Germany are dominated by labor-intensive products and low-value industries, as opposed to the German exports to Greece that are mainly products of high value-added industries

(i.e. vehicles), which reflects this widening Greece's trade deficit mentioned before. What is more, labor-intensive products are subject to strong competition from similar products from EU and non-EU countries with low labour costs.

Even if, the intra-EU Community trade is free from import procedures, tariff and non-tariff barriers, this does not mean less effort to consolidate Greek presence and increase trading shares on the German market. The market shares of Greek products in the German market, particularly in the food and drink sector, show a significant mismatch with Greece's high degree of recognition in German society, which is further enhanced by the large number of almost 4 million Germans citizens visiting Greece for their vacation. The share of the Greek exports to Germany in 2017 remained at 0.2%. In 2017, Greece ranked 48th among the supplier countries of Germany, demonstrating the low utilization of the German market relative to the margins of bilateral trade development.

### 2.3 *The Gravity Model*

From the first conceptualisation of Tinbergen (1962) the gravity equation has been used again and again to empirically analyse trade between countries. There is great number of studies exploring the links in bilateral trade flows through the gravity model approach which is a distinguished contrivance to model international trade flows among nations, trading agreements and even between continents. The model has been defined as the workhorse of international trade and its ability to correctly approximate bilateral trade flows, makes it one of the most stable empirical relationships in economics (Leamer and Levinsohn 1995). In addition, the gravity model is the most popular and robust empirical relationship (Chen 2004) to estimate trade flows between two countries, usually indicating a positive effect from both countries' capital income and negative from the distance between them. Although not founded in economic theory, the model is particularly successful in representing trade flows, yielding in most cases a good fit, with R-squared in the order of 0.7 (Natale et al. 2015).

Nevertheless, there is a huge variety of trade transactions that cannot be explained. Most authors add other variables in order to create a model that describes better the trade flows. In literature there are plenty of studies that using gravity model attempt to identify how culture effects the trade flows between countries. Countries that speak the same language will exchange two to three times more than countries who do not share a common language. Indeed, the measures of colonial bonds are positively correlated with trade (Head and Mayer 2013). Another variable used by researchers is treaties and trade policy, since countries often sign agreements to facilitate bilateral trade. This variable is crucial for European trade as the European Union is an example of a trade agreement. One of the primary applications of the gravity model was the assessment of trade flows before and after the liberalization of trade. Many times, the conclusion of free trade agreements results in another trade agreement as a defense, thus leading to a proliferation of them (Baldwin and Jaimovich 2012).

There are researches that support the positive correlation between the existence of a free trade agreement between countries and their economic development. Dollar (1994) argued that a country's extroversion affects its economic growth positively as it allows the use of external capital to economy. The development of an economy is also positively related to the volume of trade in the country (Dollar and Kraay 2004). Overall, the gravity equation model helps to understand the value of trade between two countries and to discern the obstacles that continue to confine international trade even in today's globalized economy (Krugman and Obstfeld 2009).

### 3 Data and Methodology

The classic gravity model implies trade flow as the dependent variable and as independent variables countries' income and the geographical distance between the examined countries. In this approach distance is replaced by the trade cost between the two countries. This way the trade cost constitutes income restriction for trade between countries. Even more, all variables of the estimated equation have as measurement unit US dollar. Furthermore, this study attempts to answer if the trade comparative advantage for a country and a particular product is correlated with trade cost.

Trade data (imports/exports) of both countries were derived through the COMTRADE database for the period 1992–2017. The analysis focuses mainly on basic agricultural food products (Meat and Meat preparation, Dairy Products and Eggs, Fish and Fish preparation, Cereals and Cereals preparation and Fruits and Vegetables according to SITC ver.1). Tables 1 and 2 presents the descriptive for five

**Table 1** Average Greek Imports from Germany for the period 1991 to 2017

Imports	Mean	Minimum	Maximum	Std. deviation
Meat and meat preparations	136,633,544.49	32,818,871.00	237,729,138.00	68,103,849.63
Dairy products and eggs	227,341,703.89	119,553,072.00	378,534,047.00	93,253,227.26
Fish and fish preparations	15,593,845.55	4,745,560.00	28,417,060.00	8,054,782.14
Cereals and cereal preparations	70,974,891.26	35,256,554.00	115,738,982.00	22,702,893.55
Fruit and vegetables Imports	53,183,083.37	12,590,823.00	122,084,323.00	31,631,671.60
Total	5,820,088,970.78	3,530,020,147.00	11,541,656,939.00	2,097,596,361.70

Source Survey Results, (prices in €)

**Table 2** Average Greek Exports to Germany for the period 1991 to 2017

Exports	Mean	Minimum	Maximum	Std. deviation
Meat and meat preparations	3,060,061.04	833,075.00	9,115,692.00	1,826,472.26
Dairy products and eggs	80,697,626.12	31,260,942.00	161,008,892.00	43,745,174.52
Fish and fish preparations	17,852,339.41	4,020,985.00	33,773,952.00	10,074,228.62
Cereals and cereal preparations	30,192,370.82	3,317,500.00	58,476,844.00	16,785,696.53
Fruit and vegetables	352,296,149.81	207,910,805.00	533,593,397.00	86,242,230.15
Exports total	2,125,687,488.04	1,272,174,400.00	2,911,488,160.00	398,082,706.18

Source Survey Results (prices in €)

specific agricultural products (Meat and meat preparations, Dairy products and eggs, Fish and fish preparations, Cereals and cereal preparations and Fruit and vegetables) that participate in this study.

The globalization of the financial transactions between the countries has as a direct consequence the intense competition for the prevalence on the top of world trade. The theory of comparative advantage provides that trade flows arise as a result of relative cost differences between trading partners. It indicates that countries are competitive on goods and services in which they have a relative cost advantage (Bojniec and Fertő 2009).

Competition capacity in international and domestic markets depends on comparative advantages. Therefore, data was used to estimate the development of the comparative advantage by using trade competitiveness measures for the agri-food sector in the Greece–Germany bilateral trade. This research evaluates the trade competitiveness of the two countries in the agri-food sector using three representative indicators of trade competitiveness: import coverage index, Balassa index and intra-industry trade index.

*Export Coverage Index:* This indicator shows the share of exports absorbed by the value of imports. It is defined as the ratio of exports to imports.

$$\varepsilon_i = X_i/M_i$$

where  $X_i$  and  $M_i$  exports and imports of the sector  $i$  respectively.

*Balassa Index:* In order to estimate the degree of trade specialization of a country, Balassa (1965) proposed the following Revealed Comparative Advantage (RCA) indicator.

$$RCA_i = (X_i - M_i) / (X_i + M_i)$$

The index of the Revealed Competitive Advantage is essentially the share of exports of country for commodity  $i$  of total trade of country. Where,  $X$  and  $M$  is the exports and imports of product  $i$  correspondingly. When the index gets higher than a unit, then exports of  $i$  have a larger contribution to total trade of country. In this case, country displays a comparative on this product.

*Grubel Lloyd Index:* Grubel and Lloyd (1975) published the first empirical study on the importance of intra-industry trade and identified how to assess it. This index is also the most commonly used method of measuring the extent of intra-industry trade, also known as the intra-class commercial marker Grubel Lloyd. The Grubel Lloyd index is defined as:

$$GL_i = 1 - X_i - M_i / (X_i + M_i), \quad 0 \leq GL_i \leq 1$$

GL index values range from 0 to 1. As long as the  $GL_i$  tends to unit, it means that there is only intra-branch trade, and there is no inter-branch trade. On the other hand, if the  $GL_i$  tends to zero, it means that there is no intra-trade trade, so all trade is characterized as cross-trade, i.e. the country only exports or only imports the goods or services  $i$ .

In order to find the factors that explain best the trade flows between the countries was used two approximation of the gravity model: the restricted model and the augmented model. Wall (1999) developed the view of the exclusive relationship between the value of trade between two countries, the income of the two countries and the geographical distance between them. The Wall's view is the simplest and most basic form of the gravity equation of international trade and is defined as follows:

$$T_{ij} = A(Y_i, Y_j) / D_{ij}$$

where  $T_{ij}$  is the total value of transactions between countries  $i$  and  $j$ ,  $Y_i(j)$  is the nominal Gross Domestic Product (GDP) of country  $i(j)$ , which represents domestic real income respectively,  $A$  is a constant and  $D_{ij}$  distance between countries  $i$  and  $j$ .

In the present study, the independent variable of distance between countries is defined as the trade cost that is required to export goods from one country to the other. The geographical distance that separates the two countries over time remains stable. By contrast, trade costs between the two countries are a dynamic variable that affects trade volume as it acts as an income restriction on trade flows.

At augmented model was added variables that can also affect trade flows between the two countries, such as the population and consumption. For the estimate of the gravity model of the bilateral trade the most appropriate method characterized the use of logarithm in such a way obtained the linear-by-parameter model as follows:

$$\log(T_{ij}) = \alpha + \beta \log(Y_i) + \gamma \log(Y_j) + \delta \log(TC_{ij}) + \varepsilon_{ij} \tag{1}$$

*Restricted Model*

$$\log(T_{ij}) = \alpha + \beta \log(Y_i) + \gamma \log(Y_j) + \delta \log(TC_{ij}) + \zeta \log(C_i) + \eta \log(C_j) + \varepsilon_{ij}$$

*Augmented Model* (2)

## 4 Empirical Results

The results of this survey identify the products that each country has a comparative advantage. The following tables present: (a) the Export Coverage Index (Table 3), (b) the Balassa index or Revealed Comparative Advantage - RCA (Table 4) and (c) the Grubel–Lloyd index (Table 5). It is obvious that Greece only presents a comparative advantage in the market of fruits and vegetables. Export Coverage Index of German Exports is higher than 1 for all variable except fruits and vegetable, the exactly opposite result observed on Greek Export Coverage Index. Furthermore, Balassa Index presents comparative advantage in exports of fruits and vegetables for Greece and in meat products for Germany. On the other hand, Germany has the comparative advantage on 3 product categories (Meat and Meat preparation, Dairy Products and Eggs and Cereals and Cereals preparation). In the Fish and Fish preparation category the analysis should be made only in specific fish categories since according to Grubel–Lloyd index an intra-industry trade is observed.

It should be noted that even if aquaculture is a relatively specialized sub-segment of food production, it is a rapidly growing sector of the Greek economy—and one where Greece can leverage its competitive advantages and already is a major international exporter. In Greece, approximately 90% of the sector's value is driven by two main fish products, seabass/seabream, in which Greece holds a dominant position in the global markets. In 2015, 110,000 tons of sea bream and sea bass were produced. These two species accounts for 98% of the harvest volume, while all the other Mediterranean species accounted for 2%. In 2015 Greece supplied 61% of the sea bass and sea bream sold in the EU and 31% worldwide. Greek aquaculture production is known for its product quality and has enormous further growth potential.

However, the intra-trade relationship with the Germany reveals a significant structural weakness of the sector. Fish feeds are the most important raw materials used in the production process and represent 57% - 59% of the production cost. The raw materials used in fish feed are fishmeal and fish oil, cereals, vegetable protein and oilseed products, which are imported to a large degree from northern Europe along with South America and Africa (FGM 2016) (Figs. 5, 6 and 7).

The next part of the analysis is the estimation of the gravity model that used to estimate the factors that determine the bilateral trade between Greece and Germany. The gravity model assumes that trade between any two countries is proportional, other things being equal, to the product of the two countries' GDPs, and diminishes with the distance between the two countries. Most gravity model studies introduce a large number of variables to distinguish cultural and geographic differences among nations (Tansey and Hanson 2013). The inclusion of distance in gravity equations generated

**Table 3** Exports to imports index for Greek trade with Germany for the period 1991–2017

	Meat and meat preparation	Dairy products and eggs	Fish and fish preparation	Cereals and cereals preparation	Fruits and vegetables
1991	0.020	0.261	0.837	0.096	30.827
1992	0.020	0.245	1.048	0.173	26.753
1993	0.014	0.272	1.124	0.295	22.486
1994	0.022	0.341	1.326	0.235	18.547
1995	0.023	0.414	1.342	0.048	19.181
1996	0.035	0.347	1.488	0.050	14.583
1997	0.056	0.320	1.349	0.326	13.392
1998	0.046	0.332	1.175	0.431	11.918
1999	0.020	0.287	1.637	0.406	9.384
2000	0.014	0.274	0.957	0.290	8.239
2001	0.028	0.290	1.291	0.408	8.038
2002	0.020	0.292	0.669	0.551	5.773
2003	0.020	0.299	0.623	0.799	3.970
2004	0.016	0.303	0.837	0.635	3.719
2005	0.024	0.281	1.054	0.462	4.849
2006	0.015	0.287	1.028	0.462	4.998
2007	0.013	0.213	0.890	0.365	4.310
2008	0.012	0.284	0.891	0.488	4.371
2009	0.019	0.339	1.232	0.527	4.864
2010	0.020	0.312	1.178	0.511	5.391
2011	0.021	0.310	1.195	0.608	5.544
2012	0.018	0.378	1.521	0.433	5.895
2013	0.020	0.396	1.418	0.337	6.896
2014	0.024	0.438	1.065	0.400	6.547
2015	0.029	0.634	1.138	0.451	5.249
2016	0.035	0.642	1.217	0.556	5.013
2017	0.050	0.617	1.617	1.041	6.087

Source Survey Results

a large empirical literature. Disdier and Head (2006) examined 103 different papers in the literature using meta-analysis to confirm the relationship, concluding that on average, a 10% increase in distance lowers bilateral trade by about 9%.

However, in this case the distance between Greece and Germany is constant, therefore trade cost was preferred to incorporate the distance effect between the examined countries. Even more, no variable was used to distinguish cultural differences, since Greece and Germany are both members of the European Union and even more 500,000 Greeks are economic immigrants in Germany moreover 4 million Germans



**Table 4** Balassa Index for Greek trade with Germany for the period 1991–2017

	Meat and meat preparation	Dairy products and eggs	Fish and fish preparation	Cereals and cereals preparation	Fruits and vegetables
1991	-0.961	-0.585	-0.089	-0.825	0.937
1992	-0.961	-0.606	0.023	-0.706	0.928
1993	-0.972	-0.572	0.058	-0.544	0.915
1994	-0.957	-0.491	0.140	-0.619	0.898
1995	-0.955	-0.415	0.146	-0.909	0.901
1996	-0.932	-0.484	0.196	-0.904	0.872
1997	-0.894	-0.516	0.148	-0.508	0.861
1998	-0.912	-0.502	0.080	-0.398	0.845
1999	-0.960	-0.554	0.242	-0.422	0.807
2000	-0.973	-0.570	-0.022	-0.550	0.784
2001	-0.946	-0.550	0.127	-0.420	0.779
2002	-0.960	-0.549	-0.198	-0.290	0.705
2003	-0.961	-0.540	-0.232	-0.112	0.598
2004	-0.968	-0.535	-0.089	-0.223	0.576
2005	-0.952	-0.561	0.026	-0.368	0.658
2006	-0.971	-0.555	0.014	-0.368	0.667
2007	-0.974	-0.649	-0.058	-0.465	0.623
2008	-0.975	-0.557	-0.057	-0.344	0.628
2009	-0.962	-0.494	0.104	-0.310	0.659
2010	-0.961	-0.525	0.082	-0.323	0.687
2011	-0.959	-0.527	0.089	-0.244	0.694
2012	-0.964	-0.451	0.207	-0.396	0.710
2013	-0.961	-0.433	0.173	-0.496	0.747
2014	-0.953	-0.391	0.031	-0.428	0.735
2015	-0.944	-0.224	0.065	-0.379	0.680
2016	-0.933	-0.218	0.098	-0.286	0.667
2017	-0.904	-0.237	0.236	0.020	0.718

Source Survey Results

visit Greece each year for their vacations. Assuming this way that both Greeks and Germans are familiar with the agricultural products of each other. The variables in the gravity model are described in Table 6.

Three gravity models were examined: one for the total trade, one only for the imports and a third for exports. The method of least squares (OLS) was used for the estimation. Table 7 presents the estimation of gravity model as specified in the previous section. According to Table 7,  $R^2$  in the examined product categories are quite high meaning that the variables used explain the trade between Greece and

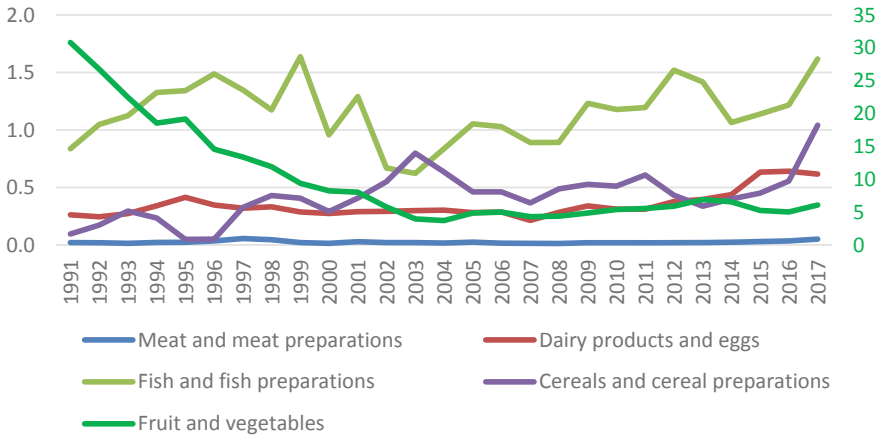
**Table 5** Crubel Lloyd Index for Greek trade with Germany for the period 1991–2017

	Meat and meat preparation	Dairy products and eggs	Fish and fish preparation	Cereals and cereals preparation	Fruits and vegetables
1991	0.039	0.415	0.911	0.175	0.063
1992	0.039	0.394	0.977	0.294	0.072
1993	0.028	0.428	0.942	0.456	0.085
1994	0.043	0.509	0.860	0.381	0.102
1995	0.045	0.585	0.854	0.091	0.099
1996	0.068	0.516	0.804	0.096	0.128
1997	0.106	0.484	0.852	0.492	0.139
1998	0.088	0.498	0.920	0.602	0.155
1999	0.040	0.446	0.758	0.578	0.193
2000	0.027	0.430	0.978	0.450	0.216
2001	0.054	0.450	0.873	0.580	0.221
2002	0.040	0.451	0.802	0.710	0.295
2003	0.039	0.460	0.768	0.888	0.402
2004	0.032	0.465	0.911	0.777	0.424
2005	0.048	0.439	0.974	0.632	0.342
2006	0.029	0.445	0.986	0.632	0.333
2007	0.026	0.351	0.942	0.535	0.377
2008	0.025	0.443	0.943	0.656	0.372
2009	0.038	0.506	0.896	0.690	0.341
2010	0.039	0.475	0.918	0.677	0.313
2011	0.041	0.473	0.911	0.756	0.306
2012	0.036	0.549	0.793	0.604	0.290
2013	0.039	0.567	0.827	0.504	0.253
2014	0.047	0.609	0.969	0.572	0.265
2015	0.056	0.776	0.935	0.621	0.320
2016	0.067	0.782	0.902	0.714	0.333
2017	0.096	0.763	0.764	0.980	0.282

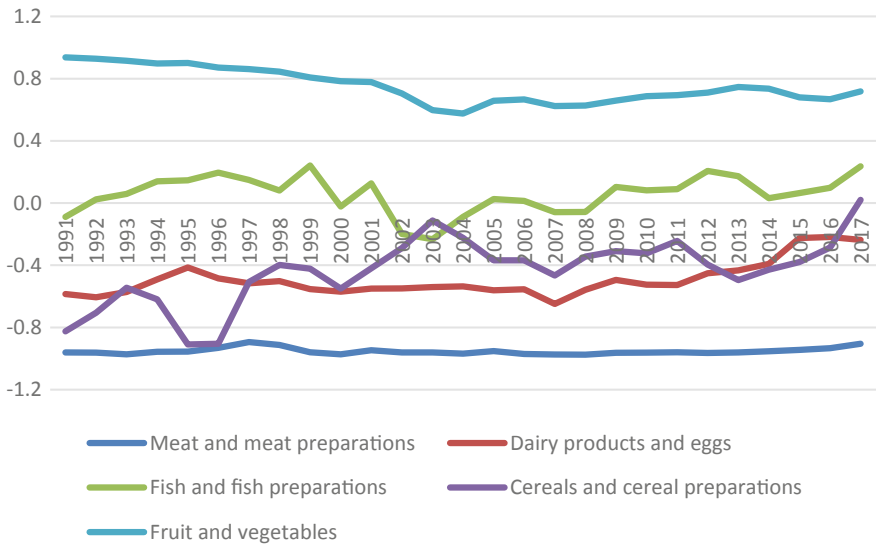
Source Survey Results

Germany. However, trade cost is not statistically significant for almost all product categories, while the same occurs for food consumption.

Table 8 presents the estimation results for the Greek imports from Germany. The results are not statistically significant for the most product categories. On the other hand, when only the amount of the Greek exports to Germany is used to calculate the Gravity model (Table 9) the estimated results are statistically significant, and they can provide some useful observations. For example, trade cost can be used as an alternative variable to distance (all three variables of the simple gravity model, are



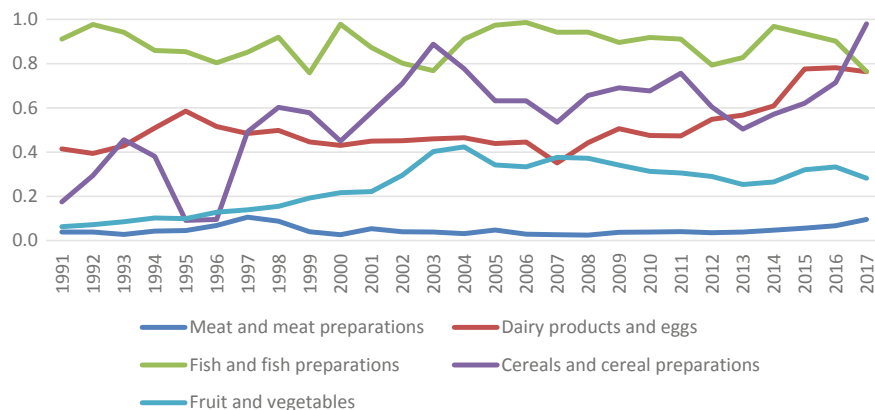
**Fig. 5** Exports to Imports Index for Greek trade with Germany 1991–2017. *Note* exports to imports index for fruit and vegetables uses the secondary Y-axis scale (on the left of the graph)



**Fig. 6** Balassa Index for Greek trade with Germany for the period 1991–2017

proved to be valid in this case also). Greek/Germany GDP affects Greek/Germany trade as it was expected.

It is worth examining the effect of food consumption in Greek imports and exports. Food consumption in Greece seems to affect negatively Greek exports, meaning that companies are export oriented only, when they cannot sell their products in the domestic market. However, there is no clear conclusion of how food consumption in



**Fig. 7** Crubel Lloyd Index for Greek trade with Germany for the period 1991–2017

**Table 6** Descriptive statistics for the variables in the Gravity model

	Mean	Min	Max	Std. dev
Per capita GDP for Germany (€)	33,412.65	21,710.52	48,942.91	8,881.91
Per capita GDP for Greece (€)	22,862.97	14,266.07	30,855.94	5,449.62
Population for Germany (Millions)	81.73	80.25	82.50	0.722
Population for Greece (Millions)	10.92	10.37	11.19	0.248
Food Consumption for Greece (€)	13,821.4	12,249.5	16,731.3	15,210.12
Food consumption for Germany (€)	19,097.2	10,959	25,632	5,172.30
Greece–Germany Trade cost (in € per tn)	111.52	102.95	124.36	6.802

Source Survey Results

Germany affects Greek Exports. Especially for the fruit and vegetable category, which means that a further investigation is needed to determine the fruit and vegetables market in Germany.

## 5 Conclusion—Discussion

According to the results, GDP of both countries, seems to have a positive effect on the exports of both countries. An increase on GDP of Greece or Germany can cause a growth on bilateral trade. However, according to the  $t$  statistic and the 10% level of significance, the GDP of Greece and Germany is statistically significant for the majority of food categories that was examined. On the contrary, Greek exports is statically significant, mainly due to Germany's GDP, which is justified because the German market absorbs an important part of the Greek exports.

**Table 7** Greece–Germany Total Trade for the period 1992–2017

	Meat and meat preparation	Dairy products and eggs	Fish and fish preparation	Cereals and cereals preparation	Fruits and vegetables
Per Capita GDP for Greece	2.230 (1.093)	1.515 (1.569)	2.769 (3.113)***	2.887 (2.313)**	2.949 (2.900)**
Per Capita GDP for Germany	3.378 (1.639)	1.866 (1.915)*	3.693 (4.212)***	2.682 (2.218)*	2.218 (2.288)**
Trade Cost	0.789 (0.626)	-1.031 (-1.375)	-1.195 (-1.729)	-1.718 (-1.771)*	-1.099 (-1.391)
Food Consumption for Germany	-2.165 (-1.344)	-1.258 (-1.651)	2.019 (2.876)**	-1.606 (-1.630)	-2.207 (-2.750)**
Food Consumption for Greece	-0.926 (-0.163)	-0.360 (-0.134)	5.281 (2.131)*	-6.583 (-1.893)*	-4.077 (-1.439)
R <sup>2</sup>	0.825	0.905	0.948	0.793	0.789
R <sup>2</sup> adj	0.763	0.871	0.929	0.720	0.714
F test (Sig)	13.219 (0.00)	26.666 (0.00)	50.959 (0.00)	10.757 (0.00)	10.942 (0.00)
DW test	0.766	1.302	1.962	1.664	1.687

Estimation Results for the examined Gravity Model

Source Survey Results

Notes All numbers are logarithmic, OLS estimation

(*t*-statistic) “\*\*\*” denoting statistical significance at 1%, level “\*\*” at 5% level, “\*” at 10% level

Trade cost appears also, to have a significant correlation with the export flow in the sectors that the country has a competitive advantage over the other. Moreover, trade cost in this case are statistically significant using the *t* statistic and a 10% significance level. The positive correlation between the cost of trade and the level of exports also appears in the estimation of the model. On the contrary, in sectors where the country does not have an advantage, the impact of trade cost on exports seems to be insignificant. The interpretation for the positive correlation between trade cost and exports in sectors that the country has a competitive advantage is that the country, due to its competitive advantage, manages to export efficiently by achieving economies of scale and reducing this way the cost of trade for each additional export unit. Thus, the country has an incentive to increase its exports even if trade cost increases. This is the case for Greece’s food and beverage companies that have created a large sales and distribution network in Southeast Europe, a strength that is reinforced by the dynamism of the Greek enterprises operating in the region.

Overall, agricultural production has been a major export sector for Greece in the past, with Greek fruit and vegetables being consumed in Germany and several other international markets. Despite the small lot size, the Greek agriculture sector has

**Table 8** Greek Imports from Germany for the period 1992–2017. Estimation Results for the examined Gravity Model

	Meat and Meat preparation	Dairy Products and eggs	Fish and fish preparation	Cereals and cereals preparation	Fruits and vegetables
Per capita GDP for Greece	2.191 (1.056)	1.490 (1.500)	2.499 (2.125)*	3.539 (2.884)**	3.070 (2.568)**
Per capita GDP for Germany	3.332 (1.590)	1.615 (1.611)	2.747 (2.313)**	2.452 (1.979)*	1.392 (1.979)
Trade cost	0.884 (0.592)	-0.951 (-1.233)	-0.565 (-0.618)	-2.314 (-2.427)**	-0.094 (-0.101)
Food consumption for Germany	-2.135 (-1.304)	-1.060 (-1.353)	-1.210 (-1.304)	-2.454 (-2.534)	-0.573 (-0.608)
Food consumption for Greece	-0.690 (-0.119)	-0.134 (-0.049)	-4.069 (-1.242)	-5.796 (-1.695)	-3.178 (-0.954)
R <sup>2</sup>	0.823	0.900	0.917	0.740	0.943
R <sup>2</sup> adj	0.760	0.864	0.887	0.647	0.923
F test (Sig)	13.035 (0.00)	25.121 (0.00)	30.891 (0.00)	7.968 (0.00)	46.601 (0.00)
DW test	0.769	1.290	1.751	1.770	1.590

Estimation Results for the examined Gravity Model

Source Survey Results

Notes All numbers are logarithmic, OLS estimation

(t-statistic) “\*\*\*” denoting statistical significance at 1%, level “\*\*” at 5% level, “\*” at 10% level

maintained a positive trade gap in a wide range of agricultural products. There are several specific sectors that show potential for increased returns in terms of production capacity. Most notably, there are several types of crops which are considered “export engines” (e.g. grapes, oranges, peaches, nectarines, kiwis) and which can all meet European and global demand with the appropriate standardization and quality control.

In this direction, Greek specialty foods that include a variety of products, ranging from high-value niche products (Chios Masticha, Kalamata olives, Aegina pistachios) to widely available categories which are endemic to the Greek diet (e.g. Greek yoghurt, olive oil, honey) to Protected Designation of Origin Status (PDO) products only found in Greece. These products have significant export potential and higher value added in the international markets. These products should be examined more and promoted with domestic and regional policies, providing capital subsidies, and developing export enhancing infrastructure. In addition, Fish farming is a sector that should be examined more, as it can obtain a leading position in Greece’s Food industry and it is a top industry sector in the EU characterized by strong market consolidation. Investing in the consolidation and expansion of aquaculture facilities and the improvement of competitiveness, operating efficiency and market access can

**Table 9** Greek Exports to Germany for the period 1992–2017. Estimation Results for the examined Gravity Model

	Meat and meat preparation	Dairy products and eggs	Fish and fish preparation	Cereals and cereals preparation	Fruits and vegetables
Per capita GDP for Greece	6.231 (3.724)***	2.708 (2.515)**	4.508 (4.484)***	1.584 (0.498)	2.311 (2.314)**
Per capita GDP for Germany	3.614 (2,181)**	1.498 (1.405)	3.059 (3.072)***	−0.959 (−0.303)	2.851 (2.985)***
Trade cost	−1,67 (−1.297)	−1,286 (−1.552)	−1,941 (−2.509)**	−0.361 (−0.147)	−1.312 (−1708)
Food consumption for Germany	11.460 (2.482)**	−1.268 (−0.427)	6.262 (2.257)**	−4.126 (−0.468)	4.233 (1.357)
Food consumption for Greece	−3.66 (−2.719)**	−1.802 (−2.141)*	−2.781 (−3.539)***	3.098 (1.242)	−2.347 (−3.009)***
R <sup>2</sup>	0.801	0.892	0.938	0.750	0.758
R <sup>2</sup> adj	0.730	0.853	0.915	0.660	0.672
F test (Sig)	11.289 (0.00)	23.134 (0.00)	42.005 (0.00)	8.387 (0.00)	8.783 (0.00)
DW test	1.878	1.604	2.045	1.668	1.785

Estimation Results for the examined Gravity Model

Source Survey Results

Notes All numbers are logarithmic, OLS estimation

(t-statistic) “\*\*\*” denoting statistical significance at 1%, level “\*\*” at 5% level, “\*” at 10% level

yield significant returns for this sector based on its growth potential and existing market positioning.

Nevertheless, food and agriculture sector in Greece is expected to maintain, over the next years, its significant contribution to GDP growth. There is abundant opportunity to create value added in many product categories, especially as the global interest in healthful foods, snack foods, and convenience foods continues to expand. The prevalence of the Mediterranean Diet, as a premier paradigm of healthy, natural eating diet that affect consumer preferences in developed economies could be a significant opportunity for the Greek food producers. They have to take advantage of their smaller scale, access to high-quality inputs and traditional Mediterranean positioning to differentiate from the global food manufacturers and gain market share value-added product segments and higher price points.

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# Tourism Destination Development, a Situation Analysis of a Greek Region



Eirini Triarchi, Paraskevi Pappa, and Efstratios Kyriotelis

**Abstract** Tourism is acknowledged to contribute to job and wealth creation, economic growth, environmental protection, and poverty reduction. Therefore, the excellent performance of the tourism sector globally implies the prospects of a significant revenue stream. Tourism beneficial influence is evident in improving the quality of social life, in intercultural understanding and the sustainable development of cities and communities. Tourism success in building sustainable destinations is a contemporary challenge that the globalization, technology, innovation, climate, and demographic change produced. Well-Balanced tourism management must incorporate all the new trends and supports policies towards sustainability and competitiveness of destinations. However, tourism growth has also unfolded its negative side, especially on the environment, society, and the local economy, shaking the balance between tourists, locals and destinations, and the organizations and businesses of the sector. Thereby, the role of policy planners and developers in tourism should be to maximize destinations communities' welfare by eliminating any other costs. They should be in the position to identify and promote those types of tourism—mass versus alternative—that locals are in favour, ensuring the success of sustainable tourism development. To this context, a challenging issue is how a remote, poor and low performing tourism region, can be developed as a tourism destination and ensure sustainable growth? What type of tourism should be evolved in the area increasing tourists' arrivals, extending their stay and at the same time respecting local society's welfare? These questions are answered through the case study of Epirus development as a tourism destination. Epirus, a region located in Northwestern Greece has the potential to be developed as a favourite tourism destination and establish a distinct tourism destination image. The region holds a wide range of heritage monuments, natural

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and cultural resources. However, inadequate infrastructure, inefficient governmental policies, ineffective promotion, lack of collaboration of the region's stakeholders, especially when existing in combination, hinder the sustainable tourism development. The central part of the case study is the S.W.O.T. analysis of Epirus as a tourism destination. This situation analysis discovers the significant advantages and the weak spots of the region as well as the potential opportunities and threats. Further, the stakeholders involved in the destination development are recorded, and the development vision is presented. This analysis will be useful in assessing the region's competitiveness as a tourism destination and in planning effective policies for the further development and delivery of tourism experiences following the current market trends of the tourism industry.

**Keywords** Tourism destination development · Alternative tourism · Mass tourism · SWOT analysis · Sustainable development · Stakeholders

**JEL Classification** Z3 tourism economics

## 1 Introduction

The tourism sector has become one of the rapidly growing services sectors of the world, recording a growth above average at around 4% per year, since 2008, involving an amount of 300 million more of international travelers for the period 2008–2016 (UNWTO 2017a, p. 11). This excellent performance implies prospects of a significant revenue stream, and indeed tourism is acknowledged to contribute significantly to job and wealth creation, economic growth, environmental protection and poverty reduction (UNWTO 2017b, p. 12). Further, beneficial tourism influence is found in war conflict situations generating peace, in gender equality and others discrimination issues, in improving quality of social life, in intercultural understanding and the sustainable development of cities and communities. Tourism success in building sustainable destinations is a contemporary challenge that the globalization, technology, innovation, climate, and demographic change produced. Well-Balanced tourism management must incorporate all these changes that reshape the world, respond effectively to, by increasing the sustainability and competitiveness of destinations (UNWTO 2017a, p. 35). However, tourism development is not costless. During the years, it has unfolded its negative side especially on the environment, society, and the local economy; it is shaking the balance between tourists, locals and destinations, and the organizations of the sector. Destinations communities estimate to what extent the benefits of tourism outweigh the social and environmental costs so that when prospects are favourable to enforce a destination's tourism development (Sharpley 2014, p. 37). Thereby, the role of policy planners and developers in tourism should be to maximize destinations communities' welfare by eliminating any other costs. Hence, they are called to identify and to promote those types of

tourism—mass versus alternative—that locals are in favour, ensuring the success of sustainable tourism development.

To this context, a challenging issue is how a remote, poor and low performing tourism region can be developed as a tourism destination and ensure sustainable growth? What type of tourism should be evolved in the area increasing tourist arrivals, extending their stay and at the same time respecting local society's welfare? Hence, a case study of Epirus, a region in Northwestern Greece is constructed for answering this question. Epirus has the potential to be a favourite tourism destination and establish a distinct tourism destination image. The region holds a wide range of heritage monuments, natural and cultural resources. However, inadequate infrastructure, inefficient governmental policies, ineffective promotion, lack of collaboration of the region's stakeholders, especially when existing in combination, hinder the sustainable tourism development in the region. The main point of the case study is the S.W.O.T. analysis of Epirus development as a tourism destination. This situation analysis discovers the significant advantages and the weak spots of the region as well as the potential opportunities and threats. The stakeholders involved in destination development are also recorded, and the development vision is presented. This analysis will be useful in assessing the region's competitiveness as a tourism destination and in establishing effective policies for the further development and delivery of tourism experiences following the market trends of the tourism industry. A brief analysis of the dispute mass tourism versus alternative is presented in the next section, followed by the case study while the last section concludes.

## **2 Mass Tourism Versus Alternative Tourism**

Although mass tourism supports economic growth through its “big” numbers in revenue, visitors, jobs creation, entrepreneurs, investors, it generates negative effects on the destination economy. These are the overvaluation and speculation on land values, the outflows of money and the rise of social, cultural and ecological dilemmas. All these turn the interest to a different approach in tourism, an alternative to large numbers of visitors, to clumsy and unregulated development, to environmental destruction, social alienation, and homogenization. Furthermore, a more sensitive approach giving priority to natural and cultural resources at the front line of planning and development, it is required. Thereby, alternative tourism has been emerging in the last decades to cope with the “inconveniences” caused by “mass tourism” and to increase the satisfaction of locals. Alternative tourism involves small-scale projects, requiring low-level of investments, being low-key, independent and self-sustaining, and embolden the high participation of the local inhabitants. When locals as hosts of visitors involved in the process the outcome are also satisfactory for the foreign guests that enjoy a more authentic, meaningful and interacting experience. After all, alternative tourism aims at establishing direct personal and cultural intercommunication and understanding between host and visitor (Dernoi 1988).

The use of the term “alternative tourism” turns to be problematic, as the forms of alternative tourism are closely related to the principle of sustainable development, making the term “sustainable tourism” more accurate in describing the “new” forms of tourism. In nowadays, according to UNWTO “sustainable tourism development guidelines and management practices apply to all forms of tourism in all types of destinations, including mass tourism and the various niche tourism segments. Sustainability principles refer to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability” (UNWTO 2005a). Weaver (2012, 2014), criticizing both mass and alternative tourism, argues that all types of tourism entail a cost. In this context, the focus must be on the ability of sustainability—strategic management nexus to eliminate costs (direct and indirect) of a given activity while at the same time maximize the associated benefits, both locally and globally (Weaver 2012, p. 1030).

### **3 A Case Study of Epirus Tourism Destination Development**

Epirus until recently was a rather remote and impoverished region in Greece mainly receiving domestic tourists. Region most known areas have been the coastal ones for attracting foreign visitors during the summer, following the traditional tourism model of “Sea-Sun-Sand tourism.” However, due to the underdevelopment of transport infrastructure and to inadequate accommodation facilities could not become the recipient of a large volume of tourists. The last decade the completion of major infrastructure works generated prospects of Region’s openness to new resources markets. Epirus now can and should follow a successful path and take a competitive position in the tourism market. For this, the creation of a destination image delineated and appealing to visitors is prerequisite. This is the concept in which our analysis is based.

#### ***3.1 Region’s Profile***

Epirus is located in the north-western part of Greece, and it is the most mountainous region. In its western part, the Ionian Islands are found (Map 1). Epirus is divided into four Regional Units. These are (a) the Regional Unit of Arta, with four municipalities, (b) the Regional Unit of Preveza, with three municipalities, (c) the Regional Unit of Thesprotia, with three municipalities and (d) the Regional Unit of Ioannina, with eight municipalities. The capital of the Region is the city of Ioannina, located in the fourth regional unit.

**Map 1** Epirus Region.

Source <http://www.maps-of-greece.com/epirus-map.htm>



Epirus is the crossroad of Balkans and Western European countries. The key feature of the region is its geomorphological variety including:

- the coastal zone of the regional units of Preveza and Thesprotia,
- the zone of mountain ranges which extends along the eastern boundary of Ioannina's regional unit,
- the agricultural land area in the southwestern part of Epirus.

Epirus is sparsely populated as its density is 36.6 inches/km<sup>2</sup>, accounting for only 3.1% of the country's population. This region, for the longest part of its history and until recently has been the least developed and the most remote region not only of Greece but of Europe as well. It has suffered from emigration, and there are still significant disparities between rural and urban areas. The main demographic problem that area is facing up is the ageing of the population.

In terms of Gross Domestic Product (GDP), Epirus is classified as the poorest Greek region. According to ELSTAT, Regional Accounts, (Time series 2012) in 2012, the region of Epirus accounted for 2.18% of the national Gross Domestic Product (GDP). In terms of GDP per capita was positioned last among the Greek regions with a regional GDP per capita of €12.207, and it is classified in the less developed region of Europe (GDP per inhabitant in PPS < 75). In 2015, the average GDP per capita decreased further to €11.500 (ELSTAT 2018). According to Kolasa-Sikiaridi (2017) "Three of Greece's 13 regions—Eastern Macedonia-Thrace, Epirus and Western Greece—were among the 20 poorest regions in the European Union in terms of per capita GDP in 2015, according to figures released by Eurostat. For 11 of the 13, their per capita GDP was less than 75 pct of the EU average".

### 3.2 Tourism in Epirus

As Epirus includes coastal areas the main reason to travel in the region is the same of this existing in the rest Greek coastal areas and islands and is based on the model of “Sea-Sun-Sand tourism” (Table 1). The clean coasts of the region (11 blue flags in 2017) enhance this reason for visitation. In accordance with this, water-sport activities are established with success. The most popular period to visit these areas is from the end of spring until early autumn. However, there is a slight increase in tourists that are nature and culture lovers, and visit the mainland mostly during winter and autumn. This type of tourists are far away from the “traditional” ones, and if communities are willing to discover their needs and satisfy them on their arrival, then there will be in the position to acquire alternative sources of revenue. Until now, the average length of visitors stay is 5.1 days in Epirus, lower than 6.8 days country’s average (SETE 2018, p. 33).

**Table 1** Reason of travel to Epirus

Activity (%)	spring	summer	autumn	winter	annual average
mountainous tourism	7%	8%	11%	12%	10%
mountainous sport	6%	5%	8%	13%	8%
tourism on the coast - traditional	30%	35%	14%	6%	21%
water sport (sea)	18%	30%	24%	16%	22%
water sport (lakes and rivers)	12%	4%	9%	8%	8%
observation of nature	6%	4%	8%	6%	6%
visiting famous places	7%	4%	11%	20%	11%
taking place in events	9%	6%	11%	11%	9%
combination of few various types of activities	5%	4%	4%	8%	5%

Source Regional Job Markets 2012, pp. 79–84 cited in Social Network for Tourism Operators (2012)

The amount of visitors that approach the Epirus Region for the year 2013 according to the Research on Regional Tourist Expenditure is 519.242, accounting for 2.9% of the total arrivals in the country. Comparing this number to the corresponding figure in 2006 which was 369.555 visitors in the region there is a significant increase of 71.2% (ELSTAT 2013). The effort of Epirus state to promote and establish a more competitive tourism destination profile combined with the provision of better infrastructure (such as transport infrastructure) supports the development of the tourism sector. Nevertheless, there are still many things to be done since in 2017, the number of arrivals in the region reached the amount of 713.000 visitors, reflecting a 2.3% in the total arrivals in Greece and ranking Epirus at the eighth position out of the 13 Greek regions (SETE 2018, p. 19).

Although, the presentation of tourism contribution to GDP by region (Table 2), is based more on approximation, is rather indicative of the reality.

Epirus tourism contribution to regional GDP is only 4%, that is higher than the corresponding of Western Greece, Sterea Ellada, Western Macedonia, and Attiki, much lower than Crete, South Aegean, Ionian Islands, and South Aegean. The revenues from tourism in 2017 were 216 million euros accounting for 1.5% of the total revenues in Greece, ranking Epirus at the 9th position out of the 13 Greek regions (SETE 2018, p. 27).

### ***3.3 Situation Analysis***

In situation analysis, the S.W.O.T. analysis is included as a key instrument in assessing tourism destination competitiveness. It is based on specific knowledge of the present situation and trends, including the factors of the internal situation such as existing strengths and weaknesses in elements of destination, in marketing and in region's tourism sector and factors of the external environment such as future opportunities and threats in competition, market, environmental issues and governmental policies.

#### **3.3.1 Analysis**

The following S.W.O.T. Analysis, referring to Epirus region is based on previous official S.W.O.T. analysis, studies made by researchers under E.U. programmes (Swarbrooke 2004; Toureg, Innovation & Tourism Knowledge 2009; South East Europe Transnational Cooperation Programme 2013; Epirus Regional Government 2015) and on other secondary data. This analysis aims to identify the weakness of the existing tourist model and to build a new one, more competitive—following the current market trends—for establishing the region of Epirus as a tourism destination.



**Table 2** Measurement of tourism contribution to the basic economic figures

Region	% Allocation of the overnight stay in hotels 2013	Ratio of direct tourism expenditure 2013 in mn €	GDP by region 2012-in mn €	The contribution of tourism to GDP by region, data 2012	GDP per capita, 2012, in mn €
Crete	28.7%	4.372	9.067	48%	14.398
South Aegean	24.7%	3.767	6.240	60%	18.064
Ionian Islands	11.0%	1.680	3.402	49%	16.100
Central Macedonia	10.7%	1.626	26.109	6%	13.645
Attiki	9.2%	1.403	94.964	1%	24.099
Peloponnese	3.2%	481	8.241	6%	13.870
Thessaly	2.6%	394	9.505	4%	12.757
Eastern Macedonia & Thrace	2.4%	369	7.653	5%	12.270
North Aegean	2.1%	325	2.784	12%	13.394
Western Greece	2.1%	317	9.150	3%	13.431
Stereia Ellada	1.7%	257	8.543	3%	15.075
<b>Epirus</b>	<b>1.2%</b>	<b>185</b>	<b>4.242</b>	<b>4%</b>	<b>12.207</b>
Western Macedonia	0.5%	69	4.304	2%	15.050
<b>Total</b>	<b>100.0%</b>	<b>15.242</b>	<b>194.204</b>	<b>8%</b>	<b>17.507</b>

Source SETE Intelligence (2015)

<p>Attractions and Events: Natural-Cultural Resources, Museums &amp; Art Galleries, Activities, Events</p>	<p>Strengths</p> <ul style="list-style-type: none"> <li>• The existence of important ecological wealth and exceptional natural ecosystems</li> <li>• Superb wetland environments in the coastal areas, with rare birds and plants</li> <li>• Clean coasts and awards of “blue flags”</li> <li>• Numerous traditional settlements</li> <li>• The variety and uniqueness of archaeological sites and monuments, locating in the four regional units</li> <li>• The existence of modern and various forms of museums and galleries in Epirus</li> <li>• Establishments of natural and cultural routes in the Region, funded by European programmes</li> <li>• The long tradition in the art of silversmith in the Region’s capital of Epirus</li> <li>• Great potential for activities both water-based (rafting, angling, kayaking, swimming, sailing, water-skiing), and mountain-based (mushroom hunting, hiking, running, cycling, climbing, parapente flying skiing, skiing)</li> <li>• The long tradition in athletic events such as rowing races carrying out in Pamvotis Lake</li> <li>• New establishments of athletic events for the participation of everyone regardless of age, origin, and others</li> <li>• The existence of traditional festivals and events in villages and towns, being open to everyone</li> </ul>
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(continued)

(continued)	<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> <li>• The transformation of Epirus as a central hub of trans-European networks in the Western and Eastern Mediterranean due to the integration of projects in transport infrastructure. Adriatiki–Ionio–Albania</li> <li>• The completion of construction of “Egnatia Odos” highway, the “Aktion” undersea tunnel and “Ionia Odos” highway, have significantly improved Epirus’ accessibility</li> <li>• The road signposts due to the completion of construction of major projects have been improved significantly</li> <li>• Igoumenitsa’s port is an important transport hub in Western Greece, welcoming an essential number of tourists annually</li> <li>• Two airports serve the region, Ioannina and Aktion (Preveza). Aktion airport is turning to be an international one, attracting recently low-cost air carries and increasing its connections to other European cities. (E.g. the British low-cost airline carrier “Easy Jet” started flights connecting London to Preveza)</li> <li>• The Undersea Tunnel of Preveza-Aktion has increased the accessibility of Preveza airport to Epirus</li> </ul>
<p style="text-align: center;">Accommodation supply, food &amp; beverage, conference centres</p>	<ul style="list-style-type: none"> <li>• A significant increase in tourist accommodation establishments</li> <li>• Many accommodation establishments are relatively new in construction, some of them offering wellness amenities</li> <li>• High-quality establishments found in the capital of Epirus (5 stars and 4 stars hotels)</li> </ul> <p>There are distinctive vineyards in the region, like those of Zitisa’s village where visitors can enjoy the high quality of Epirus wines and the hospitality of local Wineries</p> <ul style="list-style-type: none"> <li>• There are many stores for tourists to buy local food products</li> <li>• Restaurants provision of good food quality at a reasonable price</li> </ul> <p>New conference centers</p> <p style="text-align: right;">(continued)</p>

(continued)

	<p>Strengths</p> <ul style="list-style-type: none"> <li>• The rise of private and public stakeholders' awareness of the importance of marketing in Epirus' promotion as a tourism destination</li> <li>• Specific areas of the mainland start to build an international image as Zagoria and Metsovo. The coastal area of Parga is the most Known in the foreign visitors followed by Syvota and Preveza</li> <li>• Epirus Regional authority participates in tourism exhibitions inside and outside the country for strengthening the region's position "in traditional markets" where Epirus and its products are particularly famous</li> <li>• E.U. programmes and the Greek National Tourism Organisation "EOT" provide funds for the promotion of Epirus as a tourism destination</li> <li>• In the city of Ioannina recently established a tourist public information office</li> <li>• The University of Ioannina has developed an e-booking system for Epirus hotels</li> </ul>
<p>Local tourism sector</p>	<ul style="list-style-type: none"> <li>• Increase in hospitality operations</li> <li>• Prediction for the growth of the Epirus tourism sector</li> <li>• Local entrepreneurs are in business cooperation with foreign tour operators to attract more foreign visitors</li> <li>• Many successful adventure tourism organizers are based in the region</li> <li>• Provision of motives for the establishment of alternative forms of tourism</li> <li>• Presence of Academic Institutions supporting through their graduates and their researches the regional development of tourism</li> <li>• Integration of E.U. Programmes aiming at the development of a sustainable tourism model in the region</li> </ul>

<p>Attractions &amp; Events: Natural-cultural resources, museums &amp; art galleries, activities, events</p>	<p>Weaknesses</p> <ul style="list-style-type: none"> <li>• Lack of Epirus attractions awareness abroad</li> <li>• Lack of efficient management of attractions</li> <li>• No well-signed heritage and natural sites, lack of on-site interpretation, graphic panels, and information signs</li> <li>• Delays in the integration of many European programmes, enhancing the natural and cultural heritage of the region</li> <li>• The absence of contemporary interpretation techniques in the museums</li> <li>• Insufficient working hours are preventing the planning of itineraries visits to them</li> <li>• Limited awareness of traditional crafts as a tourist attraction</li> <li>• Non-established athletic events regularly as well as major athletic events</li> <li>• Lack of awareness of traditional festivals</li> <li>• Disability of organizing events in which tourists can interact</li> </ul>
<p>Transport infrastructure</p>	<ul style="list-style-type: none"> <li>• The provincial roads are bad, and the inadequate signposting is making difficult the accessibility to mountain areas. The result is long lasting, dangerous and tiring journeys</li> <li>• The performance of Igoumenitsa's port lags behind the others port of Greece (7th rank, accounting for 7%, of the total maritime transport in Greece). Severe delays in its infrastructure work</li> <li>• The airfare Ioannina to Athens is particularly expensive</li> <li>• The flights from Ioannina airport suffer from low capacity and unreliability due to the region's weather conditions</li> <li>• There is a lack of marinas with adequate capacity in comparison to other parts of Greece</li> </ul>
<p>Accommodation supply, food &amp; beverage, conference centres</p>	<ul style="list-style-type: none"> <li>• Short stay of visitor's as (average length of stay is 4.4 days)</li> <li>• Only 20.4% of hotel capacity reflects the highest hotel categories (5 and 4 stars hotels), as the majority are the lowest categories (3, 2 and 1-star hotels)</li> <li>• Lack of adequate campsites and youth hostels</li> <li>• Severe dependence of coastal accommodation on tour operators for doing business</li> <li>• Inadequate education and training in hospitality services</li> </ul>

(continued)

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Marketing	<p style="text-align: center;">Weaknesses</p> <ul style="list-style-type: none"> <li>• An absence of a coherent marketing strategic plan coordinated by public and private DMOs to market the region as a whole and build its brand name</li> <li>• The public sector's involvement in destination marketing is fragmented and not effective</li> <li>• The contribution of the participation of regional authorities to tourism exhibitions is never estimated</li> <li>• Limited tourist information offices in the region comparing to other European Countries</li> <li>• Rarely use of inbound marketing of accommodation establishments in promoting their business to tour operators and tourists</li> <li>• Insufficient packaging of the tourism product</li> </ul>
Local tourism sector	<ul style="list-style-type: none"> <li>• Only 8.3% of the Epirus workforce is employed in the tourism sector</li> <li>• Lack of flexible training and education opportunities, for both tourism officials and entrepreneurs</li> <li>• Many entrepreneurs are inexperienced in establishing cooperation with foreign tour operators</li> <li>• Lack of collaboration in culture between stakeholders, leadership, strategy destination</li> <li>• Lack of destination management</li> <li>• There are no developing tourism clusters in the region as a whole</li> </ul>

	Opportunities
Competition	<ul style="list-style-type: none"> <li>• European and national programmes enhance region rural tourism development and the delivery of quality vacation experience</li> <li>• Competitive cost of vacation compared to other Greek Regions</li> </ul>
Market trends	<ul style="list-style-type: none"> <li>• The region has the potential to follow a range of market trends existing in Europe, including:             <ul style="list-style-type: none"> <li>– the fast growth of demand for trips to various cultural attractions and amenities (cultural tourism)</li> <li>– the desire to visit not traditional tourism destinations rejecting the “mass model of tourism holidays”</li> <li>– the increasing demand for activities and adventure holidays such as rafting, kayaking, bungee-jumping, cycling, horse-riding, and hiking</li> </ul> </li> <li>– The desire of visitors to engage in more interactive and intangible experiences, to develop their creative potential (creative tourism) through active participation in courses and learning experiences, associated to local culture (languages, gastronomy, and art)</li> <li>– The growing interest of tourists in industrial or workplace tourism, i.e. Visiting places of work or craft enterprises</li> <li>• The creative innovations in tourism are repositioning the travel system, shifting from a traditional value chain towards a “value web” that includes travel suppliers, consumers, residents, other non-travel actors in the process of travel experience co-creation</li> <li>• Alternative forms of tourism represent a steadily growing market segment growing faster than any other does</li> </ul>
Environmental issues	<ul style="list-style-type: none"> <li>• Epirus is well placed to benefit from the rise of concern over environmental issues and environmental quality Europe-wide</li> <li>• Epirus can exploit the growing interest in organically produced food</li> </ul>
Government policy	<ul style="list-style-type: none"> <li>• The aim of the Greek government and “EOT” are to support the sustainable development of rural communities by developing alternative forms of tourism and less seasonal ones</li> <li>• Public authorities are dedicated to the development of sustainable tourism</li> <li>• State funding tourism’s sector transformation</li> </ul>

	Threats
Competition	<ul style="list-style-type: none"> <li>• Epirus' Rural Tourism is lagging to other competitive Greek regions such as Peloponnese and Thessaly (Pilio)</li> <li>• Strong European competitors in rural tourism such as France, Italy, Spain, Portugal</li> <li>• Rural tourism is rapidly developing in neighboring countries like Bulgaria and Croatia</li> <li>• Domestic economic recession and uncertainty</li> <li>• High taxation reduces the Greek tourism industry competitiveness</li> </ul>
Market trends	<ul style="list-style-type: none"> <li>• The lack of unambiguous framework, knowledge, and experience in the development of sustainable tourism</li> <li>• Creative Industries in Greece are not yet activated in providing creative tourism experiences, supporting innovative approaches to tourism development and marketing, and recreating the image of destinations</li> <li>• Lack of contemporary tourism packages</li> </ul>
Environmental Issues	<ul style="list-style-type: none"> <li>• The lack of strategic planning in tourism development can provoke excessive and unregulated tourist exploitation, destroying the natural beauty of the region</li> </ul>
Government policy	<ul style="list-style-type: none"> <li>• Non-operational and low funded public DMOs</li> <li>• The absence of an institutionalized framework for the development of a sustainable tourism model</li> <li>• The absence of an appropriate control mechanism to prevent delinquent behaviour in the industry that distorts the market and hinder competition</li> <li>• The Greek bureaucracy</li> </ul>

Epirus for developing as a tourist destination it should decide first which model of tourism to follow, thus, the traditional or the alternative (sustainable) one. Throughout the above analysis, it is evident that besides the coastal areas, the mainland also has the potential to receive revenues from tourism since it is qualified with resources adequate and proper for the development of alternative forms of tourism. The region should no longer be considered as four different regional units but as one, forming a tourism destination with a strong identity. The estimated benefits of this will be:

- Expanding the region's visitation all over the year.
- Differentiation of tourism activities (i.e., of the tourism product).
- Awareness of destination and established a unique character.
- The attraction of high-income, educated and sophisticated tourists with high respect for the natural and cultural resources of the territory.
- Minimizing environmental impacts.
- A rewarding experience for visitors and locals.
- Creation of sustainable and high-quality jobs.
- Increasing the contribution of tourism to the local economy.



### 3.4 *Current Alternative Forms of Tourism in Epirus*

Table 3 presents the alternative forms of tourism that are evolving in the Region and identifies ecotourism, educational-cultural tourism, and religious tourism as the dominant forms.

### 3.5 *Stakeholders Involved in Region*

The UNWTO (2005b) survey on the implementation of the Global Code of Ethics for Tourism, identifies as stakeholders in the tourism sector, the following:

- national governments,
- local governments with specific competence in tourism matters,
- tourism establishments and tourism enterprises, including their associations,
- trade unions of tourism employees,
- tourism education and training centers,
- travelers, including business travelers, and visitors to tourism destinations, sites, and attractions,
- local populations and host communities at tourism destinations through their representatives,
- other juridical and natural persons are having stakes in tourism development including non-governmental organizations specializing in tourism and directly involved in tourism projects as well as in the supply of tourism services.

Among others, the role of the following national, regional and local tourism stakeholders in Epirus is reported briefly. Their contribution is crucial to the implementation of sustainable tourism development.

- Governmental agencies and institutions such as the Ministry of Tourism and the Greek National Tourism Organisation. Their role is to establish the general institutional background and provide the policies required for tourism development. Further, they are engaging in the provision of funds, as well as technical knowledge and expertise to the local community for the successful implementation of tourism projects (Nastase et al. 2010).
- The office of WWF in Greece although it is operating on the national level, it serves the tourism development focusing on the ecotourism in the region through its local office in Western Zagori. Its purpose is to raise environmental awareness both within the local community and among the visitors. Moreover to provide guidance, education and training, technical expertise and sometimes even financial support (Nastase et al. 2010).
- On the regional level, the most significant stakeholders are the regional authorities and development agencies (Nastase et al. 2010).

**Table 3.3** Forms of alternative tourism in the Epirus Region

Form of Alternative Tourism	Komitisa	Zagori	Metsovo	Tzoumerka-Arachthos	Amvrakikos	Acherontas	Kalamas	Ioannina
Rural tourism	♦	♦	♦					
Ecotourism	♦	♦	♦	♦	♦	♦	♦	
Special Sea Tourism					♦	♦		
Winter tourism (Skiing)	♦		♦					
Adventure tourism	♦	♦	♦			♦	♦	
Inherent tourism		♦			♦	♦		♦
Spa tourism	♦				♦			
Sport tourism								♦
Educational-Cultural Tourism	♦	♦	♦	♦	♦	♦		♦
Religious tourism	♦	♦	♦	♦	♦	♦	♦	♦
Congress tourism			♦					♦
Exhibition tourism								♦
City tourism					♦			♦

Source: Information Leaflets of EOT – LRAs of Region cited in the Region of Epirus' (2015) operational programme

- Finally, the educational institutions conducting relevant research, providing new technologies and cultivating qualifying workforce supports the future evolution of tourism in the region.

### ***3.6 Epirus' Vision***

Epirus can be developed as one of the first three continental Greek destinations, providing to its visitors unique and authentic experiences from its wide range of heritage monuments, natural and cultural resources. The wild, awe-inspiring but also relaxed and sunny features of the Region result to a destination that is fascinating to visit during all seasons.

Epirus' main mottos

- Epirus for all seasons. Keeps you alive.
- My Epirus destination for every season.
- Epirus: Breathtaking Greece.

Goals

- The four regional units to be integrated as one destination.
- Established destination's unique character. Destination of 4 seasons.
- Grow destination awareness through integrated marketing activities.
- Ensure that the growth of tourism is in harmony with the community, the environment and the commitment to support sustainable tourism.
- Minimizing environmental impact.
- New resources markets (outside the national borders).
- The region's seasonality to be extended.

Target markets

- Domestic market.
- Neighboring countries, such as Balkan and other eastern countries, Turkey and Italy.
- Other European countries.
- Israel.

### ***3.7 Strategic Direction***

The current market trends and the intense competition insist on

- The rejuvenation and diversification of tourism product.
- Targeting segmented markets.
- Positioning in the international market.

- Develop effective marketing communication.

Region's aim to evolve as a tourism destination for all seasons is not easy to be achieved. The SWOT analysis revealed many weak spots of Epirus and potential threats of its external environment. The region should implement destination management in which the collaboration of all stakeholders is prerequisite. The initial step is universal acceptance by every one of the same vision. Then, the region increases the possibility to become a visitor's destination for every season. The evolution of alternative forms of tourism in Epirus is serving this goal. Although Stakeholders' agreement is crucial, it is not sufficient in turning the destination one of the top Greek mainland destinations.

The critical factor in planning tourist strategies, especially for attracting "alternative" visitors is the policymakers to reveal their needs (usually psychological ones like inspiration) and satisfy them through the co-creation of tailor-made tourist products, services, and experiences. The designing of an unforgettable experience is significant in becoming "instant" tourists more "permanent" (Chang et al. 2014). The satisfied visitors can be the region's evangelists promoting more efficiently the destination (WOM) than other means (media travel). The region should provide tourist packages that trigger the visitors' interests. Objects of supply could be found in sports and cultural facilities, encouraging visitors into driving, walking or visiting traditional towns and making journeys for experience and discovery. Key to tourism supply is the growing awareness that tourists participate in the production of their product, by their cultural capital, expertise, emotions, experience (Prentice and Andersen 2007). This interaction will act as supportive to visitor's decisions to travel again to the destination. If Epirus succeeds in implementing these strategies, then it will raise the numbers of visitors. Therefore, the region will maximize the tourism sector's contribution to the regional economy.

## 4 Concluding Remarks

Epirus as the most Greek Regions has not yet established a Tourism Destination Image. This fact, constraints its tourism development in the sense that Epirus being unable to maximize the economic benefits of tourism, it retains low the contribution of the sector to the total of its economy. An increase in tourism revenue would also serve as a way of confronting the negative impact of the prolonged domestic recession. Therefore, it is substantial for the region to elaborate a destination development plan for improving its position in the domestic tourism market and acquire for the first time a market share in the international one.

In the SWOT analysis, on the one hand, the main issues that hinder Epirus tourism destination development were identified, on the other hand, region's strengths and opportunities giving birth to a destination vision and strategy recommendations were recorded. The planning of the destination development is a serious, painful and tricky process as many stakeholders of the region are involved interesting in serving only

their interests. The leading and coordinating DMO should be able to negotiate, to claim, to persuade or to make concessions, providing an adequate level of satisfaction to all involved members. This ability is crucial for proceeding to the actual development of a sustainable plan. Well-structured, incorporating marketing strategies, detailed and efficient budgeted plan, aiming at the well-being of society will provide the framework under which Epirus will become a tourism destination with a distinct tourism destination image.

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# The Core-Periphery Analysis as to Socioeconomic Characteristics: The Case of Ankara



Cigdem Varol and N. Aydan Sat

**Abstract** In recent decades, socioeconomic inequalities have become increasingly noticeable at international, national and regional scales. Strikingly, a significant number of countries have been characterized by a division between dynamic and growing metropolitan areas and shrinking and declining rural regions. Relatedly, the Territorial Agenda 2020 of the EU states explicitly that “the core-periphery division is still present”. Increasing socioeconomic inequalities are more apparent within the prosperous metropolises and there has been an increasing socioeconomic differentiation between core and periphery regarding income, employment, and socioeconomic characteristics. Metropolitan areas have been experiencing population growth within the urban core, driven primarily by younger, better-educated and higher income people, in contrast to the peripheral areas witnessing an ageing, poorly-educated and low-income population. This differentiation occurring between core and periphery of metropolitan areas and their distribution across space may bring challenging issues for the governments to deal with. The aim of the study is to figure out how much core and periphery differentiate from each other in terms of their socioeconomic characteristics. As a case study, Ankara metropolitan area is analyzed considering the variables of age groups, sex, level of education, household structure, employment, and political views in district level. Ankara metropolitan area have totally 25 districts. The core is defined as the inner metropolitan area, including eight central districts, and the periphery as the outer area, including 17 districts mainly defined by their rural characteristics. In the empirical part of the study, the socioeconomic characteristics of the core and the periphery are compared by using the Turkish Statistical Institute’s data set. The statistical analysis of socioeconomic variation is realized via recently available economic and social data for the 25 districts and cluster analysis is used for the classification of the districts. By analyzing the districts using the economic

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and social variables, a district pattern of socioeconomic differentiation of Ankara metropolitan area is revealed.

**Keywords** Core-periphery · Socioeconomic differentiation · Metropolitan area · Ankara

## 1 Introduction

As a result of globalization and economic restructuring, there has been an increasing socioeconomic polarization among settlements in international, national, regional and local scales. In this process, settlements/regions have been observed as differentiated and divided into different sections containing different activities and people with different characteristics. For instance, it is widely witnessed that while metropolitan areas, carrying the potentials of agglomeration economies, represent a dynamic and growing characteristic, rural areas represent a shrinking and declining characteristic in contrast. The Territorial Agenda 2020 of the EU explicitly states this situation as the maintaining core-periphery division. The ‘core-periphery’ approach has been appropriated by various fields of research attempting to provide a systematic interpretation of the existence of significant developmental gaps between individuals, regions or countries. It tries to explain uneven development and socioeconomic inequality within a framework that the core is defined as an area of relatively high socioeconomic development, and the periphery is described as a region with low levels of economic activity and associated poor quality of life indicators (O’Hare and Barrett 1996; Taylor 1989).

Heterogeneous divisions within metropolitan areas can be defined as core and periphery regarding income, employment, and other socioeconomic characteristics. Within the core, metropolitan areas have been experiencing population growth, driven primarily by younger, better-educated and higher income people, in contrast to the periphery witnessing an ageing, poorly-educated and low-income population (Siedentop et al. 2018). This differentiation occurring between core and periphery of metropolitan areas and their distribution across space are often seen as a dichotomy and in opposition, with unequal power and resources. This dichotomous division has been increasingly questioned and it may bring challenging issues for the governments to deal with. Mapping of different social, economic, and demographic variables leading to core-periphery approach by which the uneven distribution of people according to their characteristics forms the basis of spatial outcomes of the socioeconomic differentiation.

In the face of these considerations, the main aim of this study is to emphasize the core-periphery discussions regarding the socioeconomic characteristics and to figure out how much core and periphery differentiate from each other in terms of their socioeconomic characteristics. As a case study, Ankara metropolitan area is analyzed regarding the variables of age groups, sex, level of education, employment, and household structure both in the core and in the periphery. For this purpose, after



the introduction the second part of the study contains a short overview of main theories and models of the core-periphery approach and the existing relationships between the core and the periphery. The third part provides an analysis of Ankara case in order to find out the core-periphery pattern by using descriptive statistics and cluster analysis underlining the core-periphery differentiations. For Ankara metropolitan area; the core is defined as the inner metropolitan area including central districts, and the periphery as the outer area including districts mainly defined by their rural characteristics. There are totally 25 districts of Ankara, where eight of them are defined as core districts and 17 of them are defined as peripheral districts. The methods employed in the empirical part of the study are to compare the socioeconomic characteristics of the population living in the core or the peripheral districts by using the Turkish Statistical Institute's data set. Finally, discussions of the results and concluding remarks aiming to help the decision makers to develop alternative policy objectives are given in the fourth part.

## 2 Theoretical Discussions on Core-Periphery Approach

Core-periphery approach offers a set of processes and outcomes to examine geographical patterns of inequality (Reitsma and Kleinpenning 1985) whether regional, national or international (Hirschman 1958; Friedmann 1973; Healey and Ilbery 1990). There are different definitions for 'core' and 'periphery', which are geographical as well as economic. Mathematical term periphery was adopted in geography to represent "radius" or "fringe". Peripheries were defined as outskirts and determined by their distance to a center/core. The greater the distance from the core, the more peripheral the location is. Here, it is important to recognize that core and the periphery are not regarded as mutually exclusive spatial units. The periphery is therefore compared to a center and the main idea of the core-periphery approach is that core use political and economic dominance to exploit the periphery in favor of its own interests. The relations developed among them covers an asymmetric dependence (Pascariu and Tiganasu 2017).

The core-periphery descriptions entered the scholarly debate after the World War II era and became a novel agenda for social thought. Previously, in 1929 Prebisch used the terminology of 'core' and 'periphery' such another variant of the 'rich and poor' dichotomy in social sciences. In the 1950s, core-periphery approach used as an explanation of dependence as the way in which the formation and the functioning of the peripheral economies match the needs of central economies (Prebisch 1950). In economic geography in the 1950s, regarding the core-periphery approach, polarization theories emerged as a critical response to the neoclassical theories in which it is discussed that regions would converge towards a common equilibrium of productivity and wealth (Myrdal 1957; Hirschman 1958). In contrast to these ideas, polarization theories identified an increase in inequalities between regions depending on the cumulative processes of growth and shrinkage between regions. Growth processes of the centers are linked to shrinking processes of the peripheries

via the interregional mobility of people, goods and capital (Kühn 2015). In the theorization of “polarized development” of Friedmann (1973) “core regions” differentiate from “peripheral regions”. Core regions are the centers of technological, economic and social innovation where peripheral regions are all other areas. Besides, cores and peripheries constitute a spatial system to contribute to the divergence of development patterns.

In the late 1950s, the concepts of “growth poles” and “growth centers” which are related to the spatial scale of cities and their surroundings have been added to polarization theories (Hirschman 1958; Perroux 1950). A growth pole results from the advantages that the cities have as agglomerations, their density of services and activities. An agglomeration provides a context favorable to various activities, which in turn attracts more activities and reinforces the agglomeration (Myrdal, 1957, Lasuen, 1973). In this way, cities further extend their advantages over rural regions, which become peripheral in time. The concept of peripherality finds its roots in the definition of lagging behind the core. The main indicators used to explain the degree of peripherality of a country/region are the use of socioeconomic indicators like the GDP, population and rate of employment, correlated with spatiality indicators (density of various transportation modes, distance from one area to another, daily accessibility etc.) (Pascariu and Tiganasu 2017). A peripheral situation is often characterized by a higher concentration of employment in agriculture (Erkut and Ozgen 2003). Conversely, it is argued that the consideration of innovative capacities and knowledge endowment become important to describe the reasons for income disparities in the core than the peripheral location. Place-based inequality is also argued instead of a pure peripheral focus and peripheralization refers to the social ‘making’ of peripheral cities or regions in this argument (Werner et al. 2017).

During the 1990s, new economic geography has contributed to polarization theories by integrating transport costs and historical development paths in the discussions of core-periphery relationships (Krugman 1991). It is claimed that peripheries are disadvantaged in terms of higher transport and distance costs and weak agglomeration advantages. However, the dichotomy between core and periphery was questioned and criticized as these factors have become less important because of economic and technological improvements such as information and communication technologies and the emergence of polycentric developments (Copus 2001).

Currently, we observe a “revival” of polarization trends with the emergence of the knowledge economy. The current metropolitanization of the knowledge economy creates new peripheries, which have been labelled negatively as “non-metropolitan regions” (Herrschele 2012; Lang 2012). The growth of knowledge economy is driven by highly qualified business services (e.g. banking, consulting, marketing and legal services) which are highly concentrated in metropolitan regions (Crone 2012). The centralization through attracting people, economic productivity and infrastructures determine the processes of centralization and peripheralization. Metropolitan regions nowadays show intense signs of core-periphery differentiation which leads to the idea that the diversity of regions/districts and their dynamics have to be considered. The demographic change of inner metropolitan areas, so the rejuvenation (youthening) of population stands in contrast to the trends of ageing in periphery. On the other

side, the economic restructuring of the core by specialized intensive capital and medium/high tech industries against the periphery by intensive and low/medium tech industries even by carrying rural characteristic clearly reflects the situation. Besides, distinguishing rate of employment, population, GDP/per capita, level of education, accessibility, socioeconomic structure are the other indices of core-periphery differentiation.

Related to the core-periphery differentiation, there is a common emphasis that most approaches are developed to serve for policy recommendations and development of political solutions for lagging regions (Laffan et al., 2016). This means it is important to check the specific assets of an area or region if peripheral regions are always lagging. The underlying reasons for the current status as well as the development potentials of these regions must be considered in order to ensure that the proposed approach can be used for practical applications.

### **3 Core-Periphery Analysis of Socioeconomic Differentiation in Ankara Case**

In this study, it is aimed to analyze socio-demographic, economic and political differentiation among the districts of Ankara metropolitan area. There are totally 25 districts of Ankara metropolitan area where the core is defined as inner metropolitan area including eight central districts, and the periphery as the outer area including 17 districts mainly defined by their rural characteristics (Fig. 1).

#### **3.1 Methodology**

The methodology of the study consists of three steps; the selection of the variables, conducting descriptive statistics and cluster analysis.

*The first step—Selection of variables for the analyses:* For a multidimensional evaluation of core-periphery differentiation, it is important to include different variables. Thus, the validity of core-periphery distinction in Ankara is analyzed by examining the districtwide distribution of three groups of variables: socio-demographic, economic and political structure. Related to socio-demographic characteristics; age groups (0–15, 15–65 and over 65), gender, level of education (illiterate, primary, high school, university, postgraduate) and household size are selected; related to economic structure; employment in manufacturing and service sector variables are selected, and related to political view; voting for political parties that are conservatives, nationalists or social democrats are selected for the analyses. The data on socio-demographic and economic structure are obtained from Turkish Statistical Institute. The political view data, are collected from the 2019 Turkish local election results (Table 1). In terms of displaying the economic structure, although the income data is critical for



**Table 1** Description and sources of selected variables

Variables	Descriptions	Sources, Year
<i>Socio-demographic characteristics</i>		
Population	Population size of districts (#)	TurkStat, 2018
Household	Average number of households in districts (#)	TurkStat, 2018
Education	Percentage of illiterate, primary, high school, university, postgraduate in districts (%)	TurkStat, 2018
Gender	Percentage of female and male population in districts (%)	TurkStat, 2018
Age	Percentage of distribution of 0–15, 15–65, 65+ age groups in districts (%)	TurkStat, 2018
<i>Economic structure</i>		
Employment	Employment in manufacturing and service sectors in districts (%)	TurkStat, 2018
<i>Political structure</i>		
Political View	Vote rates for social democratic, conservative and nationalist parties in districts	Results of 2019 Turkish local election

This visualization allows for the inclusion of the spatial component in the core-periphery characterization, thus helps to display spatial aspects like the position of a district at the center or the core. It also allows for the simple evaluation of spatial accumulation of different distribution patterns of all types over a metropolitan area (Werner et al. 2017: 194).

### 3.2 Descriptive Analyses

*Socio-demographic characteristics:* To clarify the differentiation of socio-demographic characteristics between the core and the periphery of Ankara, main descriptive statistics are derived from the data set. As can be seen from Table 2, standard deviation of population variable is enormous, which means that there is a discernible distinction in terms of population distribution among districts. While core districts have higher population, peripheries in contrast have lower. The area close to the center has a higher population density than the area further away from the center can be explained by higher employment and consumption patterns in the core areas (Thomas 2013).

According to the household size variable, which also gives clues on socio-demographic characteristics of the districts, the core-periphery description is not

**Table 2** Main descriptive statistics of selected variables

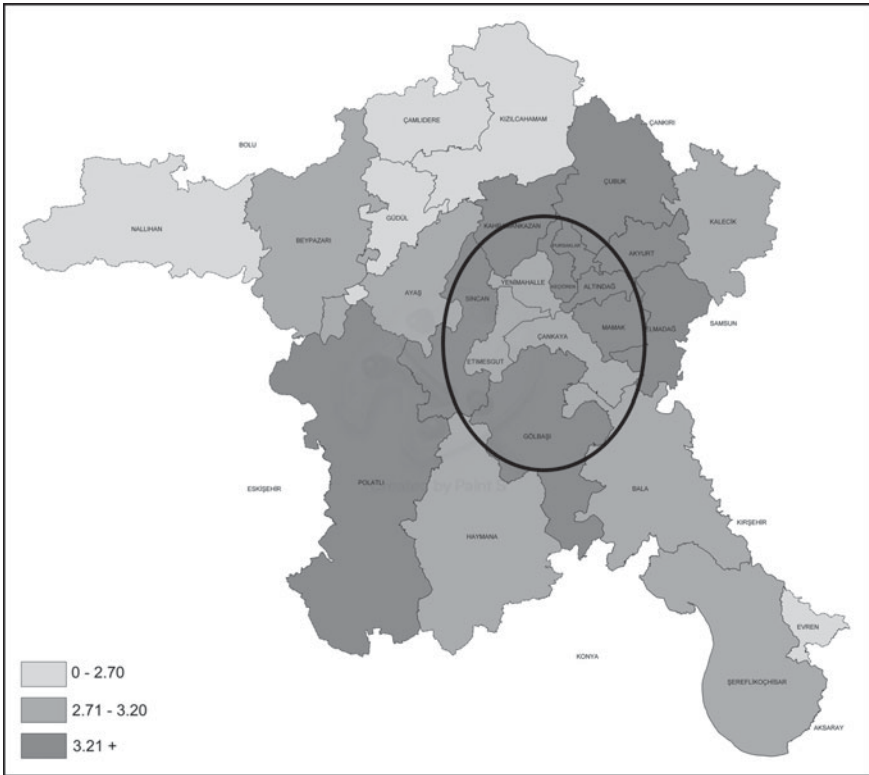
		Minimum	Maximum	Mean	Std. Dev
<i>Socio-demographic characteristics</i>					
Population (#)		2.847	922.536	230.442,72	295.354,4
Household (#)		2.38	3.62	3.07	0.36
Education	Illiterate (%)	1.03	14.29	3.99	3.1
	Primary (%)	7.74	42.53	24.54	9.1
	High school (%)	10.05	41.04	19.22	6.57
	University (%)	3.44	30.42	11.17	6.88
	Postgraduate (%)	0.03	7.57	1.11	1.62
Gender	Male (%)	48.41	52.1	50.19	0.89
	Female (%)	47.9	51.59	49.81	0.89
Age	0–15 (%)	8.6	17.92	13.49	2.93
	15–65 (%)	61.4	79.88	74.21	4.94
	65+ (%)	4.12	29.93	12.3	7.4

apparent among districts (Fig. 2). Minimum household size is 2.38 at Gudul district and maximum household size 3.62 at Pursaklar district that are both peripheral districts.

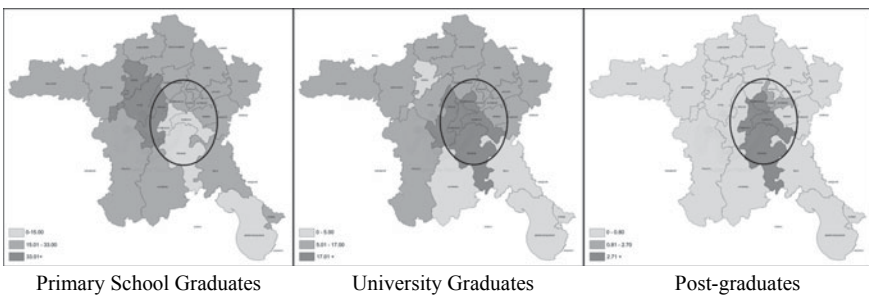
Education levels of districts are examined in terms of the percentage of illiterates, and graduates from primary, high school, university and postgraduate levels in total population (Fig. 3). The core-periphery separation is clearly apparent for this variable, like the empirical studies of different countries (Hospers 2013; Thomas 2013; Kebza 2018; Kühn 2015; Siedentop et al. 2018). Except the core districts, all peripheral districts have lower education levels. There are three sub-regions due to the results of the analysis; core has the highest values that means the percentage of people graduated from university and had post-graduate education is very high, north and west peripheries have mean values, and southern east peripheries have the lowest values that means lower education level is high in these districts.

According to several researches, the demographic change of inner metropolitan areas, thus the youthening population stands in contrast to the trends of ageing in the periphery. Spatial distribution of percentage of 0–15, 15–65 and 65+ age groups in total population for Ankara is given in Fig. 4. Although, the core-periphery differentiation is apparent, extreme cases emerge. The largest peripheral district in the southwest (Polatli) has higher values in both 0–15 and 15–65 age groups like the core districts that can be explained by the employment opportunities that the district carries.

*Economic Structure:* The core and periphery distinction can easily be observed also in the economic structure of Ankara. A high percentage of the employment in service sector (92%) and in manufacturing sector (80%) is in core districts (Fig. 5 and Table 3). One of the core districts Cankaya, where the CBD is located, takes nearly 50% of the service sector employment. On the other hand, 80% of the employment

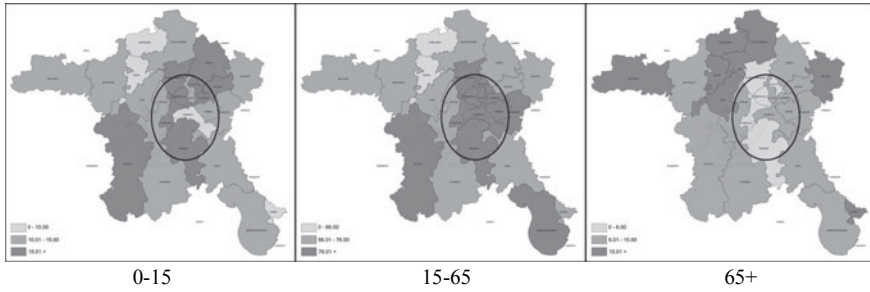


**Fig. 2** Spatial distribution of household size by Districts in 2018

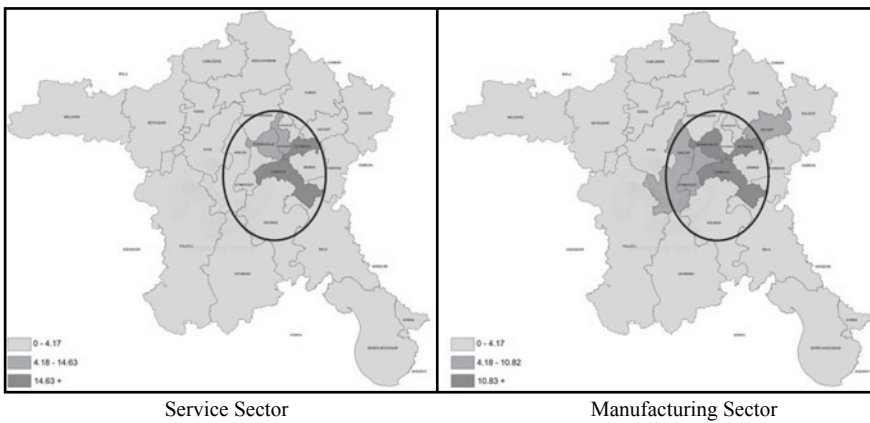


**Fig. 3** Spatial distribution of education levels by Districts in 2018 (%)

in manufacturing sector locates again in core, except three districts in the periphery (Kazan, Polatlı and Akyurt) where important machinery and defense industry investments exist. These results emphasize that except some of the districts, peripheral districts of Ankara metropolitan area are mostly engaged in agricultural activities, while core districts in service and manufacturing sectors.



**Fig. 4** Spatial Distribution of 0–15, 15–65 and 65+ Age Groups in Total Population by Districts in 2018 (%)



**Fig. 5** Spatial distribution of employment in service and manufacturing sector by Districts in 2018 (%)

*Political view:* Most of the researches on core-periphery distinction are focused on socioeconomic characteristics. Nevertheless, this study brings a new dimension to the researches by analyzing the political views of the residents in the districts. For the analysis, the results of 2019 local election is examined in district level (Fig. 6). There are three main political views; conservatives (Justice and Development Party-AKP); social democrats (Republican People’s Party-CHP) and nationalists (Nationalist Movement Party-MHP) in Turkey. From the results of the local election, it is observed that while the mayors of Ankara Greater Metropolitan Area and the three core districts are from social democrats, the majors of peripheries are from conservative and nationalist ones that obviously show the core-periphery separation in the political views.



**Table 3** Employment in manufacturing and service sectors by Districts in 2018 (%)

Districts	Manufacturing		Service		Districts	Manufacturing		Service	
	No	%	No	%		No	%	No	%
Altindag *	23.033	18.96	70.917	15.91	Camlidere	35	0.03	292	0.07
Cankaya *	24.323	20.02	222.89	49.99	Cubuk	891	0.73	3830	0.86
Etimesgut *	6157	5.07	10.312	2.31	Elmadag	3129	2.58	2238	0.5
Golbasi *	1236	1.02	6331	1.42	Evren	3	0	106	0.02
Kecioren *	2184	1.8	24.116	5.41	Gudul	38	0.03	343	0.08
Mamak *	2925	2.41	13.703	3.07	Haymana	124	0.1	1456	0.33
Sincan *	11.298	9.3	11.668	2.62	Kalecik	90	0.07	534	0.12
Yenimahalle*	25.951	21.36	48.851	10.96	Kazan	4713	3.88	2227	0.5
Akyurt	9649	7.94	3511	0.79	Kizilcahamam	197	0.16	2193	0.49
Ayas	52	0.04	1642	0.37	Nallihan	218	0.18	2842	0.64
Bala	138	0.11	653	0.15	Polatli	3745	3.08	9901	2.22
Beypazari	603	0.5	2832	0.64	S.Kochisar	747	0.61	2472	0.55
					Total	121.48	100	445.86	100

Source TurkStat, 2018.

\* Core districts



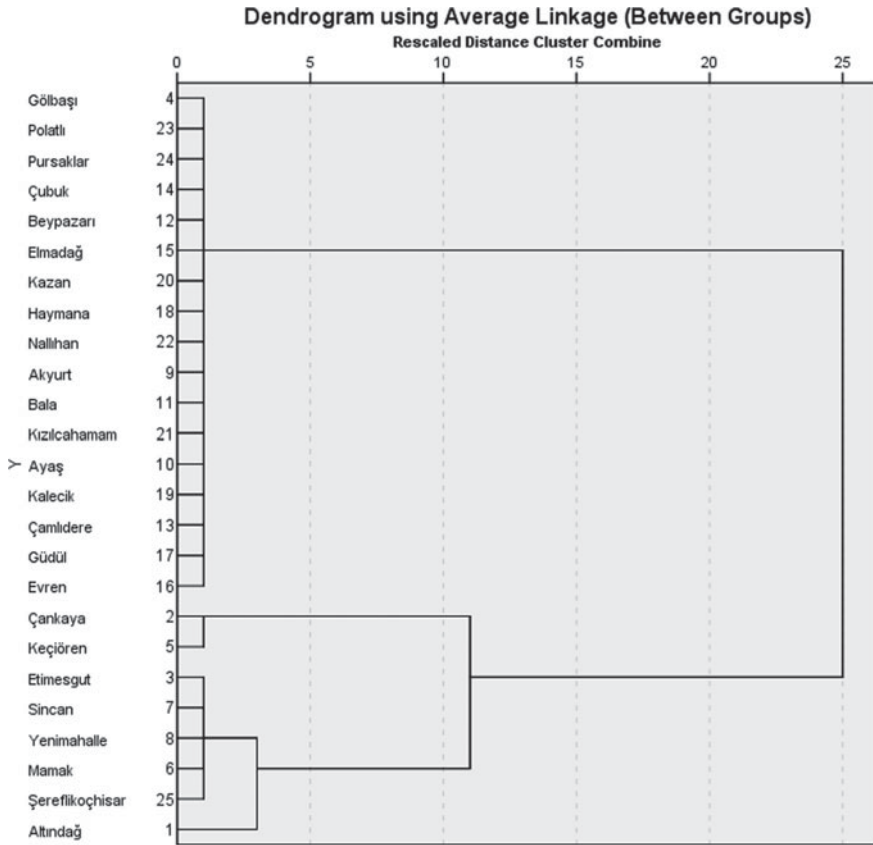
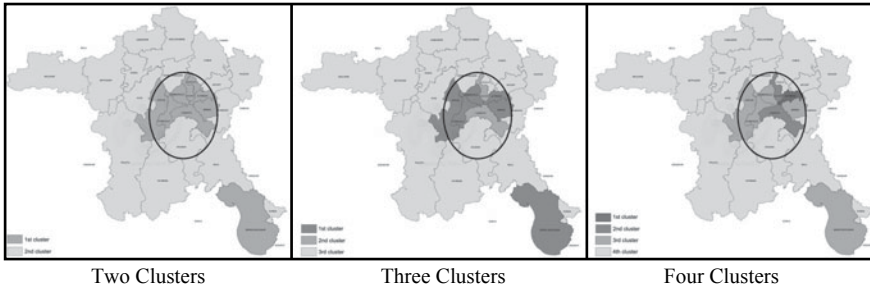


Fig. 7 Dendrogram of cluster analysis representing the linkages among Districts

As illustrated in Fig. 7, except two of the peripheral districts (Golbasi and S.Kochisar), the districts determined as core are clustered in the same group, and the districts determined as periphery are clustered in the same group as well. Golbasi which is determined as a core district is taken place in the periphery according to the results of the cluster analyses and S. Kochisar is vice versa.

Figure 8 shows the results of cluster analyses by different numbers of clustering. Analysis shows that even if the number of clusters changes, the districts in the clusters representing the core and the periphery do not change. As the number of clusters increases, only subgroups appear within the core group.



**Fig. 8** Results of cluster analyses by different cluster numbers

## 4 Concluding Remarks

There has been an increasing socioeconomic differentiation between core and periphery of metropolitan areas regarding income, employment and socioeconomic characteristics. Most of the regions defined as core are economically stronger than the regions further away from core and there is a clear movement of production and capital towards the core. However, relatively few studies have explored the spatial socioeconomic inequalities of a metropolitan area in district level. The present study, which aims to emphasize the core-periphery discussions regarding the socioeconomic characteristics, is realized at district level in Ankara metropolitan area. In this study, by using multi-dimensional variables, a complex district pattern of development in Ankara metropolitan area is revealed. Analyses of the study show that spatial socioeconomic contrasts at the districts of Ankara metropolitan area are distinguishable and core-periphery framework adequately reflects the existing spatial arrangement of socioeconomic inequalities. Parallel to the results of empirical studies from different countries, the analyses display that the core of Ankara is younger, more educated (especially graduate and post-graduate degree), white-collar and has social democrat political view when compared to its periphery.

Several studies outline the relevant contribution of public interventions through the core-periphery approach aimed to reduce development gaps differentiated by time and types of regions. Especially, interventions on social and technical infrastructure and transportation networks all play a vital role for the economic power of regions. The findings of the present study point to the need to reconsider urban and regional development approaches by placing the main emphasis on a differentiated regional development policy, rather than a homogeneous or a uniform regional development policy due to the differentiation of the districts/regions. The socioeconomic differentiation pattern in Ankara can highlight the importance of equity issues and social welfare programs in the country by core inducing tendencies including economic efficiency through economic restructuring. Recognizing the socioeconomic differentiation pattern between the core and the periphery, governments can develop programs for softening the gap between them, thus helping those regions to converge. Many of the districts within the metropolitan area can also have their own local policies and

programs regarding the intervention within their own spatial boundaries. Concerning the problem of low innovative capacities and knowledge endowments of peripheral districts, the use of smart specialization approach that has realized in the EU in framework of strategy Europe 2020 can also be practiced to overcome the socioeconomic inequalities.

Clearly, the compulsorily limited number of considered variables confines the study, so that more accurate conclusions could be reached by extending the number of variables. Thus, further researches can include more variables, like GDP, density of various transportation modes, distance from one area to another, daily accessibility etc. to explain the degree of peripherality, thus core and periphery differentiation.

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# The Economic Integration Maturity of Romania and Bulgaria



Oleg Tankovsky and Viktória Endrődi-Kovács

**Abstract** The paper discusses the issue of integration maturity in the case of Romania and Bulgaria. These countries joined the European Union in 2007 and since then several economic issues and problems were revealed related to their accession. The aim of this paper is to analyze the economic integration maturity of Romania and Bulgaria at the time of their accession and since then. The paper suggests that although these countries fulfilled the Copenhagen criteria were not fully prepared to join the EU markets. The paper forms the hypothesis that Romania and Bulgaria did not fulfill all the criteria of economic integration maturity and were not fully ready to join the EU in 2007. However, by the time of their accession, their readiness was appropriate to join. To prove this, the paper uses the methodology of economic integration maturity. The concept of integration maturity is more complex than the economic accession criteria since it shows how a candidate country is able to exploit the benefits of membership and minimize its drawbacks before and after the accession. Based on data analysis and document analysis it can be examined how successfully these countries could exploit the economic stimulating effects of joining the economic integration, how effectively took advantage in cohesion and convergence to the other member states during their membership. In sum, it can be stated whether Romania and Bulgaria were able to exploit the benefits of their membership and minimize the drawbacks.

**Keywords** Integration maturity · European Union · Convergence · Romania · Bulgaria

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## 1 Introduction

Bulgaria and Romania joined the European Union on 1st July 2007. Although the two countries have fulfilled the Copenhagen criteria and could join, these countries cannot fully realize the benefits of membership and some economic problems have been emerged since their accession—e.g. these countries are still the less developed in the European Union (see GDP per capita) or there were several scandals related to using EU budget for developing purposes. Moreover, in recent years, concerns have grown about their respect for rule of law and the independence of judiciary. In the framework of Cooperation and Verification Mechanism these two countries are oversighted by the EU whether they fulfilling the 17 recommendations (European Commission 2018). A question arises whether these countries were really ready to join the European Union? This topic is more than relevant and actual as the EU presidency is currently held by Romania and Bulgaria applied for EU's Exchange Rate Mechanism II last year (Reuters 2019). The aim of this paper to answer this question but from a different point of view than fulfilling Copenhagen or Maastricht criteria. The originality of this paper is that it introduces Romania's and Bulgaria's ability to gain from EU membership and readiness of (euro) membership by using a complex methodology and by giving a complex economic analyses. The paper uses the methodology of integration maturity (focusing on its economic criteria), which measures in a more appropriate way how an official candidate country is ready to join an integration. Moreover, it gives an outlook how a member can benefit from membership. In sum, the paper gives an economic outlook of the two countries since 2007 from the point of view of European integration, which have not been analysed since their accession.

In the next chapter first the theory of this integration maturity will be introduced than its methodology. Then, in Chap. 4, the two country will be introduced from their accession until nowadays based on this theory.

## 2 Theory of Integration Maturity

Every integration has its own criteria to let new members in. In the case of the European Union (at that time European Economic Community), the first criteria were introduced by the Treaty of Rome. These were just the followings: the candidate country should be European and democratic (Baldwyn and Wyplosz 2004). As integration enlarged, candidates' integration preparedness has become more and more relevant. As a result, the European Communities formulated concrete accession criteria in 1991 in connection with the transition to an economic and monetary union (Palánkai 2011). Following the Maastricht criteria for the introduction of the euro, new conditions were created in connection with Eastern enlargement in 1993, the so-called Copenhagen criteria, which are: stability of institutions guaranteeing democracy, rule of law, human rights and respect for and protection of minorities;



functioning market economy and the capacity to cope with competition and market forces; and adaptation of *acquis communautaire*. So there is a political criterion, an economic criterion and an administrative and institutional criterion (European Commission 2019). So, if a country would like to join the European Union, they have to fulfill the Copenhagen criteria and the European Commission prepare reports how the candidate fulfills the criteria.

Nevertheless, based on the lessons of previous accession rounds, it became obvious that economic, political, administrative, and institutional accession requirements, which are set by the European Union, do not reflect on the readiness of a candidate country to enter the Union. Overall, these requirements are not coherent, clearly structured and well composed. The research gap is to develop and adapt a more complex theory and methodology to measure whether a country is mature to join the European Union and benefit from the membership. If we consider the European Commission's enlargement reports, we can observe that it uses a more complex analysis than Copenhagen criteria and uses more economic indicators.

Some theories have emerged how to measure integration preparedness, integration capacity alternatively than the European Union does (e.g. Schimmelfennig et al. 2015 or Bergs 2001), from which the most complex is Tibor Palánkai's integration maturity theory. It gives a more complex approach to determine whether a country is mature to access or not (Palánkai 2006) than the Copenhagen/Maastricht criteria or other theories. Although this concept and methodology have not been adapted to the cases of Bulgaria and Romania yet, it can be, since this concept was developed to measure a country's preparedness to join the EU, mainly for Central and Eastern European countries.

'The integration maturity is an ability to maximize benefits from the integration and to minimize its costs and drawbacks. It can be measured by the balance of costs and benefits. If membership is a positive sum game, overall the country can gain/profit from it; the country is mature to enter integration' (Palánkai 2011, p. 378). Accession criteria define the minimum of membership criteria, while maturity far beyond that and it examines the general criteria of successful and efficient integration, which can be measured before and after the accession (Palánkai 2006).

Four dimensions of integration maturity can be distinguished: economic, political, institutional and social; in this analysis, the focus is on the first one since economic dimension is the most objective, tangible and quantifiable dimension, which can give relatively objective conclusions. Moreover, by using economic data other dimensions can be covered, too (e.g. by using EBRD's transition index or Maastricht criteria can show us the institutional and political willingness to fulfil EU's willingness).

According to Palánkai (2010), the economic integration maturity can be defined by the following basic criteria: functioning market economy, competitiveness, macroeconomic stability, convergence, and financing ability. Functioning market economy is one of the Copenhagen criteria. It presupposes free movement of market participants and prices determined by the market conditions. Competitiveness is also partly an accession criterion until it was reformulated. It expresses that new members should be able to cope with the competitive pressures of the EU markets and compete against other European enterprises. But it should be analyzed in a more complex way using

micro and macro approaches; countries compete also against their social, economic and institutional systems. Macroeconomic stability is crucial in order to get the benefits from the integration itself. Convergence is necessary in order to avoid the negative consequences of the accession. It is well known that integration between a less developed and developed industrialized countries can be a source of serious problems. For example, as a result of sharpening competition, most producers may lose or lose markets, which might be resulted in a severe deterioration in the current account and balance of payments of underdeveloped countries. This can cause serious problems in terms of employment, budget and halt economic growth. In addition, a more developed state is abler to adapt to changed competitive conditions, more easily mobilizes its capital resources and converts to more modern techniques. Financing ability contains availability of domestic capital resources, how an economy is capable to produce the resources for its own development and how a country operates in capital markets; so it shows the ability of a particular country to absorb capital, both in terms of external investments of private capital (e.g. foreign direct investments) and the intake of budgetary transfers (Palánkai 2011).

### 3 Methodology

Our main hypothesis is that Romania and Bulgaria were partially ready to join the EU in 2007, as only some of the main criteria of economic integration maturity have not been contented. On the one hand, quantitative figures will be presented and analyzed, on the other hand, as qualitative analysis, reports and literature will be shown. We are going to use the theory of economic integration maturity and its methodology. The analyses will be carried out based on the criteria of functioning market economy, competitiveness, convergence, macro-stability, financing ability.

Functioning market economy is listed in the Copenhagen criteria. Basically, in case of every integrational cooperation in order to be integrated, it is necessary to have the basic conditions of a market economy to ensure that the free movement of goods is guaranteed and that internal trade starts to flourish (Baldwin and Wyplosz 2004). The European Union does not provide an exact methodology of how to measure it, only general conditions have been laid down for the Central and Eastern European countries which had a socialist past. With these recommendations, they were able to move from planning economy to free market economy in their own rhythm. The European Bank of Reconstruction and Development prepares case studies in every year on the state of transformation of the examined economies (EBRD 2005). Among other things, their research takes into account the competition policy of each country, the level of privatization, the functionality of the securities market, price liberalization or the process of infrastructure development. Subsequently, an objective complex indicator comes out, as a result, ranging from 1 to 5. The lower figure indicating the need for further reforms. We will compare these indicators established by the EBRD

one by one, and we will calculate with their average therefore in cases when the average result is below than 3.4, that economy cannot or just partially be considered as mature for economic integration.

In case of competitiveness, the EU does not provide a concrete or specific methodology neither, but only different guidelines and patterns. For instance: a country seeking full membership needs to implement the competition law of the EU and fulfill all of its criteria. However, there are several economic research institutes, which are publishing case studies with a detailed competitiveness report. In this paper, we will use the IMD (Institute for Management Development) and WEF (World Economic Forum) studies to examine the competitiveness of Romania and Bulgaria.

Convergence is an important aspect of our research, as with the assistance of it, we are able to measure the level of development of an economy, and we can also compare the results of that economy to the EU members average. As trade among different economies in the mid and long term, can lead to asymmetric interdependencies, most of the times creating a negative impact in the underdeveloped countries, it is highly important to examine the convergence among the member states and the newly joined countries. A complex economic indicator is lacking in this case as well, so we will create our analyzation matrix using the methodology of László Práger (2005). According to him, we can get a relatively objective view of the convergence of a country's economy when we measure the macro-economic indicators (GDP, GDP per capita), the level of integration of a concrete society to information technologies, the social indicators (life expectancy, number of hospitals) or the balance of payments (current account balance, public debt).

Macroeconomic stability is usually measured with 3 indicators: GDP growth, unemployment rate and inflation. These indicators are representing the main indexes of an economy, and if the analyzed period is picked correctly, the chosen development path shall be bright and clean. The most important question is to make the right comparison with other economies (Palánkai 2006). In our case, we have more opportunities to compare with the EU average during the last 15 years, or with the Eurozone members, or with other neighboring but EU member countries.

Financing ability requires not only one economy's maturity but the EU's maturity as well as integration. Even in the Copenhagen criteria, it is mentioned that the integration needs to have the skill to converge the newly joined state. Basically, it does depend on the will of the previously joined member states if they would like to provide enough resources for the catching up process of the new member (Guérot 2004). Moreover, it is also worth examining the acquisition of foreign capital, and its changes. In our case, as Romania and Bulgaria already a member, the absorption ratio of the EU funds will also be analyzed, since how they can demand more resources when they cannot use the currently available amount.

## **4 The Economic Integration Maturity of Romania and Bulgaria**

### ***4.1 Functioning Market Economy***

Bulgaria had some similarities compared to Romania regarding the EBRD transition topics, but in overall it was in a better shape than its northern neighbor. Bulgaria had a 3.4 score on average regarding the transition indicators. There were many aspects where they performed well and received a good score (4). Similarly, as in Romania, the reform of price and trade liberalization has been quickly implemented, but they could also reach good results in small and large-scale privatization (EBRD, 2008). However, the enterprise reform was not that successful as it was expected. Bulgaria outperformed Romania in the process of infrastructure reform. According to the 2007 EBRD report, it is highlighted that Bulgaria made some huge steps forward, but the economy's flexibility has to be furtherly improved in order to reach a higher level of integration. The barriers to market entry needs to be decreased which would also improve the business environment that could result in more foreign investment therefore, fighting against corruption has one of the highest priority. In order to have a more efficient and less bureaucratic energy sector, on the one hand, the privatization has to be finished, and on the other hand, technology transfer and modernization of infrastructure has to be implemented. One of the biggest threat for the Bulgarian economy was the large external imbalance which had to be financed. The global financial crisis had major negative effect on the Bulgarian economy. As the enterprise restructuring still did not reach the required level, the Bulgarians were addressed with new policies, which can provide a successful structural shift from the non-tradeable to the tradeable sector (EBRD 2013). As the modernization of infrastructure still needs further improvements, the competitiveness of the country has decreased. One of the most problematic fields were still the energy sector, as market opening and building interconnectors with neighboring countries are expected. Eventually, some major progress could have been recorded in the financial structures of the country. Joining the ERM II is a real opportunity for the Bulgarians. They are already fulfilling the macroeconomic conditions, but they need to continue with the key reforms, including tighter cooperation with the European Central Bank, introducing new macro-prudential instruments and anti-money laundering frameworks (EBRD, 2018). Improving the business environment could affect higher foreign investments, but retraining of qualified workers and developing the skills of the current labor force is crucial as well.

In the case of Romania, we measure the existence of the functioning market economy by examining the EBRD transformation indicators between 2005 and 2018. The first date is coming from just before their accession to the integration and then every year has been analyzed. In the first reviewed year, Romania had a 3.25 score on average among EBRD indicators. The lowest value was measured in the area of financial structures, the reform of banking sector had a score of three, which was acceptable especially because they could improve this number throughout the years,

but they have missed the reforms of non-bank financial institutions (2.3). The highest value was measured in the area of price and trade liberalization by the EBRD, where Romania has received a 4.3 score (EBRD 2005). By the year 2010, after 3 years of EU membership, they performed better and almost every indicator reached the score of 3. However, the enterprise restructuring is still lacking, in 5 years they improved their results from 2.3 to 2.7, but it was still the most problematic area after the financial crises. It has also been addressed to them as one of the key challenges already in 2007. Another critical area was the investments of the private sector, its framework should have been improved in order to modernize the infrastructure more effectively and to have a better absorption ratio of the EU structural funds. Even as an EU member, Romania still faces transition challenges, the most influential lag is in the infrastructure and energy sector (EBRD 2008). The quality of the road network is not reaching the EU standards yet, and competition is limited in the energy sector. The financing ability of small and medium enterprises is also not reaching the sufficient level. In the most up to date report, three main priorities have been highlighted for the Romanian economy (EBRD 2018). Further independence of the judicial system could assist transparency and also the success of the government's anti-corruption commitment. Basically, the privatization of state-owned companies did not change significantly during the past 8 years. The government, especially in the transport and energy sector, should prioritize this question as major improvements are expected in this field. The third most problematic area is the business environment. Firms are still facing difficulties in accessing skilled labor. There is an inefficient government bureaucracy and the bad quality of infrastructure is providing challenges for doing business efficiently. In overall, Romania made some huge step forwards during the past 12 years, but some significant issues can still be addressed. There was a robust progress regarding the non-performing loans, just in 5 years the ratio decreased from 22% to 5.7%. The level of investments is also higher than in the neighboring countries. Currently, Romania is close to reach the level of developed countries, which could attract even more foreign investment in the coming years.

## ***4.2 Competitiveness***

Bulgaria has been ranked as 72nd most competitive country before its accession (WEF 2007). The most problematic area was the role of institutions. They have been ranked 109th from 125 countries in this field, which is a quite bad result from an already EU member state. Mainly, the inefficient government bureaucracy, access to financing and the high level of corruption are providing obstacles for small and medium-size business in Bulgaria (IMD 2011). The highest result has been measured in the field of health and primary education. They received a 6.6 score from 7, which is considered as a great result, but previously they were struggling with illiteracy in the poorest regions. By 2013, they have already performed better [4.3 overall scores compared to 4 in 2007]. However, improvement has already started in the field of institutions, but the judicial independence is still not equaling the required level, and

organized crime is reaching a massively high volume in the country [130th from 148 countries], and the efficiency of legal framework is lacking (WEF 2013). For investors, the role of innovative industries can be a worrying sign: cooperation among universities and industries is insignificant, and the overall spending on R&D is far from sufficient (IMD 2016). Bulgaria performed had great macroeconomic results in 2012 and 2013. The general government debt was relatively low (18.5%), the budget balance was also well-planned (0.5% deficit), and the inflation was very low (2.4%) which was a good result in comparison to the Eurozone members.

Romania had the 68th position in 2007 regarding competitiveness. What could have been noted as their advantage at that time is the technological readiness, the availability of research and training services and the number of trained scientists and engineers. The level of government debt was not too high; it has increased the credibility and competitiveness of the country. Macroeconomic stability was not present in these years, inflation and exchange rate volatility was not satisfying, neither the volume of state debt. The other most problematic factors for doing business in Romania were the following: tax regulations (especially tax rates), policy instability, high level of corruption and inefficient bureaucracy. The overall infrastructure quality was one of the lowest even in the South-East European region. By 2012, the country started to emerge in many fields. However, the GDP per capita decreased in comparison to 2007, but without the financial crises it could have been much higher. The total amount of GDP almost doubled in this period, their share of the world total has also increased. Overall, the competitiveness did not emerge significantly, as in the most problematic fields just quick solutions have been implemented, efficient change of regulations was not performed. The tax rates were still extremely high; it has significantly lowered the competitiveness of Romanian small and medium-sized enterprises on the common European and global markets. The government could not achieve groundbreaking results in the fight against corruption, even in 2017 and 2018 there were massive problems in the country regarding it (civil protests). Except for some improvements in higher education and business innovation, in most of the measured fields, Romania could not achieve a better result compared to 2007 regarding competitiveness; therefore, the overall rank has also decreased. According to the latest WEF report, they are ranked as 52nd (WEF 2017). Overall, they were able to increase their performance in most of the analyzed aspects, however, major improvements are still yet to come.

### *4.3 Convergence*

Bulgaria had major improvements in the last 15–20 years; it doubled its real GDP (see Table 1). From this aspect, a remarkable development process took place in the country, but it lags behind in the Central and Eastern European (CEE) region, where the average real GDP per capita is almost double than the Bulgarian data; 12,000 EUR. Our next indicator is the share of households with internet access. In Bulgaria from 2007 to 2018, this number has almost reached the EU average.

**Table 1** Real GDP per capita (EUR) in Romania and Bulgaria in selected years

Real GDP per capita (EUR)	2000	2005	2007	2009	2011	2014	2017
Bulgaria	3000	4200	4800	5000	5300	5500	6300
Romania	n.a	5100	6100	6400	6300	7000	8300

Source Eurostat (2019)

Basically, this ratio has been growing year by year, currently, it is 72%. Creating new telecommunication infrastructures has played an important role, but as it is a paid service also provides us some hints about the wealth of the Bulgarian society. In 2007, this number was only 19%. In the whole EU, the current average is 87% and Bulgaria has the lowest ratio but it is expected to grow in the following years (Seybert 2011).

There were no significant changes in the life expectancy at birth in Bulgaria in the recent period. In 2000, it was around 71.6 years; since then it is rising but very slightly. According to the latest information's, Bulgarians have 74.6 years of life expectancy at their birth. With this result, they are only outperforming Latvia and Lithuania from the EU. In the case of Bulgaria a bright progress can be noted from Table 2. Due to the global financial crisis, and new regulations from 2007 until 2010 they were suffering from a 30% deficit in their budget. Except in 2016, the government could reduce the deficit year by year. The process has been stabilized in the country, during 2017 there was a period when they could even produce almost a 20% surplus. However, it is important to note that the country's economy is relying on the cohesion funds, but it can be considered as a great result as they could improve domestic consumption as well.

Romania's overall picture was very similar to the Bulgarian example, in the first 10 years of capitalism, they were struggling and almost no improvements could be noted regarding real GDP per capita. However, a massive improvement could have been noticed in a short period lately. Romania has started its convergence process to the CEE countries, but further improvement is still needed. The ratio of households with internet access in Romania has been growing similarly to the EU. Almost in 10 years, this number has doubled. 81% of households have stable internet access

**Table 2** Life Expectancy at Birth and Inflation ratio per GDP in Bulgaria and Romania in selected years

Indicator/year	2000	2005	2007	2009	2011	2014	2017
Life Expectancy at birth (yrs) in Bulgaria	71.66	72.56	72.66	73.46	74.15	74.41	74.61
Life Expectancy at birth (yrs) in Romania	71.16	71.87	72.56	73.36	74.46	74.90	75.01
Inflation in Bulgaria	10.3%	5%	8.4%	2.7%	4.2%	-1.4%	2.06%
Inflation in Romania	45.6%	9%	4.8%	5.5%	5.7%	1.06%	1.33%

Source Eurostat (2019)

in Romania. In 2007 it was only 22% which was one of the lowest on the continent. Currently even Croatia is outperforming Romania, however, they have joined the EU 6 years later. Basically, they have the same ratio, but the Romanian government needs to implement new regulations in order to achieve higher result in this field. The infrastructure of the country is far from desirable, we reckon that major improvements would be beneficial for the country's economy and would provide higher well-being for its citizens as well. Romania performed better regarding life expectancy. In the first years of the new millennium, they were behind Bulgaria. In 2000 71.1 years was the average, but by 2010, they could reach the same level as their southern neighbor. From that point, they were constantly outperforming them. However, compared to the EU average, it is still not a considerable result, but the improvement in 18 years is significant. If they can keep up with the good progress, in a short period the EU average can be reached. The current account balance of Romania has been fluctuating, especially during their first years of EU membership. In 2007 and 2008 even 15% deficit has been reached, then a major depreciation of the national currency has been implemented by the central government. Until 2013, they were still struggling, and 7–9% of the deficit was still present in the Romanian budget (Dritsaki 2016). For a three-year period, they could deal with the maximum 3% deficit regulation, throughout the past three years they had 4–5% again, and 6% at the end of 2017.

#### 4.4 Macroeconomic Stability

Bulgaria's GDP growth was quite stable during the previous years. From the early 2000s they were able to reach a stable 6–7% growth in average until 2009 when a 3.5% drop has been measured (see Table 3). Compared to other countries it was not even a bad result, but further growth has stopped for some years, until 2014 they could not reach even 2%. In the last 4 years, an economic boom could have been noticed, similarly to other CEE countries, however, their highest achievement was 3.9%, but the constant grow is unquestionable. The unemployment rate was around 7% when they were accessed to the EU. As a result of the crisis, it was rising until 2013 when it has reached 12.9%. The government introduced some new labor force

**Table 3** GDP growth and unemployment rate in Bulgaria and Romania in selected years

Indicator/year	2000	2005	2007	2009	2011	2014	2017
GDP growth in Bulgaria (%)	4.94	7.123	7.344	-3.581	6.021	1.328	3.561
GDP growth in Romania (%)	2.395	4.179	6.867	-5.912	8.259	3.076	6.947
Unemployment rate in Bulgaria (%)	16.21	10.08	6.88	13.73	10.28	12.94	6.159
Unemployment rate in Romania (%)	6.969	7.17	6.41	6.95	6.96	7.1	4.929

Source Eurostat (2019)



related regulations, and they could stop the process. Since then, the unemployment ratio is constantly dropping in the country, currently, it is around 6%. The level of inflation is in tight relations with the current account balance, therefore we can see similar results (Eurostat 2019).

From the 2000s until a major depreciation of the Bulgarian national currency in 2008, the inflation was around 7%. It is a relatively high result, but in the case of a converging and transforming economy, it happens quite often. In 2008 12.5% inflation has been measured (Eurostat 2019), but since then the Bulgarian national bank was very much aware of this question and did not let a higher inflation ratio than 3% as we can see it in Table 2. The Bulgarian leva is standing quite stable, it has been fixed to the euro's exchange rate. Summing it up, the macro-stability of the country has improved during the past 10 years. In the first years of EU membership, they were struggling and new regulations had to be implemented, but overall, the Bulgarian economy started a stable development path.

Regarding macroeconomic stability, the case of Romania is very similar to other Central Eastern European countries. However, before the accession to the EU, they were one of the runners up, recently their economy is also on a stable track and constant growth can be notified for the past 5 years. We have already mentioned that the GDP per capita counted on PPP in Romania has almost tripled in 20 years. Basically, the GDP growth has also shown us a similar development process as it is demonstrated in Table 3. Already from 2001, a rapid blooming has started, the Romanian economy was constantly growing by 5–6% until 2009. The financial crisis hit hard their activities; as a result of it in 2009 and 2010 a drop of 5.9% and 2.8% could be noted. Lessons have been learned, and after some years of struggling (just as like the Eurozone members), from 2013 the spillover effect of the economic boom reached Romania as well. They could save the 3% annual growth, and in 2017, they had a beetling result with 6.9%. The unemployment rate is not telling us that much like in Bulgaria, as during the last 15 years it was very stable in Romania. Basically, it was moving around 6–7% and not even the financial crisis could affect it negatively (Eurostat 2019). However, it is worth to mention that after the accession to the EU, a massive number of Romanian young talents left the country and migrated to big cities such London, Paris, Milano, Barcelona - according to the national statistics at least 2 million employees. Therefore, the Romanian government didn't have to face strong unemployment as the promise of higher salaries and better life quality convinced the younger generations to move. This process seems acceptable in the short term, but it will have major negative effects in the long term (for instance: aging societies) (Anghel et al. 2016). The inflation in Romania is showing us some interesting data. It is well-known that the Romanian Central Bank had a flexible exchange rate and they were devaluating the national currency for years. In 2000, there was a 45% of inflation in the country, which is far from acceptable. In the process of preparing for EU membership, they were able to stabilize the Romanian lei, from 2006 only 6–7% of inflation could be measured until 2011. In 2013 they have decided to implement new financial regulations, and in the past 5 years, they had a healthy 1–2% of inflation (Eurostat 2019). Regarding macroeconomic stability, we need to state that Romania didn't have an easy task, as their economy was one of the

most underdeveloped after the fall of communism. In spite of that, they were able to face most of the challenges and with critical thinking, they could start modernizing the economy, establishing new regulations, fighting against corruption, and as a result of it, a constant development started in the country.

#### **4.5 Financing Ability**

The FDI inflow per GDP in Bulgaria provided interesting results. From the early 2000s, foreign direct investment has been constantly growing. It has already reached a relatively high basis in 2001 and 2002, 5–6% of the GDP came in as direct investment. From this point, a major rise has started. In 2003 it was already 10%, three years later it was 23% and in 2007 it reached a record high 31%. As Bulgaria was about to join the European Union, firms have started their investments in advance. In the past 10 years, the level of FDI has never dropped below 3% of the GDP. It is not generating an extremely high ratio anymore, but a stable level of capital inflow has been reached (World Bank 2019). Regarding the absorption ratio of Bulgaria, it needs to be stated that right after their accession the 6-year common budget of the EU has started (2007–2013). In total, they could implement the 97% of every fund. Surprisingly, the cohesion funds were not fully used (97.36%), but 99.86% of the social funds has found their destinations. The case of Romania is showing us some similarities. A constant grow of FDI could have been measured from the late 1990s, however, it wasn't that high as in Bulgaria. In average, it was around 2–3% of the GDP, only in a 5-year period, it was higher. Its peak was in 2006 (8.9%), the year before their accession to the European markets. During the past 10 years, it was stabilized on 2–3% of the GDP, but on the other hand, this capital inflow provided technological innovation and modernization as well, which helped the Romanian economy to become more competitive. The absorption ratio of the EU funds in the period of 2007–2013 was not that high in Romania. They were able to make use of 90.49% of the total amount. The regional development fund had the highest ratio with 92%, but the social and cohesion funds did not even reach 90%. Please also note, that the absorption ratio was 100% almost in every other Central Eastern European country. It also strengthens our main statement, that Romania and Bulgaria have joined the integration earlier than they supposed to (Mirela et al. 2015).

### **5 Conclusions**

According to legislative regulations, neither Bulgaria nor Romania could be considered as a perfectly mature economy and they were not completely ready to join the integration in 2007. Regarding to the most recent measures, Bulgaria is the 51st most competitive economy from 140 countries. They had major improvements in innovation capability and the higher level of attracting business as the cost of starting a

new business has dropped significantly. The efficiency of institutions and the inflexibility of the financial system are the most problematic areas these days. The level of organized crime is still one of the highest in Europe, and they need to focus more on property rights, especially on the protection of intellectual property. Overall, IT infrastructures are rapidly developing and the adoption of new systems are growing quickly. The labor market regulations are meeting the criteria's, its competitiveness has improved during the past 15 years mostly thanked to internal mobility, newly advocated labor policies, and modernized worker's rights (WEF 2018).

The most problematic area in Romania is still the financial system of the country. Financing small and medium-size companies are the most crucial part of it. Most of the credits are coming from abroad, the availability of domestic credits should be established and its position shall be strengthened if the Romanians want to avoid a future debt crisis. Improvements in non-performing loans could also be noted, but no significant results has been achieved. On the other hand, the business dynamism and the labor force regulations have been changed which resulted a considerable increase in the total competitiveness of the country. For instance, getting hired as a foreigner in Romania is much easier than before, and female participation has also increased. Unfortunately, the internal labor mobility is still very week, and the tax rate on labor shall be reduced, but the innovation capability has also been ameliorated. During the past 15 years, Romania has increased its global competitiveness and became attractive for further foreign investments. In several aspects, they need to continue the reforms, but they already had good progress (WEF 2018).

These countries have improved in many aspects since their membership, and in 2018 without any doubt, they are integrated part of the EU, but our analysis highlighted some of the shortcomings of their early joining process (related to all of the criteria). During the past 10 years, they were able to overcome many of their previous difficulties. Their competitiveness massively improved and the regional diversification has also developed. There are still some problematic fields, but their overall economic development cannot be questioned.

The strengths of this paper are that it provides a unique, objective and quantitative analysis how Bulgaria and Romania were ready join the European Union in 2007 and since then how these countries could benefit from membership. Such analysis has not been elaborated in the literature. Although, the paper has some weaknesses, too. First, since the methodology of integration maturity is complex, more indicators would have been involved and more literature would have been used for further explanations. Moreover, among basic criteria there are overlaps, which partly reinforce each other, but this can be confusing, too. From the findings, some research questions arise: how these results may change if we involve more indicators to the analysis; can these countries continue to improve their economic performance in the next few years? So, it is worth to extend and repeat the analysis in 5–10 years.

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# Supranational Class Formation and Concept of Control in Global Economy



Efstratios Kyriotelis, Eirini Triarchi, and Konstantinos Karamanis

**Abstract** In classical theory, the relationship between state and capital is presented as an internal relationship, although there is an argument that it is external. If the relationship is external, that means that state and capital are two separate entities in a dialectical relationship. The relationship between state and management and control is independent of the relationship between capital and state, whether the latter is internal or external. Some commentators have gone as far as to suggest that we are witnessing the era of the post-national corporations. Doubters have predicted the demise of the nation-state, and globalization has brought changes in state sovereignty, capitalize on its exposure to global market. On the contrary the nation-state persists, especially in its control of fiscal and monetary policies, and international business, thus remaining the only political unit. Many combinations and variations can be designed; the state is in a more advantageous position in the global market. The expansion of the state sector in the economy marks the expansion of the recognition of the social nature of the productive forces. However, historical evolution does not end with State Monopoly Capitalism, which is replaced by the Supranational Monopoly Corporation (SNMCo)—for subjective and objective reasons. This movement creates new trends in the control sphere of global economy, leading to the birth of *external, supranational control*. The transition to the global market takes place through the passage of capital and labor force movement into the global economy. This article offers a theoretical framework to explain and present the process of developing supranational class and supranational capital and their effect in control of global economy. The countries of SE Europe (SEE), located on the edge of both sides of EU and Eurasia are affected from the supranational control and unipolar global

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governance. Awareness of the closer reality rather than the wider unseen policy is the primary and necessary element towards the deeply divided Europe.

**Keywords** Supranational capitalist class · Supranational capital · Globalization · Enterprise · Transnational capitalist class

**JEL Classification Codes** F01 · F20 · F60

## 1 Introduction

The objective of the study is to contribute in the field of world political economy (WPE), enriching the discussion and the intellectual debates concerning the formation of supranational class and the control of global economy. This article argues that the most powerful route to globalization is the capitalist form, on the basis of which capitalist globalization takes place in the system of imperialist integration, which is a real event. The concentration of capital and the creation of supranational enterprises, which control capital and utilize the labor force independent of national economies, creates complex bonds, both between the various operations and between the various branches within the supranational company, which thus indirectly controls the labor force and the different national economies. This creates a system of contradictions between the perception that there is no substitute for the nation-state, the absorption of states in regional integrations and global integration, the contradiction between the supposed strengthening of states with the integrative processes and their dissolution in favor of supranational capital. This also marks the transition process of regional integrations, in which weak nation-states are absorbed and dissolved. At the same time, the national bourgeoisies are dissolved along with the nation-states, creating the supranational capitalist class.

The fluidity of the situation is what creates the corresponding fluidity in the economy, because smaller and larger powers will decide their futures in the globalized economy on the basis of the cost-benefit analysis. This fluidity leaves the outcome of globalization open, which not only reverses the terms of global governance but also disturbs the global balance.

Control of the economy passed to the supranational capitalist class intertwined with the supranational capital. Supranational Capitalist Class had evolved as a segment of the bourgeoisie, representing in the outset the transnational capital that control the means of production through transnational corporations. The objective of this work is to deepen the discussion on the transformation of the Transnational Capitalist Class into supranational and the establishment of worldwide supranational control of supranational capital.

## 2 Supranationality and Globalization

The literature concerning the transnational corporations and their transformation into supranational is very limited. Sklair delivered, by his work, the formation of transnational capitalist class (TCC) and the discourse of globalization. According to Sklair, while globalization means different things to many different people, there is a growing consensus that capitalist globalization is its most powerful form (Sklair 2002). A transnational capitalist class (TCC) has emerged as that segment of the world bourgeoisie that represents transnational capital, the owners of the leading worldwide means of production as embodied in the transnational corporations and private financial institutions (Robinson and Harris 2000).

This notion was developed on the class-based approach, with the dismantling of the global economy, which interprets socioeconomic affairs narrowly and based on class. The class-based approach is historically legitimate and objective. If this is the case, however, then history came and imposed its own changes; just as no historical achievement is permanent, so too has the class-based approach proven historically limited. In fact, however, this is a political position that is consistent with the global dimension, arisen for the universalist view of global reality. It is a methodological and political process on a new level and with a new quality in approaching universal phenomena.

However, the earlier historical experience remains and is utilized during the course of global integration. This means that there are two integrations on the path to global integration: the capitalist and the socialist. This also conflicts with the modern reality of capitalist globalization, where supranational institutions dismantle the corresponding national ones, and external relations are transformed from secondary into primary ones. This is today's reality; it is also a new level of political practice within the determinist process of interdependence of all the countries in the world.

Examining the world as a whole and also in its parts, systems and subsystems, and globally assessing the movement of nation states, regional unions and international bonds, we can observe that a gradual, long-term rapprochement is taking place. In this process, the national and the supranational element move together in dialectical unity, in a constant movement of cooperation and confrontation.

In the global economy today, issues objectively matured on the ground of supranational capital and that of the nation-states arise, where the evident trends become dominant realities. The discussion of the dissolution of the nation-state is a frequent rhetoric in the scientific community, as though it were the dominant obsession of the two sides of the same coin, where on the one side, it is idealistically perceived that the dissolution of the nation-state will bring about the emancipation, and on the other, that political guarantees of the national and international order will be perished. Despite all its shortcomings, the nation-state has shown amazing resilience, and every country that emerged from the nineteenth-century colonial empires has established itself as a nation-state (Drucker 1997).

It is important at the outset to distinguish between three distinct approaches to the movement of capital from national to the global market:

The first is based on the state as the vehicle that transfers the capital into the global market that conveys the social and production relations from national to international and from international to globalizing. This is the subjective perception of globalization. This is the concept of capitalism disillusion denial, because it is based in the ideology conception of capitalism perpetuation.

The second is the supranational conception of globalization, where the globalization is realized under the supranational practices. This the actual process realized today, and the international institutions cover the deficit in global governance. This is the monopolar or unipolar globalization where the nation-state loses its sovereignty and the individual becomes superior to the collective, where each subject claims the individual interest. In the atomized world, the nation-state is violently led to the globalization crucible, with the visible danger of losing the vehicle of transferring sustainable elements, cultural, ethnical, national, political and so on, during the transition from national to global. The violent dissolution of the state alters the state itself and state's institutional status becomes synonymous with nationalism and de-nationalization.

The third perception of globalization is emerging from the multipolar globalization. On this basis, social development is stimulated by strengthening multipolarity against unipolarity, by the emergence of new powerful poles, entering and claiming to become subjects of global governance. Because it should not be expected that the trend towards globalization will be marked with a straight line and that the withdrawal of the nation-state will result from rules imposed by the powerful forces on all sides. Big powers will be appropriately adapting to changing circumstances in the pursuit of global governance through interventions in domestic politics of current states (McGrew and Held 2002). With the weakening of unipolarity, multipolarity is strengthened and vice versa. Traditional powers and new emerging ones, mainly economic powers, are consolidated, creating strong subjects of global governance mainly through new institutions; those powers are subject, of course, to the universal economic laws. The regulations of international institutions and their coherence is what will characterize the path to be taken by global governance, whether there will be a strengthening of multipolarity with the creation of new poles, resulting in a discussion of multipolar globalization.

The third way is connected with democratic globalization, the strengthening of nation-states, until their final and definitive withdrawal in the globalized economy through procedures analogous to those of their constitution. In this case, the nation-state becomes the vehicle of national diversity, culture and other sustainable national elements in the new global society. International or supranational institutions increase their prestige with the participation of most states in them, their democratic functioning is increased, and the rising course of the nation is strengthened while national sovereignty and independence is reinforced. However, the question remains open as well as whether arrangements in global politics will be the common field of public confrontation or cooperation.



### 3 Supranational Capitalist Class

Transnational Capitalist Class (TCC), according to Sklair, can be analytically divided into four main fractions and the people and institutions from which they derive their power in the system can differ over time and locality (Sklair 2002). These fractions are:

1. owners and controllers of TNCs and their local affiliates;
2. globalizing bureaucrats and politicians;
3. globalizing professionals;
4. consumerist elites (merchants and media).

The leading personnel in these groups constitute a global power elite, dominant class or inner circle in the sense that these terms have been used to characterize the dominant class structures of specific countries (Sklair 2016).

We argue in this essay that a Supranational Capitalist Class (henceforth SCC) has emerged, and that it is now a ruling class since it controls the global decision - making and in this extent the global economy. SCC has constructed a new axis consisting of economic forces that have become the dominant “authority”, imposing economic control through economic and political predominance. The SCC uses the global structure to unfold the vast accumulation of capital in the global market. The capital is becoming supranational and consists of internationalized (globalized) national capital. The difference between the TCC and SCC is that the latter stands above nation-states and it uses the supranational formations to impose its power and achieve its aims but also uses the state itself, imposing economic control over the state through supranational institutions such as EU, IMF, World Bank, G4, G7 etc. In its formation contributed the weakening of the state and state’s sovereignty and the subordination of the state into supranational entities.

The state is at the core of the system and is the agent of political-cultural and other special features. Thus, the survival of all these elements is directly linked to the state’s position in the world. However, the attacks against the nation-state and the attempts by supranational organizations to absorb it, are a direct attack on political-cultural values, which are borne by the nation-state as a political-cultural value itself. The state is connected with bourgeois society and the capitalist system in such a way that the withdrawal of the nation-state also means the change of society and the socio-economic system, while any other attempt to dissolve the nation-state is reactive and unlawful historically. As a consequence of this, the bourgeoisie is weakening within states, which can be compared with the fall of the landowner’s aristocracy in France in the mid-19th century, with the rise of industry as the most important source of wealth.

The result is the creation of the supranational capitalist class, bearing new entrepreneurial practices (Nikolopoulou 2016). The SCC emerged as a dominant class, so that the pursuit of the strengthening of the bourgeoisie in the classical sense is utopian. In contrast to the collapse of the landowners’ aristocracy, followed by the collapse of conservatism, which was replaced by the radicalism and the progressive

character of the bourgeois class of commercial capitalism, what may not have been perceived by the current national bourgeoisie is the fact that, in its utopian pursuit of the recovery of political and economic control, it has entered into alliances with the class created in its place and by its degradation. The new and different element that the SCC introduced as a political practice and ideology, is the neo-conservatism that turns the society back, an entire historical era. The partnership of the old and the new at the global level has resulted in a confusing and deteriorating situation and, eventually, in the further weakening and fragmentation of the national bourgeoisie. A characteristic of this confusion is the strengthening of nationalisms of all kinds, even in the heart of “progressive” Europe, not only in the economically weak states but also in the stronger European countries. It has not been realized that the national bourgeoisie has become unnecessary in the globalized economy, and no ideological affinity is capable of putting into operation forces to save it, because saving the national bourgeoisie also means saving the basis on which it relies, that is, the national economy.

In contrast, unipolarity is based precisely on the weakening of national economies, which in turn presupposes the weakening of the bases that support them, starting with bourgeois civilization and science. *Certain issues are introduced here, which are related to the law of continuity and the line of rescue of the diachronic and sustainable elements of the nation-state’s historical community, national cultures and, of course, political civilization, its political system and its core, democracy* (Ntouskos 2000).

The Supranational Capitalist Class should be considered as a whole and not divided into fractions, including the following subdivisions:

1. Owners and controllers of SNCs
2. Controllers of Supranational Institutions
3. Globalizing Politicians
4. Upper ex-bourgeois class elite
5. Controllers of NGOs

These subdivisions derive their power from the great powers and uses the substructure of the great powers, to impose the economic and political model formed upon their geo-strategic goals. The channels through which their power is spread in the complex globalized system, are the same channels used by the great powers to spread their political power. So it could be said that the expression of the SCC, the Supranational Monopolistic Corporation is also in dialectical unity with the powerful states, and this is happening in both socioeconomic systems, capitalism and socialism.

The issue that arises here is who exercises control on whom, the SNCs on the state or vice versa. This is a very serious issue because if the control is exercised by the SNCs on the states, even on the great powers, the institutional expression of this control also means control over the international institutions. This is true on the side of capitalism, where national governance is replaced by a system independent of nation-states and tends to become a global governance system through international institutions (McGrew and Held 2002), as a mechanism of control and management of the economy. The bourgeois class and the bourgeois states passed into the control of

the SCC and the SNCs. The bourgeoisie, which had exercised economic and political control on certain conditions, became useless and parasitical, and was replaced by the SCC in which economic and political control were merged. *Unaware of these huge changes, the bourgeoisie is transformed into wage laborers, who are unable to pass to the new class, like the feudal nobility, from feudalism into capitalism and be absorbed by the upper social classes of the then dominant urban class, as the nobles had the power to do* (Kondylis 2015).

#### **4 From the State to Globalization and Supranational Formations**

The new element of the globalized economy is the attitude of supranational capital, which partly subverts the global correction to global governance and control. In fact, international economic interdependencies have grown so much that crises and institutions are in a dialectical unity, with the former being distorted by linear growth, and institutions are the alignment of distortions.

The historically growing course of the nation-state is curtailed, while capital is shown to be superior to that of the state and continues to grow out of it, having broken the internal state-capital bond. The gap created by breaking the internal capital-state bond covers the supranational capital in the sphere of control and governance, and geostrategy covers the gap in the sphere of the economy's regulation. International institutions are becoming regulating mechanisms, depending on the international weight and their acceptance by individual states, as well as on the ability of states to impose their views, shaping global politics from their own perspective and thus influencing the control of global economy.

Globalization is not independent of the national and international dimension, which will also determine its content. Internationalization as a manifestation of the nation-state contact points and socio-economic systems, is the step before the formation of global politics and consequently of global governance. The international element is also what will transfer the national to the global. The question is how the transition to the world economy will be and what is the way of global governance, since capital, labor and scientific and technical progress are organically bound together in the global sphere. But this process is not automatic and that it is unsustainable, it is an obstacle to growth and the flight of mankind to the front. A contradictory term in global development is the geostrategy of supranational capital, unipolar globalization, the neoconservative one-way street and the New World Order as the only direction to globalization.

The accounting base is divided into roles between states, based on the pursuit of unipolar globalization. However, the realization of this division is in contradiction, first with each subject involved in it, because each participating subject has its own pursuit of power. Secondly, with the laws of world development that are inconsistent with the pursuit of unipolar globalization (Huntington 1999), but requires everyone's

participation. This latter is a prerequisite for globalization, otherwise globalization is partial, e.g. technological globalization, economic globalization, and so on. Moreover, each state has the potential to seek its own place in the international division of labor, based on its own power. Thus, the global pursuit of power forces states to demand their own alliances or to rally among themselves or become subordinate to one of the great powers.

Problems in the global economy are universal and therefore require global solutions. Individual solutions at the level of nation-states and regional unions (Hirst and Thompson 1996) take the overall picture out of the global picture and hinder globalization. At the time of the big one, the solution will be at this level and any other will be just short and partial. The overwhelming obstacles in the sphere of leadership are evident in the indifference of supranational capital for this sphere, which they deliver to the hands of the managers (upper ex-bourgeoisie elite), and the mismatch in their remuneration and performance.

One might say that supranational capital draws national production relations with it and transfers them to the destination countries. In this sense, supranational capital creates or affects production relations in the different countries to which it is exported, modelled on the relations in the country of origin. In other words, capital creates the production relations which serve its development and movement, and of course the two elements of monopoly capital (which also apply to supranational capital): monopoly superprofit and monopoly control. This is not true of the productive forces, which develop objectively, according to the economic laws (Thornhill 2017) to which capital is also subject.

## 5 Supranational Capital and Control of Global Economy

The dynamics of movement from the national to the global element is linked to the development of productive forces trapped within the nation-state boundaries and seeking to flee forward. This does not automatically mean the abolition of nation-states, but they are called upon to play a new role in a globalized society.

The bond between state and capital from internal is transformed into an external one, and capital is transformed into a supranational capital and becomes an entity wider than the state. The transition is first from the national level to the international one, and at this level capital is transformed into a transnational capital, while at the next level, the world, capital is transformed into supranational. These changes are not only linear, but through setbacks and barriers they have followed the dynamics of capital that could not remain locked in the narrow limits of the state.

Competitions from the late 19th and the 20th century were in the national context. Since 1989, the conflicts are clearly emerging as the pursuit of global subjects to assert global governance and control. In this perspective two issues, of equal importance, are raised. The first issue concerns global governance and control and the second the management of the economy. Hence, recourse was made to international institutions, and at the same time as the need to resolve these issues, this also became a priority

within the changes that took place at the end of the 20th century. International institutions are taken as a mechanism where the goals are in response to the demand, control and regulation of a divided economy so as to bridge the gap between the subjective pursuits and the objective course of events. The global, international and national viewpoints can cooperate through the institutions, and the internal democratic, or social structure of each institution, pulls out their communicative, democratic or social view in the direction of the economy and the corresponding form of governance and control.

Performance in the sphere of control is not simply a matter of geostrategy, nor a question of supranational capital that has the power to seek the governance and control of the global economy. Irrespective of the privatization of the economy, which offers the material interpretation of the principle of equality, it is widely understood that neither is it free nor open to anybody to claim the share that would be attributable to it, depending on its “capabilities”. As long as the state takes over the control of the economy, if it has the power to do so, the above issues are solved within policy boundaries and the state acts as a stabilizing mechanism. Thus, the government was taken over by the state, as well as the control of capital through the government policies and of the labor force, through the control of the trade unions. This mechanism worked as long as capital could develop within the narrow limits of the nation-state. But capital needs to be expanded globally, and this contradicts Keynesianism and the free market economy that cannot function globally, as mechanisms for regulating supranational capital. SCC and its expression supranational capital overthrows these economic methods, sets its course on the basis of geostrategy, and nation-states cannot understand why their efforts to harmonize in the new world order fail.

While a new global configuration emerged out of these changes, there are two issues concerning the control of global economy and consequently the national economies:

- The first of these issues concerns the scientific deficit that distinguishes the approach of the system of Directorate and Control in the modern economy, through the International Institutions that play a role in shaping the international and consequently the political economy. When control comes out of the possibilities of the state, through the relative contradictions and the risk of losing control of the economic process, then the control passes at a superior level to the *supranational control* exercised through the international institutions. This control is subject to the law of anomalous development.
- The second issue concerns the creation of a multipolar opposition, the global control system, which tends to be created by states and ethnic groups that accept the pressures of capitalist globalization. The various poles that are created tend to create unified structures and forms of organization, with new institutions either that had been institutionally recognized or unrecognized. Science is called upon to examine the creation of new institutions, their dynamics, their resilience to the pressure of economic outcomes and the strength of their structures. The debate concerns the retreat of the national element and the impact on nations-states

as autonomous social entities. The functions of the nation-state are no longer dominant and a new role is assigned to it.

## 6 Supranational Capital and Dissolution of State

The current situation is a strong obstacle to global economic integration, mainly because the inconsistency between objectives and instruments is quite far from being manageable. Therefore, the distance between the powerful and the weak economically, states is further complicated by the geostrategy of supranational capital, which is oriented towards the interest of capital. The movement of capital is slow at the level of the small enterprise. The global market was scattered in small segments exploited by nation states, limiting circulation and the development of the productive forces. Large industrial production transforms competition into international and global competition.

Capitalism is based on the nation-state and on national enterprises and under this perspective it hinders the internationalization and growth of productive forces, due to individual capitalist ownership. In this respect, supranational capital is more progressive than individual capitalist ownership and facilitates the globalization of productive forces. The internationalization of the productive forces is incompatible with the tightness of the nation-state, which hinders the development of capitalism and globalization. On the other hand, though, the viable features of the nation-state are essential (Boyer 1996) to the historical continuity of mankind towards globalization. For these reasons, we must find the international institutions and mechanisms that will address these issues and provide the prerequisites for global integration.

The system of contradictions is expressed in the consolidation and the simultaneous dissolution of the nation-state, at the political level (Keohane and Nye 1977), and the convergence of the economies and the dissolution of production in the same countries, at the corresponding economic and social level. While the contradiction arises from the dissolution of the small enterprise, increasing the percentage of wage labour, which is inside a capitalistic formation, a socialistic characteristic, which is excluded from the first. The governance using quantitative economics alters, correspondingly, qualitative characteristics, by alleviating the strong local coherence, false historical truth configuration, dissolution of the state's economic structure (which dissolves the productive potential of economies), and altering states' identity to consumers, rather than producers. States are weakening and the international institutions become stronger than the states, which abolish national identity and lose control. Thus, the transnational cooperation is performed on the basis of politico-economic inequality. The structure of the system is unstable and its construction is based on economically powerful states for convergence but on the other hand assumes weak states, so that supranational administration can be applied by the supranational element. As a result, such structure cannot stand and will collapse from within. It becomes clear that the substance of the previous process is the dialectics of productive

forces and production relations, the dialectics of nation-state and international institutions, and those of management of the economy and the lack of an international economic mechanism to exercise management at the global sphere. The productive forces are now over-developed, with global range, and require corresponding ecumenical management.

Economic effects also extend to the sphere of politics, with the depreciation of the political system, dependence on downgraded credit rating due to the unreliability of the political system, the need to increase debt, the deterioration of the welfare state, and eventually the dissolution of the welfare state. In such a situation it is easy to say that the state is parasitic for the economy as the state is an obstacle to the development of the business sector (Fulmer 2010). This unscientific position is linked to the de-scientification of the political economy and serves only the supranational capital that comes to fill the gap with the aim of gaining the monopoly superprofit in undervalued economies. The above mechanism is part of the geostrategy of supranational capital, whereby a country is first de-industrialized, national capital is depreciated, and then supranational capital is exported to the country whose economy has been depreciated and passes under supranational control.

The dismantling of the nation-state (Strange 1996) and national businesses, subject to the geostrategy of supranational capital, signifies a weakening of the capitalist system, weakening of the state, and, generally, dissolution of the core of the system, the small enterprise. The creation of supranational capital is however a transfer of national production relations from the national to global level. This transfer means overcoming local tightness, and is a superior form of production relations, which implies a superior order of interests. This movement of the transfer of production relations from the national to global framework is a movement that is historically progressive and contains economic and social magnitudes. Behind economic one finds the social magnitudes, which collide with each other and determine both economic and social development. When economic and social magnitudes grow unevenly and ambiguously, both the economic and the social structure are affected.

The supranational capital in the process of economic sovereignty and global economic control conflicts with the rules of social production, affects the structure of the system, raises the productive forces to a higher level, and production relations fall under the control and governance of the new SCC (Sklair 2000). This economic-theoretical stance, of course, also has an ideological background and a sociopolitical point of view, because of the position that the economic element cannot be regarded only from the aspect of economic criteria but from a superior social and economic point of view. Those who acknowledge only the economic point of view, and only profit as a source of economic development, have overlooked basic rules of political economy.

Supranational capital affects the structure of the financial system, in particular the financial capital, banks and industry, that is, the real economy, material production and the financial services associated with it. In their stead, it puts forward services and directs financial capital to the virtual economy. Financial capital, in the short term, is making profits from the “new” virtual economy, which is based on usurer lending. This is a source of development that geostrategy has inherited from imperialism. The

profits made by the virtual economy are short-term, so the supranational capital is turning towards sovereign debt crisis to maintain profitability.

Debt crisis, however, is a crisis of geo-economics and is borne by the developed productive forces; it is a version of the virtual economy, whereby the real economy is deprived of the funds which are borrowed in order to be collected, without being used in production. Debt concerns the national bourgeoisie, which is deprived of its sources of income, industrial production; debt is unsustainable and results in rendering the national bourgeoisie unviable. The intervention of the general economic crisis of capitalism in 2008 wiped out historical profit margins from the virtual economy, and the high profitability of supranational capital was shifted to the sovereign debt crisis. The only thing that is still feasible, is to improve the economic position of states or regions and then only occasionally and cyclically as long as this economic dimension is also directly dependent on this geostrategy of neo-conservatism; and this because regional associations are included in the international division of labour, having taken the place of nation states. There remains the last cell of capitalist development, that of private ownership and the individual capitalist enterprise has been put aside (absorbed) by supranational capital. Whereas these are things that happen in theory, in practice the Euro-Atlantic structures dissolve the nation states, in an unregulated and rushed way and at the same time undermining the EU the most durable and strongest regional union. EU can be used as a guide to global integration, even if this may be an imperfect experiment.

## 7 Conclusion

In a theoretical framework this paper identifies the process of the development of the supranational class and supranational capital and their effect in control of global economy. A mechanism of transition is established, starting from the nation state and moving on through the heart of the economic life, the enterprise and the investment at the global market. The type of entrepreneurship and the type of enterprise are key issues in the evolution of the economy.

In this transition process, this paper stands on the realm of reality, not of course what it seems, but what is created by the unity of objective conditions and the action of socio-economic subjects. It is evident that the facts are compiled with the laws of global development. Collusion of heterogeneous factors inevitably leads to conflicts, leading to sharpening in the sphere of directorate and control of global economy.

The developments that are historically legitimate and scientifically substantiated, obey the universal economic laws and are the products of the capitalist system, in which property and labor can be sold as commodities, meaning that ownership tends to become a unified global ownership, and the same applies to the labor force.

According to the literature, the movement of capital in the global sphere is subject to the geopolitical antagonism of the powerful forces that have the power to impose geopolitical arrangements. However, this is a geostrategy with geopolitical and geo-economic elements, imposed by supranational capital through its influence on states



that are subjectively capable of planning and implementing that geostrategy. This subjective capability does not necessarily mean that the geostrategic aims will be achieved, since geostrategy, too, is subject to the influences and reactions of all the forces of the global economy. The dependency between the productive forces and production relations forms a dialectical unit with their socialization, and both together characterize social production.

Concerning the control of the global economy this is related to the superprofit of the supranational capital, its appropriation of world value and surplus value, intensifying the system of unequal exchange by means of the dollar, the networks of institutional economies of scale, European agreements, the European energy map, and so on.

In the substance of globalization and the decline of national forms and other subjects of historical legitimacy and hence the retreat of other hypertexts with regional and federal character, for the benefit of the SNCs, with its corresponding geostrategic, the resulting situation will be deteriorated.

Finally, the supranational capital shakes the structure of the economic system, raises the productive forces to a higher level, and production relations move under the control and governance of the new Supranational Capitalist Class.

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# Measuring Global Political Economy



Spyros Roukanas

**Abstract** The global political economy is a field of study that has its roots in international relations. The augmentation of world economic transactions after the collapse of Bretton Woods System in the 1970s created the need for a new field of study, in order to explain the interdependence between politics and economics at the international level. Decisive factors for the formulation of the global economy such as nation-states, international markets, multinational companies and international organisations created multiplied interactions, such as the emergence of economic globalisation. The need to understand these interactions, and the two oil crises of the 1970s, were the fuel for the speedy development of the discipline of global political economy as an interpretative tool of the global economy. The evolution of economic globalisation was originally analysed in qualitative terms. But studying these multiple interactions only in qualitative terms was not easy. In recent years, a number of indicators were developed, in order to facilitate quantitative analysis in terms that were hitherto discussed only under the quality prism. The OECD, for example, has developed indicators in order to measure the implications of economic globalisation. The aim of this article is to study the main indices that are trying to measure different aspects of the evolution of the global economy. This study is going to show whether these indicators can have a predictive utility or mainly an interpretive capability of certain facts of the global political economy. The article is going to focus on the following countries: the United States, Germany, and China for the last decade (2008–2018), on the basis of the available data. The analysis of the last decade will also reveal the implications of the global economic crisis.

**Keywords** Global political economy · Measurement · Indexes · Economic globalization

**JEL Classification** F2 · F4 · F6

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## 1 Introduction

The study of the path of the global economy is a means for understanding the main economic challenges that the biggest economies of the world and the process of economic globalisation are going to face. In order to study the global economy, international economic organisations such as the International Monetary Fund and the World Bank, central banks, rating agencies, multinational corporations, merchant banks, investment banks, and other investors, mainly focus on understanding fundamental macroeconomic indicators. These macroeconomic indicators are mainly: GDP, GDP per capita, GDP growth rate, inflation, unemployment rate, current account balance, trade balance, government debt as a percentage of GDP, and general government lending/borrowing as a percentage of GDP. The study of these macroeconomic indicators provides us with a picture of the strengths and the main vulnerabilities of each national economy. But the process of economic globalisation restricts our capability to understand the prospects of each national economy only by using this traditional method of economic theory. As a result of the intensity of the phenomenon of economic globalisation, the discipline of Global Political Economy emerged from the discipline of International Relations (Roukanas 2011). In the 1970s the global economy underwent certain changes that created the need for the development of a new field of study, in order to understand the new complex reality. According to Ravenhill (2017, p. 18) these changes were the following:

1. FDI and multinational corporations emerged as key players in the global economy;
2. Foreign investment and trade grew faster than production;
3. Intra-industry trade was developed, especially among industrialised economies;
4. New nation-states were created;
5. Multilateralism was developed, leading to the creation of global and regional institutions.

Global political economy is a field of study that is trying to understand the interdependence among the main factors of the global economy (Roukanas and Diamantis 2014). According to Roukanas and Sklias:

These defining parts may be either economic or political, and may originate in either the domestic or the international environment. Understanding the modern world under the prism of these four dimensions raises international political economy to the status of a state-of-the-art holistic approach, which acknowledges that multidisciplinary is the means for understanding an increasingly complex modern world (Sklias et al. 2012). (Roukanas and Sklias 2016, p. 12)

Another definition of the field of study of GPE is the following:

Global political economy is a field of enquiry, a subject matter whose central focus is the interrelationship between public and private power in the allocation of scarce resources. It is not a specific approach or set of approaches to studying this subject matter... Like other branches of the discipline GPE seeks to answer the classic questions posed in Harold D. Lasswell's (1936) definition of politics: who gets what, when and how? This definition

explicitly identifies questions of distribution as being central to the study of politics. It also points implicitly to the importance of power-the concept that is at the heart of the study if political science-in determining outcomes. (Ravenhill 2017, p. 20)

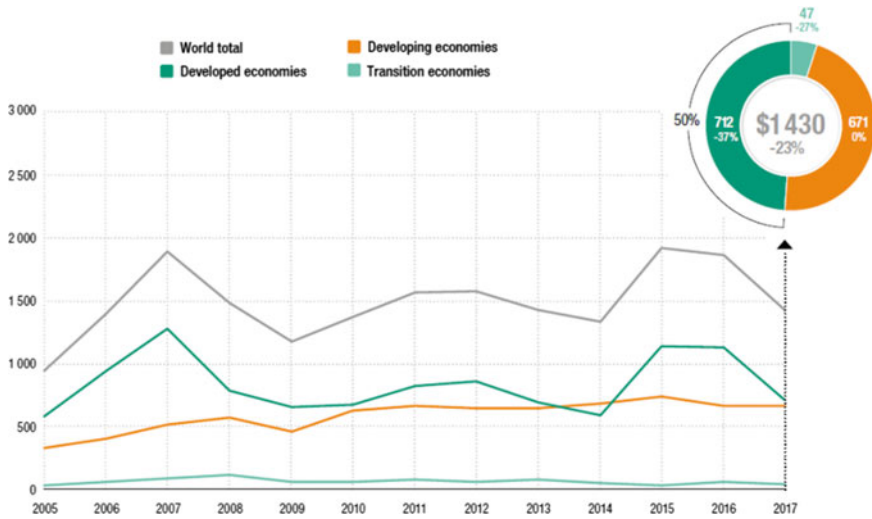
As a result of this new complex international economic and political environment it is necessary to study indices designed to capture different aspects of economic globalisation. The most difficult task is to quantify qualitative concepts, such as the concept of economic globalisation. The aim of this article is to study the main indices that try to measure different aspects of the evolution of the global economy. This study is going to show whether these indicators can have a predictive utility or mainly an interpretive capability as regards certain facts of the global political economy. The article is going to focus on the following countries: the United States, Germany, and China during the last decade (2008–2018), on the basis of the available data. The analysis of the last decade will also reveal the implications of the global economic crisis. For this reason, in this article we are analysing three indicators that try to measure economic globalisation. First, we study the FDI Regulatory Restrictiveness Index, as FDI is a key determinant of the economic development of national economies. Then, we study the KOF Globalisation Index De facto, De jure and Economic Globalisation, which reveals the path of the economies under review in relation to globalisation and specifically to economic globalisation. Finally, we analyse the A. T. Kearney FDI Confidence Index, which is the opposite of the first of the two other indices, as it focuses mainly on the advantages of each national economy as an incentive for investments.

## 2 Measuring Economic Globalisation

The first index to be analysed is the FDI Regulatory Restrictiveness Index, which is published by the Organization of Economic Cooperation and Development (OECD). Foreign Direct Investment has been instrumental to boosting the importance of the process of economic globalisation. According to the latest available data from the United Nations Conference on Trade and Development, in 2017 global FDI inflows stood at 1.430 billion US dollars. FDI inflows to developed economies stood at 712 billion US dollars and to developing economies at 671 billion US dollars. As we can see in Fig. 1, developing economies play an increasingly important role as destinations of FDI inflows and as a result they are playing a more important role in formulating the global economy as compared to the last decade.

As a result of the increasing importance of FDI, the OECD tries to understand the obstacles to FDI. FDI restrictiveness is a means for measuring the main types of FDI restrictions, which are the following:

1. Foreign equity limitations
2. Screening or approval mechanisms
3. Restrictions on the employment of foreigners as key personnel



**Fig. 1** FDI inflows, global and by group economies, 2005–2017 (billions of dollars and percent). Source UNCTAD (2018, p. 2)

- 4. Operational restrictions, e.g. restrictions on branching and on capital repatriation or on land ownership. (OECD 2019)

It is important to point out that the OECD is not trying to develop a holistic approach for determining all the factors that shape a country’s investment climate. The index mostly focuses on measurable aspects of FDI attractiveness and tries to highlight the quantitative dimensions. More specifically, according to the OECD:

A range of other factors come into play, including how FDI rules are implemented. Entry barriers can also arise for other reasons, including state ownership in key sectors. A country’s ability to attract FDI will be affected by factors such as the size of its market, the extent of its integration with neighbors and even geography. Nonetheless, FDI rules are a critical determinant of a country’s attractiveness to foreign investors. Furthermore, unlike geography, FDI rules are something over which governments have control. FDI restrictions tend to arise mostly in primary sectors such as mining, fishing and agriculture, but also in media and transport. (OECD 2019)

According to Kalinova et al. (2010), the FDI Index was first developed in 2003 and was updated in 2010 through the expansion of the covered sectors. As regards the above four aspects of FDI Restrictiveness, the following scores apply:

The highest score for any measure in any sector is 1 (the measure fully restricts foreign investment in the sector) and the lowest is 0 (there are no regulatory impediments to FDI in the sector). The score for each sector is obtained by adding the scores for all four types of measures, with the constraint that their sum is also capped at a value of 1. (Kalinova et al. 2010, p. 9)

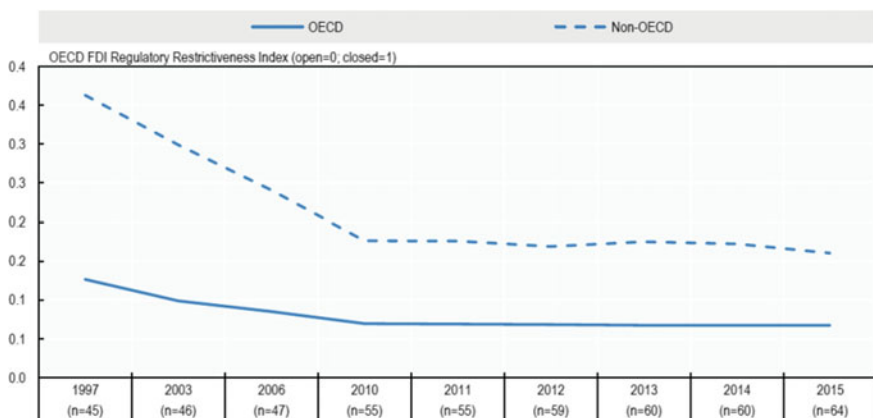
For the purpose of our analysis we focus on the total index and to 22 specific sectors of the index. The study of the index shows that China receives the highest scores, albeit with a downturn during the years under review, which means that China is trying to limit restrictions on foreign direct investment. On the other hand, Germany presents a better picture in regard with the index, with a stable score for all the years under review, at 0.023. Germany is also performing better than the OECD average, which improved from 0.068 in 2010 to 0.066 in 2017. Finally, the United States have a more restrictive investment environment in comparison with Germany and the OECD average, but at the same time a more liberalised investment environment in relation to China (Table 1).

In 2017, the OECD published a note in order to answer the question of whether investment protectionism is actually on the rise? The study of the data on a historical basis reveals two different pictures for OECD and non-OECD countries. More specifically, as we can see in Fig. 2, OECD countries pursue more open economic policies concerning FDI for all the years under review, in comparison with non-OECD countries which followed an openness path from 1997 to 2015, but are still far behind in relation to OECD countries. The majority of OECD countries adopted

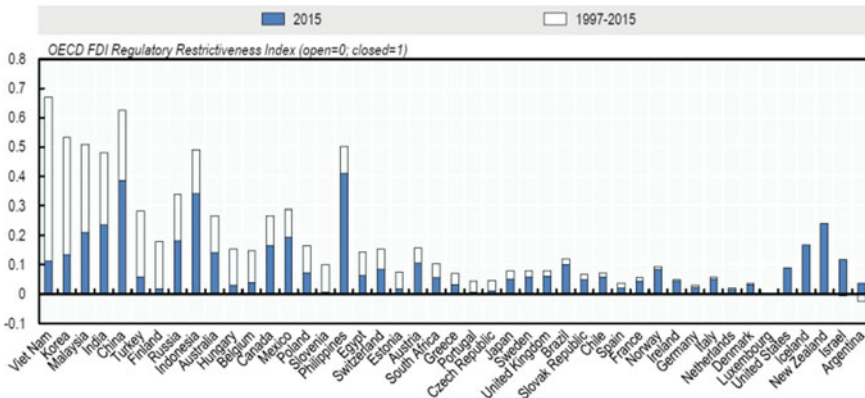
**Table 1** OECD FDI regulatory restrictiveness index

Countries	Years								
	2010	2011	2012	2013	2014	2015	2016	2017	
China	0.427	0.427	0.422	0.422	0.422	0.384	0.335	0.317	
Germany	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	
United States	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	
OECD—Average	0.068	0.068	0.067	0.066	0.066	0.066	0.066	0.066	

Source OECD (2019)



**Fig. 2** Changes in the overall FDI index, 1997–2015. Source Thomsen and Mistura (2017)



**Fig. 3** Top FDI reformers, 1997–2015. *Source* Thomsen and Mistura (2017)

investment regime reforms in the 1970s and 1980s. Developing economies adopted the investment reforms especially after the success of the export-led development driven economic model (Thomsen and Mistura 2017).

In Fig. 3 we can see that the top FDI reformers during the period under study review were from Asia, as these countries started from a high level of restrictions. Thomsen and Mistura also argue that the speed and intensity of the reforms are not only related with the political decision of the governments to pursue FDI openness, but were also affected by factors such as OECD membership or WTO accession, the manifestation of economic crises, and the adoption of regional free-trade agreements.

The most common FDI restriction has to do with equity, as we can see in Fig. 4. Countries are trying to adopt limits on foreign equity ownership in order to provide domestic investors with an advantage over foreign investors. More specifically:

Countries often impose such restrictions to allow domestic investors to share in the rents from the project and in the expectation that having a domestic investor involved will help to facilitate linkages with the domestic economy and enhance technology transfers and other potential spill-overs. The extent to which joint venture requirements or foreign equity limits are an effective way to achieve these spill-overs is an open question. Many investors prefer majority ownership and hence equity limits may deter potential investors. (Thomsen and Mistura 2017)

As we can see from Fig. 4, China is having the highest equity restrictions, the second highest among the countries under review, followed by the United States, while Germany is last. The equity restrictions imposed by China are not only higher than the OECD average but also higher than the non-OECD average. Moreover, the equity restrictions imposed by the United States are at par with the OECD average, and Germany is much more liberal as regards equity restrictions, with a score lower than the OECD average.

In order to have a more accurate picture of FDI Restrictiveness Index, we also focus on the study of these restrictions by economic sector, as shown in Fig. 5. The study of the index reveals the existence of certain sectors where restrictions are



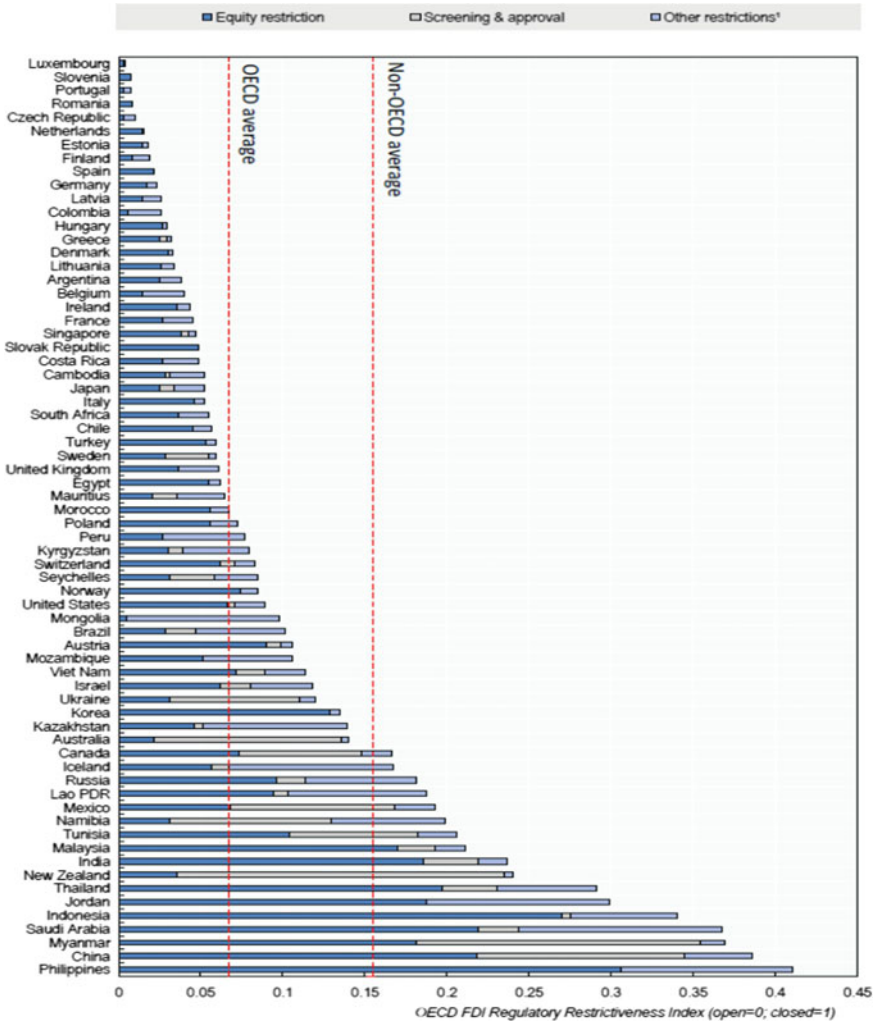
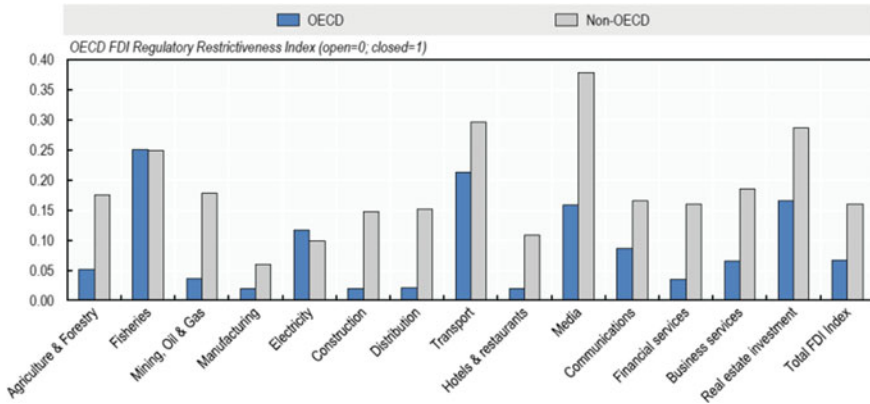


Fig. 4 Discrimination against foreign investors by type of restriction, 2015. Source Thomsen and Mistura (2017)

higher than the total average. The sectors with the highest restrictions are energy and transportation and, more specifically, the countries are trying to prevent foreign investors from capturing gains in the primary and service sectors. The sectors with the highest discrepancy between OECD and non-OECD countries are the following: agriculture and forestry, mining, oil and gas, transport, manufacturing, construction, distribution, media, communications, financial services, business services, and real estate investment. Closing the analysis of this index, we can see that the majority



**Fig. 5** FDI restrictions in OECD and non-OECD countries by sector, 2015. *Source* Thomsen and Mistura (2017)

of countries pursue an economic policy of investment reform, in order to liberalise their investment environment.

The second index that we are going to study is the KOF Globalisation Index. The index is published every year by the KOF Swiss Economic Institute, which focuses on economic research. The index is trying to reveal different aspects of globalisation, and for this reason it studies the economic, social and political aspects of globalisation (Gygli et al. 2019). The index is based on a large sample, as it has been following 195 countries from 1979 to 2016. The index covers an extended period from the start of contemporary economic globalisation of the 1970s until the recent era. It also divides the aspects of globalisation between de facto and de jure globalisation. It employs a scale from 1 to 100, and comprises 42 variables. More specifically, as regards the methodology of the aspects of the index:

The subdivision of **economic globalization** contains both trade and financial globalization. De facto trade globalization is determined based on trade in goods and services. De jure trade globalization includes customs duties, taxes and trade restrictions. De facto financial globalization includes foreign investment in various categories. De jure financial globalization includes investment restrictions, openness of the capital account and international investment agreements. The **social globalization** sub-domain in turn comprises of three segments, each with its own de facto and a de jure segment. Interpersonal contact is measured within the de facto segment with reference to international telephone connections, tourist numbers and migration. Within the de jure segment, it is measured with reference to telephone subscriptions, international airports and visa restrictions. Flows of information are determined within the de facto segment with reference to international patent applications, international students and trade in high technology goods. The de jure segment measures access to TV and the internet, freedom of the press and international internet connections. Cultural proximity is measured in the de facto segment from trade in cultural goods, international trademark registrations and the number of McDonald's restaurants and IKEA stores. The de jure area focuses on civil rights (freedom of citizens), gender equality and public spending on school education. The sub-domain of **political globalization** is regarding the de facto segment measured with reference to the number of embassies and international non-governmental organizations (NGOs), along with participation in UN peacekeeping missions. The de jure segment

contains variables focusing on membership of international organizations and international treaties. (KOF Swiss Economic Institute 2019)

The study of the KOF Globalization Index reveals that Germany is ranked first in terms of all three studied aspects of the index, i.e. de facto, de jure and overall economic globalisation, followed by the United States of America, while China is in third place, as we can see in Tables 2, 3 and 4. China has been on the rise, especially after 1990 as we can see in Fig. 6, by starting from a low level in comparison with the other two countries. The second specific characteristic of China is that de facto and de jure globalisation is having close performance. In contrast, in the case of Germany and United States of America de jure globalisation is higher than the de facto globalisation. The common element of Figs. 6, 7 and 8 is that after 1990 both de facto and de jure globalisation have been on the rise. Moreover, the economic

**Table 2** KOF globalisation index de facto, de jure and Economic Globalisation of China

	Years								
	2008	2009	2010	2011	2012	2013	2014	2015	2016
De facto	62.19	60.67	61.7	62.41	62.07	62.31	62.71	62.13	62.06
De jure	62.64	63.4	65.11	64.94	65.32	66.42	66.87	66.32	66.89
Economic Globalisation	46.44	45.47	49.01	48.21	47.07	47.74	48.73	45.89	46.36

Source KOF Swiss Economic Institute (2019)

**Table 3** KOF globalisation index de facto, de jure and Economic Globalisation of Germany

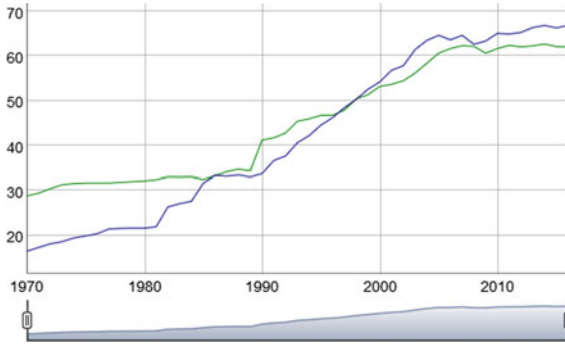
	Years								
	2008	2009	2010	2011	2012	2013	2014	2015	2016
De facto	84.85	83.31	84.3	84.79	84.96	85.28	85.09	85.49	85.85
De jure	90.54	90.59	89.51	89.57	89.62	89.31	90.2	89.64	90.5
Economic Globalisation	79.12	77.71	77.03	77.51	77.63	77.48	78.72	78.35	79.39

Source KOF Globalization Index (2019)

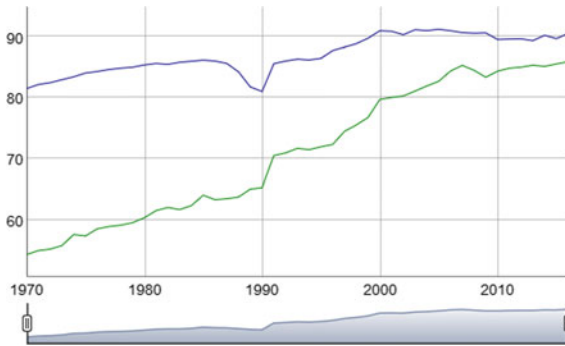
**Table 4** KOF globalization index de facto, de jure and Economic Globalization of United States

	Years								
	2008	2009	2010	2011	2012	2013	2014	2015	2016
De facto	75.09	73.71	74.5	75.25	75.55	75.87	76.13	75.97	76.01
De jure	86.51	86.36	85.86	86.54	85.9	86.27	87.05	87.35	88.18
Economic Globalisation	65.64	63.8	64.6	65.16	65.42	65.45	66.78	65.92	67.12

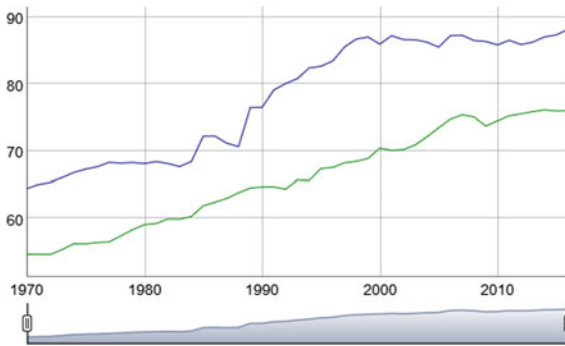
Source KOF Swiss Economic Institute (2019)



**Fig. 6** De facto and de jure KOF Globalisation Index of China. *Source* KOF Swiss Economic Institute (2019)



**Fig. 7** De facto and de jure KOF Globalization Index of Germany. *Source* KOF Swiss Economic Institute (2019)



**Fig. 8** De facto and de jure KOF Globalization Index of the United States of America. *Source* KOF Swiss Economic Institute (2019)

globalisation index is lower in all three countries in comparison with de facto and de jure globalisation.

The third index for the measurement of global political economy that is studied in this article, is the A. T. Kearney Foreign Direct Investment Confidence Index. A. T. Kearney is a firm that specialises on the provision of consulting services in more than 40 countries. A. T. Kearney was established in 1926. It offers consulting services to governmental and non-profit organisations (Kearney 2019). The A. T. Kearney Foreign Direct Investment Confidence Index is an index that mainly focuses on quantitative elements of each country’s investment environment, as it collects the opinions of business executives, in order to predict the investment prospects of each market in the next three years. The index was first published in 1998 and its predictions have been confirmed in most cases over the next years. For 2018, the index utilised primary data from 500 business executives from leading world corporations. All companies under review have annual revenues of at least US\$500 million. The index for 2018 comprises companies from 29 countries and from all sectors, and represents more than 90% of FDI global flows in recent years. It is important to mention the following division: 46% of respondents are coming from service-sector firms, 35% of respondents are from industrial firms, and finally 17% from IT firms. The index classifies answers in three levels: high, medium, and low, as regards the possibility of making a direct investment in the upcoming three years. In order to be evaluated, the responses should only come from company headquarters in foreign markets (Kearney 2018). The scores range from 0 to 3, with the highest score indicating higher FDI investment confidence (The Global Economy 2019).

In summary, the latest available data of the A. T. Kearney Foreign Direct Investment Confidence Index for 2018 produce the following results for the three countries under review (Kearney 2018):

1. In 2018, China has the lowest score for the years under review, as we can see in Table 5 and Fig. 9. The decline of its performance has to do with the lower investment prospects of emerging economies. Moreover, China introduces a tighter institutional framework for FDI with reduced transparency. For

**Table 5** A. T. Kearney FDI Confidence Index

Countries	Years										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
China	–	–	1.93	–	1.87	2.02	1.95	2.00	1.82	1.83	1.76
Position	–	–	1	–	1	2	2	2	2	3	5
Germany	–	–	1.43	–	1.52	1.83	1.84	1.89	1.75	1.86	1.81
Position	–	–	5	–	5	7	6	5	4	2	3
United States of America	–	–	1.67	–	1.52	2.09	2.16	2.10	2.02	2.03	2.09
Position	–	–	2	–	6	1	1	1	1	1	1

Source The Global Economy (2019)



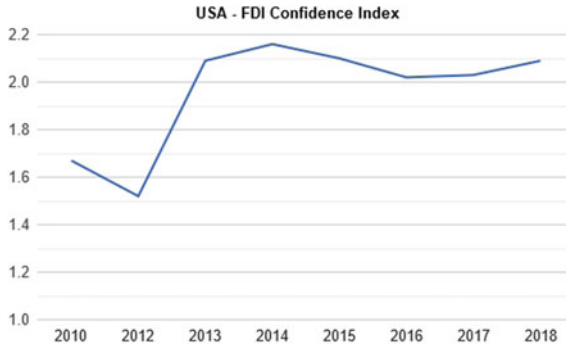
**Fig. 9** The FDI Confidence Index of China. *Source* The Global Economy (2019)

example, China requires foreign companies to use virtual private networks from China, a policy that causes data challenges and higher costs. On the other hand, China is taking initiatives to create a more attractive investment environment for foreign investors. More specifically, China announced lower foreign ownership and investment restrictions for specific sectors of the economy, such as insurance, banking, securities and transportation. Finally, China adopted tax reforms, according to which foreign firms that reinvest their profits in the country will be exempt from tax withholding obligations.

2. For the last three years Germany gets the higher score among European countries, as we can see in Fig. 10. Investment in Germany's services sector has the largest contribution to employment. The investment environment of Germany is a major attraction for Chinese investment activity. For Germany, Chinese investment are a new challenge that raises concerns regarding the control of strategic sectors by foreign investors. On the other hand, Germany also has a negative factor in regard to FDI, which has to do with the bureaucratic institutional framework for starting a business, ranking the country 113 globally in the 2018 Doing Business Report of the World Bank.



**Fig. 10** The FDI Confidence Index of Germany. *Source* The Global Economy (2019)



**Fig. 11** The FDI Confidence Index of Unites States of America. *Source* The Global Economy (2019)

3. The US is ranked first for the last six years, also with the higher score than the previous year, as we can see in Fig. 11. The main driving forces for this path are recent corporate tax cuts, the size of the market, and sustainable economic growth. On the other hand, NAFTA negotiations and the possibility of higher protectionism are discouraging investors. Moreover, the US Committee on Foreign Investment adopted a tighter institutional framework concerning the approval of US business with foreign acquisitions, using the argument of national security. Moreover, the sectors with higher demand for FDI inflows are financial services, wholesale trade, and manufacturing. Finally, the countries that invest more in the US through FDI are Japan, Canada, and the United Kingdom.

### 3 Conclusions

The analysis of the indices that try to measure the performance of economic globalisation is revealing as regards the three economies under review. In terms of the OECD FDI Regulatory Restrictiveness Index, China is the worst performer in comparison with the other two economies. One explanation could be the fact that China is following a different economic model, which is a combination of central planning and market economy. Germany’s performance is better than that of the United States of America and better than the OECD average. Furthermore, as part of our analysis we studied the KOF Globalization Index de facto, de jure and Economic Globalization. The picture is the same as with the previous index, as Germany is ranked first in all three aspects of the index, followed by the United States of American, and China. The index reveals that the process of economic globalisation was amplified after the 1990s, especially in developing economies such as China. The study of the third index does not follow the path of the previous indicators. The United States are ranked first globally, and Germany and China are changing places in the years under review. The analysis of the index reveals that each country faces certain challenges

concerning the future prospects of inward FDI. It is important to mention that this index tries to predict the FDI prospects of each national economy. This is a positive sign for the US as they remain at the first place for many years. But at the same time, it is a disappointing sign for China, as it seems that it has lower prospects of attracting FDI in relation to the previous years. On the other hand, it may be a new normality, which has to do with the lower growth prospects of China during this decade, as compared with the 2000s.

In conclusion, it is important to mention that there is a great need for enrichment of indices that are trying to quantify qualitative concepts such as economic globalisation. This measurement process will give the capability of a holistic approach and it will try to combine the theory and concepts of global political economy with specific quantitative indices. The measurement process is an open process of enrichment, combining global political economy with economic theory and economic policy.

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# Examination of the Liquidity, Profitability and Indebtness Relations for Polish Companies with Neural Networks



Katerina Lyroudi

**Abstract** This study tries to investigate the relations of liquidity, indebtness and profitability for non financial listed companies in the Warsaw Stock Exchange, by applying the non parametric method, neural network analysis. After we present the legal environment of the Polish stock market, we investigate the relationship of liquidity, as measured by the selected indicators, with the company's profitability and with the firm's indebtness. It is important for the financial managers to know that by improving their company's profitability, the liquidity is also affected, or that by managing their company's liquidity efficiently, they can improve the firm's profitability. Similarly, a relationship between liquidity and indebtness will also be investigated, since high liquidity reduces the firm's default and bankruptcy risk. Our results showed that the cash conversion cycle was positively related to the return on assets ratio but had a changeable relation with the return on equity, the net profit margin and the gross profit ratio. The current and the quick ratios were positively related to the return on assets and the return on equity ratios, supporting our hypothesis. We found that the cash conversion cycle was positively and negatively related to the debt ratio, in other words had a changeable relation, while the current and the quick ratios were negatively related to the debt ratio, supporting our hypothesis. Our results compared to the relative literature indicated that the selected methodology (parametric vs. non-parametric) did not give any different results regarding the examined relations but complemented each other.

**Keywords** Liquidity · Indebtness · Profitability · Neural networks

**JEL Classification** G30 · G39 · G15

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## 1 Introduction

Short-term financial decisions are crucial for the survival and growth of companies along with the long run decisions of capital structure and capital budgeting and can also affect the owners' wealth. One important factor in short-term financial management is liquidity and its accurate measurement with the static current (CR) and quick ratios (QR) and the dynamic cash conversion cycle (CCC). Another important factor that sustains the survival and growth of a company is its profitability as measured by the net profit margin ratio (NPM), the return on assets or investments (ROA or ROI), the return on equity (ROE) and the gross profit ratio (GP).

In the literature there are studies that support a positive relation between the liquidity and the profitability of a company since, a high liquidity will lead to high profitability because it reduces the firm's need of external financing, to finance positive NPV projects that will increase its value. Hence, its cost of capital, as well as the credit risk will be lower and its profitability will increase. There are other studies that support a negative relation between the liquidity and the profitability of a company, since a firm that carries a high amount of cash, for protection and to lower its credit and financial risk, it will lose the return it would have earned from investing the excess liquidity in more productive investments. It is a type of opportunity cost that lowers the firm's profitability. There are also studies that support a negative relation between liquidity and debt, since the more liquid a firm is the less external financing needs.

In this paper, our objective is to investigate the relationship of liquidity, as measured by the selected indicators, with the company's profitability, as measured by the known profitability ratios; and with the firm's indebtedness, as measured by the debt ratio. It is important for the financial managers to know that by improving their company's profitability, the liquidity is also affected, or that by managing their company's liquidity efficiently, they can improve the firm's profitability. Similarly, a relationship between liquidity and indebtedness will also be investigated, since high liquidity reduces the firm's default and bankruptcy risk. These issues for the Polish market have been examined by Lyroudi and Rychter (2012) with parametric techniques and here we will examine them using a non-parametric neural network approach to see if we get different or similar results which fact will give us more insights about these relations, and their method of analysis. The results of our study will help the practitioners to plan their strategies regarding liquidity, profitability and leverage accordingly for the success of their company and the academicians to learn more about these intricate relationships.

The Polish stock market is basically represented by the Warsaw Stock Exchange (WSE) which was established on March 22nd in 1991. The WSE evolved in four phases till it matured as a public share company supporting the growth of the Polish economy. In 2012, the WSE consisted of 366 companies (329 domestic and 37 foreign ones) in the main market and 62 companies (60 domestic and 2 foreign) in the parallel market with a total capitalization of 715,553.44 PLN million. In 2017, it had listed 432 domestic companies (PLN 645.0 billion = EUR 152.6 billion) and total 483

domestic and foreign companies (PLN 1316.5 billion = EUR 311.5 billion). An additional market called NewConnect was introduced on 30 August 2007. (*Source*: Warsaw Stock Exchange ([www.gpw.pl](http://www.gpw.pl))).

This study is structured as follows: Sect. 2 presents the literature review; Sect. 3 discusses the data set and the methodology we follow; Sect. 4 depicts and analyzes the results whereas Sect. 5 outlines the conclusions and the future research directions.

## 2 Literature Review

Huberman (1984) developed a model and a theoretical analysis showing that low earnings (profitability) are associated with low liquidity, which will drive the company to external financing and will increase the cost in the aspect of financing and agency costs as well as a tax liability. Bruinshoofd and Kool (2004) investigated corporate liquidity management for Dutch companies for the period 1977–1997 and found that liquidity measured by the ratio of cash and marketable securities over net assets had a positive relation with profitability as measured by the return on assets ratio.

Filbeck and Krueger (2005) examined the working capital management between industries and found that profitability increased due to lower financing costs that occurred because the firms decreased their current assets, as a means to finance their expansion instead of issuing more debt.

Garcia-Teruel and Martinez-Solano (2007) for small and medium sized companies in Spain for the period 1996–2002 found that when the cash conversion cycle of the firm was reduced the firm's profitability increased. So, managers could increase their firm's value and their profitability by reducing their inventories and the number of days accounts receivable are outstanding, hence, reducing their receivables and their cash conversion cycle.

Dash and Hanuman (2009) found that there was a negative relationship between liquidity as expressed by the current ratio and profitability as expressed by the profit margin ratio.

Nobanee and Al Hajjar (2009a) studied 5802 US non-financial companies, listed in the NYSE, ASE, NASDAQ stock markets and the OTC market for the period 1990–2004 using the GMM approach for panel data analysis. They found that there was a significant and negative relationship between the cash conversion cycle and the firm's profitability, as well as with the receivables conversion period and profitability.

Nobanee and Al Hajjar (2009b) found a significant negative impact of the cash conversion cycle and the payables deferral period on the firm's profitability. This can imply that lengthening the payables deferral period hurts the firm's credit reputation and probably reduces its suppliers, thus reducing its sales and its profitability. The quick ratio was negatively related to profitability, sales growth was positively related to profitability, while the debt to equity ratio, as a measure of the firm's capital structure was not related to profitability.

Nobanee and Al Hajjar (2009c) studied the relationship between the cash conversion cycle and profitability for a sample of 2123 Japanese non-financial firms listed in the Tokyo Stock Exchange for the period 1990–2004. They found that the above relation was negative.

Chatterjee (2010) examined the relation of the cash conversion cycle and the current and quick ratios with a company's profitability measured by the net operating margin, for a sample of UK companies listed on the London Stock Exchange during the period 2006–2008. The results revealed that there was a significant negative relationship between the cash conversion cycle and profitability. The relation of the current and quick ratios with profitability was negative implying that if a company wants to increase its profitability it should reduce its current assets, especially its receivables and inventories.

Afeet (2011) found that the cash conversion cycle had a strong negative impact on profitability for a sample of 40 Pakistani small and medium sized firms for the period 2003–2008. Lyroudi and Rychter (2012) examined the liquidity of the listed non-financial firms in the Warsaw Stock Exchange using correlation and regression analysis and found that the cash conversion cycle was negatively affected by the profitability indicator return on equity (ROE) and positively affected by the gross profit indicator. The current ratio was positively affected by the net profit margin and the gross profit. On the other hand, the quick ratio was negatively affected by the net profit margin and positively affected by the return on assets or investments. Since there was such ambiguity this issue needed further examination.

### **3 Model, Testable Hypotheses, Data and Methodology**

#### ***3.1 Model***

We use the traditional indicators of liquidity the current (CR) and the quick (QR) ratios and the dynamic one, the cash conversion cycle (CCC). High current and quick ratios and low CCC indicate a firm with a good liquidity position.

We use the return on assets ratio (ROA) and the return on equity ratio (ROE), to distinguish the profitability due to assets management (ROA) from the profitability due to financing (ROE). We also use as profitability indicators the gross profit ratio (GP) as Deloof (2003) and the net profit margin (NPM) which measures firm profitability in relation to its revenues. The higher these profitability ratios, the better for the firm.

The debt to assets ratio (DR) indicates the portion of a firm's total liabilities (external capital) in the firm's capital structure. The lower this ratio is the better for the firm.

### 3.2 Testable Hypotheses

The first hypothesis investigates the relationship of the three liquidity measures under examination with the company's profitability ratios. It allows for a positive relationship between the current-quick ratios and profitability and a negative relationship between the cash conversion cycle and profitability. The results of these tests will be helpful guides for managers because they will be able to see which variables are affected, if any, by managerial decisions.

**The Liquidity and Profitability Hypothesis:** There is expected to be a positive relationship between the variables: current ratio, quick ratio and a negative relationship between the cash conversion cycle, as indicators of liquidity and each of the variables: return on assets (ROA), return on equity (ROE), net profit margin (NPM) and gross profit (GP), as indicators of profitability.

That is:

$$\begin{aligned} r_{CR,ROA} &> 0; r_{CR,ROE} > 0; r_{CR,NPM} > 0; r_{CR,GP} > 0 \\ r_{QR,ROA} &> 0; r_{QR,ROE} > 0; r_{QR,NPM} > 0; r_{QR,GP} > 0 \\ r_{CCC,ROA} &< 0; r_{CCC,ROE} < 0; r_{CCC,NPM} < 0; r_{CCC,GP} < 0 \end{aligned}$$

The second hypothesis examines the relationship of the three liquidity measures under consideration with the company's debt position. The more liquid a firm is, the lower its short-term debt obligations should be and the higher its short-term debt capacity. This issue is very useful for the managers of the firms, to guide them for their financial planning, as well as for the various financial institutions that are considering to grant loans or credit to the examined firms.

**The Liquidity and Leverage Hypothesis:** There is expected to be a negative relationship between the CR and QR and a positive relationship between the CCC, as indicators of liquidity and the leverage ratio such as: the debt to assets ratio (DR).

That is:

$$r_{CR,DR} < 0; r_{QR,DR} < 0; r_{CCC,DR} > 0$$

### 3.3 Test Data

To explore the above mentioned relations we use a sample of the non-financial companies listed in the Warsaw Stock Exchange in Poland for the period 1997–2005 and data from the annual statements. It is the same database as the Lyroudi and Rychter (2012) study, so that we will be able to compare and check for different results due to different analytical approaches and not due to different data. We excluded those companies that did not have continuous data for the whole selected period.

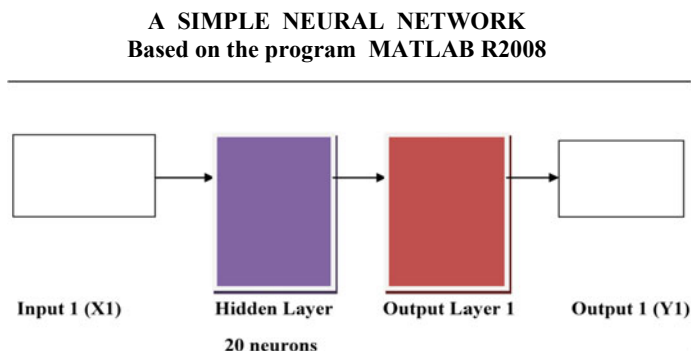
### 3.4 Methodology: Neural Networks Analysis and Relative Literature

For the examination of the testable hypotheses we use the non parametric statistical method called neural network analysis. A neural network is an information processing system that is functioning in a similar way to biological nervous systems when it processes the information given to it. Specifically it processes data mimicking certain processes of the human brain and has the ability to learn from its mistakes. For the nonlinear modelling of the relationship between variable  $x$  (input) and variable  $y$  (output) a neural network was employed based on the studies of Lin and Lee (1996) and Hush and Horne (1993). The processing elements of it are called neurons and are similar to those of various biological nervous systems. Each neuron receives inputs, processes them and produces a single output. Therefore, a neural network is a system of neurons that are classified in layers. Three major categories of layers can be distinguished in every such system: the input layers, the hidden layers and the output layers. Between the input and the output layers several hidden layers can exist.

The neural network analysis can identify patterns in data as it is exposed to it. A neural network maps between a data set of numeric inputs and a set of numeric targets. Using back propagation a neural network learns through an iterative procedure. The most simple of such a model is composed of three layers, one input, one hidden and one output. The input layer takes the input variables, processes them, assigns them values and forwards these latter values to the hidden layer/layers. Then the values of the variables are further processed going from one hidden layer to the other and afterwards the processed values are transmitted to the output layer, which corresponds to the output variables.

The data for this study was processed with the mathematical program MATLAB R2008b and gave a plot of the pattern the two examined variables followed.

Graph 1 depicts a simple neural network based on the program MATLAB R2008 that was used in the present analysis.



**Graph 1** A simple neural network based on the program MATLAB R2008

As any methodology of data analysis the neural networks in financial decision making have advantages and disadvantages. Briefly, based on Hawley et al. (1990) we can report that this approach is most effective in cases of pattern recognition, classification and clustering (e.g. the grouping of bonds), in cases of corrupted or incomplete data. Another advantage is the fact that neural network analysis can be applied in highly unstructured problems, it does not require preprogrammed rules or a set knowledge base. The major advantage and the differentiating factor from all the other approaches is that such a system has a learning ability, it can be trained and can adapt automatically to various changes that the decision maker might impose. On the other hand, the limitation and major disadvantage of this analysis is that the processes in all the layers and even more in the hidden layers are unclear, they cannot be traced or evaluated for accuracy or for the case of an error or a system's malfunction. So it is difficult for the decision maker to know how the neural network processed the input data and how it reached a conclusion.

## 4 Analysis of Results

Descriptive statistics of all the variables involved are depicted in Table 1. The results in this table are similar to the Lyroudi and Rychter (2012) study, since we use the same dataset. The Pearson correlation coefficients between the examined variables are presented in Table 2. These results are also similar to the Lyroudi and Rychter (2012) study in order to make the necessary comparisons. The CCC is 30.2 days on average, but has a high deviation of 424.62 days. The minimum value is  $-6928.4$  days which implies that some industries have very long payment deferral period and that usually occurs when they are subsidized by the government. The maximum value is 10,346.2 days which implies that some companies in some industries have very long receivables conversion period and are unable to manage their receivables. In order to investigate in depth these cases of very high or very low CCC more research

**Table 1** Descriptive statistics of the variables

Variables	N	Mean	Minim	Median	Maxim	Stand. Dev.
CCC	1809	30.2	-6928.4	21.2	10,346.2	424.62
CR	1809	1.93	0.008	1.35	36.957	2.44
QR	1809	1.47	0.054	0.96	36.957	2.29
ROA	1809	0.045	-1.273	0.051	3.074	0.172
ROE	1809	0.128	-20.596	0.065	36.728	1.521
GP	1809	0.264	-0.932	0.218	3.207	0.264
NPM	1809	-0.641	-9.058	0.028	187.053	5.695
DR	1809	0.487	0.002	0.439	6.224	0.398

Source Authors' calculations



**Table 2** Pearson correlation coefficients

Variable	ROA	ROE	NPM	GP	DR
CCC	0.002 0.930	-0.026 0.283	- 0.032 0.185	0.026 0.278	-0.076* 0.001
CR	0.043* 0.070	0.038 0.110	-0.016 0.514	0.022 0.353	-0.349* 0.000
QR	0.007 0.770	0.036 0.128	-0.021 0.368	-0.061 0.496	-0.299* 0.000

Source Authors' calculations

\*Statistical significance at the 5% level

\*\*Statistical significance at the 10% level

is needed to determine the CCC and the other liquidity measures by each industry and examine the characteristics, the economic conditions and the peculiarities of each industry listed in the stock exchange in Poland. The CR and the QR ratios have an average of 1.93 and 1.47 respectively. The maximum value is very high equal to 36.957, implying that 36.957 monetary units of current assets can cover 1 monetary unit of current liabilities. Since the maximum value is the same for both ratios, it means that there are some industries with zero inventories. For instance, the construction, food and beverages, transportation, computer equipment and other industries. Examining the other variables of our study and their descriptive statistics we do not observe any other major "surprises" or extreme values.

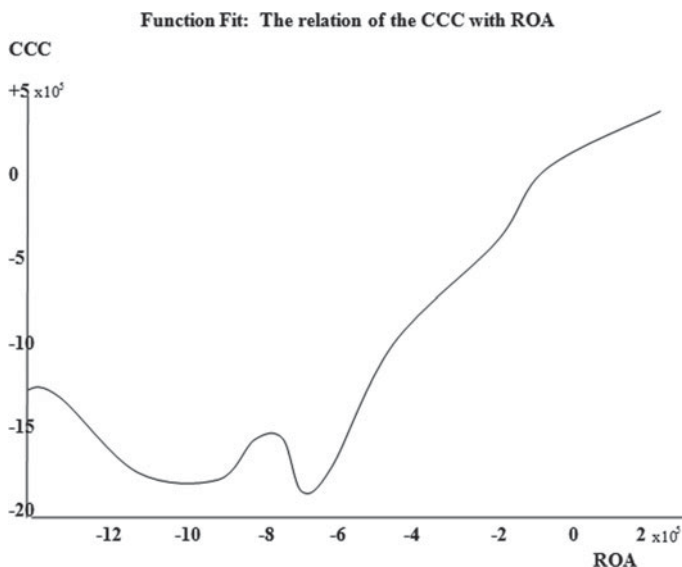
Table 2 depicts the results for the Pearson correlation coefficients between the liquidity, the profitability and the debt ratio of our sample Polish companies. The CCC has no linear relation with any of the profitability measures. This result is in contrast to previous studies for other markets. The CR is positively related to the ROA variable [ $r = 0.043$  (0.070)], while the QR has also no linear relation with any of the profitability measures. This result agrees with the findings of Lyroudi and McCarty (1993) for small USA companies and Lyroudi (2003) for Greek companies that are also rather small compared to the USA ones. Regarding the relation between the liquidity and the indebtedness of the Polish companies there is a significant negative correlation between the CCC and the debt ratio DR [ $r = -0.076$  (0.001)], as well as between the CR and the debt ratio [ $r = -0.349$  (0.000)] and between the QR and the debt ratio [ $r = -0.299$  (0.000)]. The first relation of the CCC and the DR is not consistent with our second hypothesis as well as with the results of Deloof (2001, 2003) and we hope that the further analysis with the neural networks will clarify the issue. Based on the results regarding the CR and the QR we can infer that if a company has enough liquidity, it will use less leverage. Similar results for the current and the quick ratios and their relation to the debt ratio have been found by many studies for various markets.

Table 3 and Figs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11 depict the results of the neural network analysis. Based on the coefficient of determination ( $R^2$ ) in Table 3, for all eleven examined relationships/models, we can infer that the neural network regression fits the data very well, since this coefficient is close to 99.9% for most

**Table 3** Neural network results

Model	Output-Input	Mean square error (MSE)	Coefficient R <sup>2</sup>
1	CCC-ROA	1.88060e-6	0.999999
2	CR-ROA	8.48551e-7	0.999999
3	QR-ROA	1.91700e-8	0.999999
4	CCC-ROE	0.526416	0.999980
5	CR-ROE	4.23770e-4	0.999980
6	QR-ROE	2.45239e-5	0.999999
7	CCC-NPM	6.68152e-4	0.999999
8	CCC-GP	0.5121993	0.999967
9	CCC-DR	2.13852e-3	0.999999
10	CR-DR	7.311111e-4	0.999947
11	QR-DR	2.75543e-4	0.999997

Source Authors' calculations



**Fig. 1** The relation of the CCC with ROA. Source Authors' calculations

models. Furthermore, the MSE is very low for most models, which implies that the errors between target and output variables are very small.

Figure 1 presents the relationship of the CCC as an indicator of the firm's liquidity, to the ROA, the return on assets ratio as an indicator of the firm's profitability. The pattern indicates a positive relation with negative values. Based on the parametric results in Table 2, this relation was also found positive but not significant [ $r = 0.022 (0.369)$ ]. The results from both non-parametric (present study) and parametric

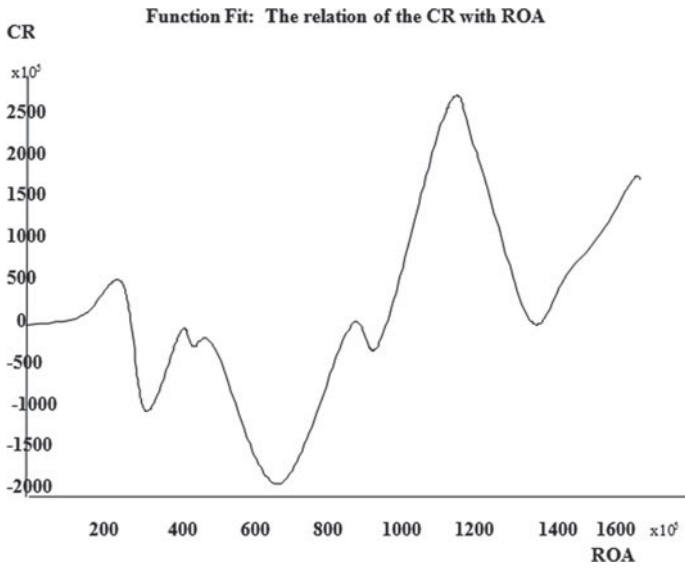


Fig. 2 The relation of the CR with ROA. *Source* Authors' calculations

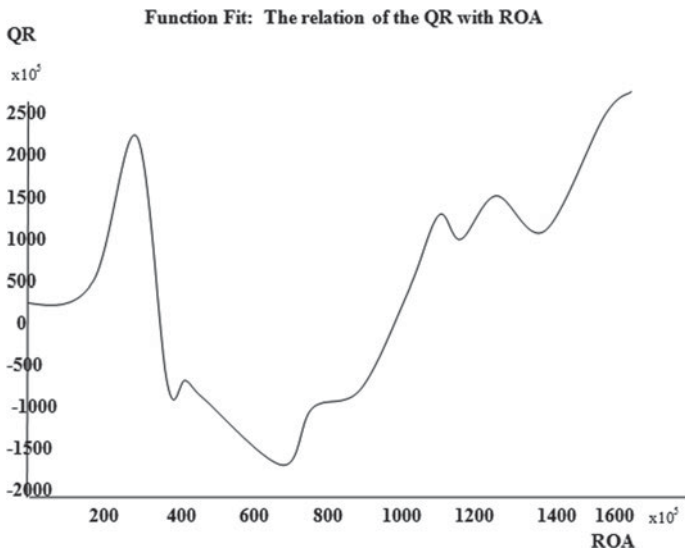


Fig. 3 The relation of the QR with ROA. *Source* Authors' calculations

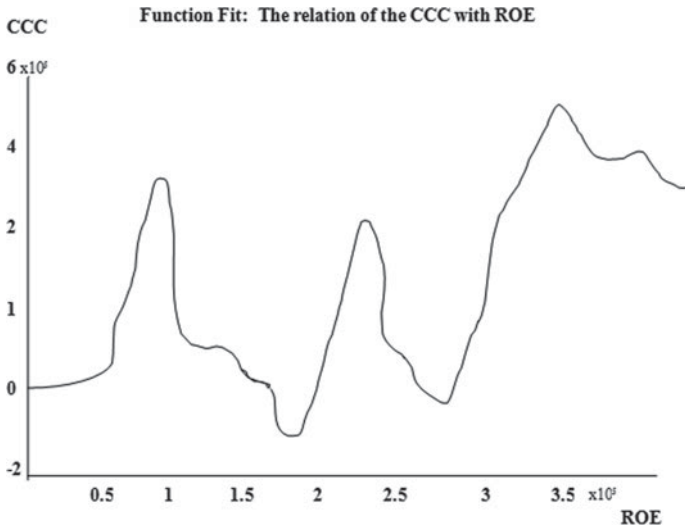


Fig. 4 The relation of the CCC with ROE. *Source* Authors' calculations

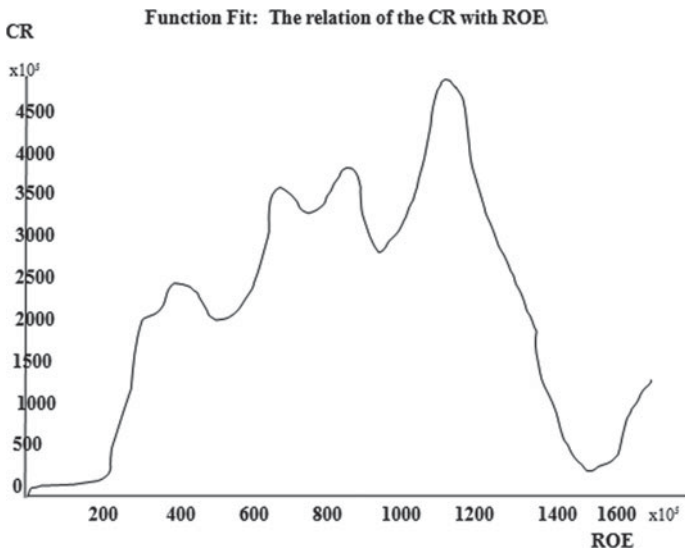


Fig. 5 The relation of the CR with ROE. *Source* Authors' calculations

approaches (Lyroudi and Rychter 2012 study) indicate that a low cash conversion cycle that means a good liquidity position is associated with a low ROA, which means low profitability.

Figure 2 shows the relationship of the traditional measure CR as an indicator of the firm's liquidity, to the ROA, the return on assets ratio as an indicator of the

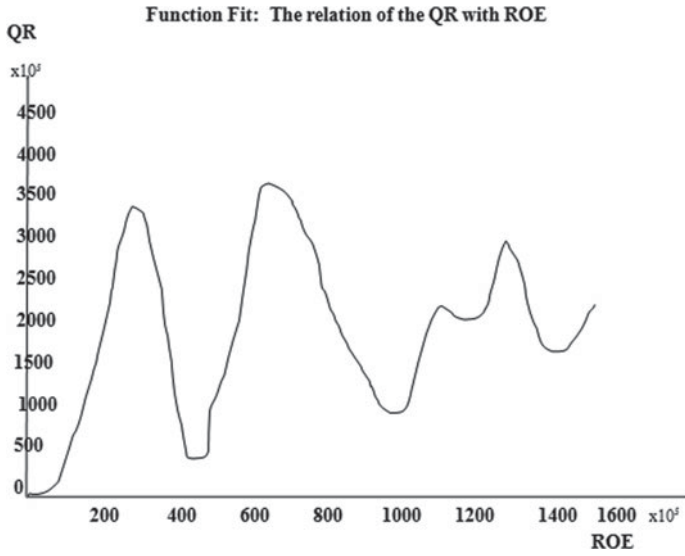


Fig. 6 The relation of the QR with ROE. *Source* Authors' calculations

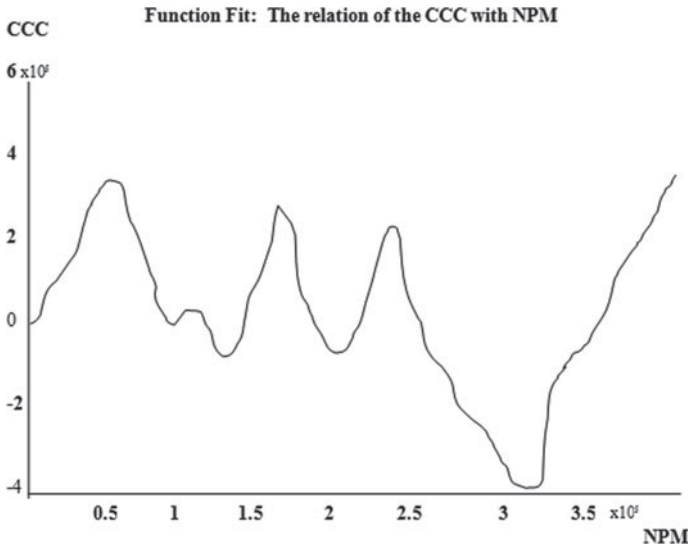
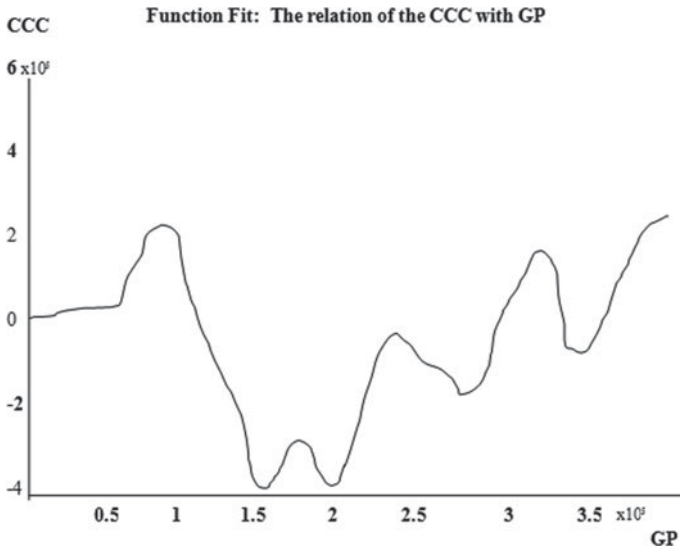
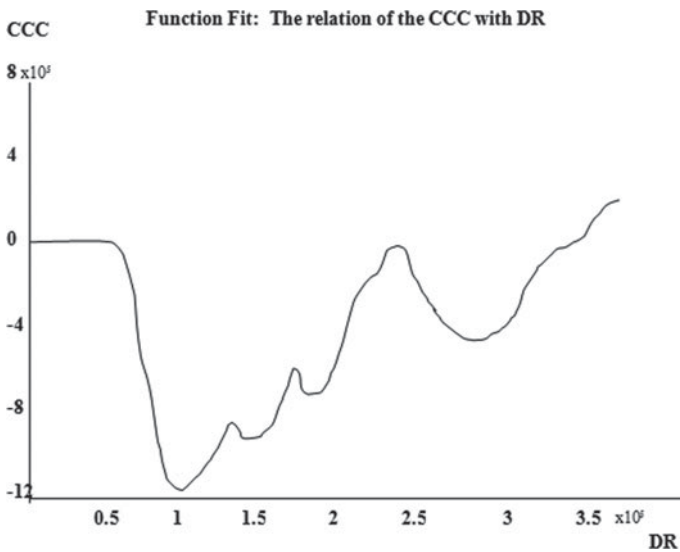


Fig. 7 The relation of the CCC with NPM. *Source* Authors' calculations



**Fig. 8** The relation of the CCC with GP. *Source* Authors' calculations



**Fig. 9** The relation of the CCC with DR. *Source* Authors' calculations

firm's profitability. The pattern indicates a positive relation partially with negative and partially with positive values. Based on the parametric results in Table 2, this relation was also found positive and significant [ $r = 0.150 (0.000)$ ]. The results from both non-parametric and parametric approaches indicate that a high current ratio that

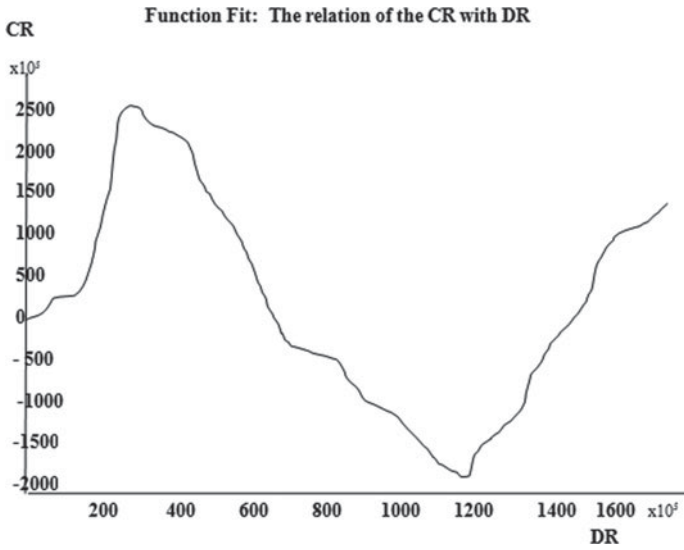


Fig. 10 The relation of the CR with DR. *Source* Authors' calculations

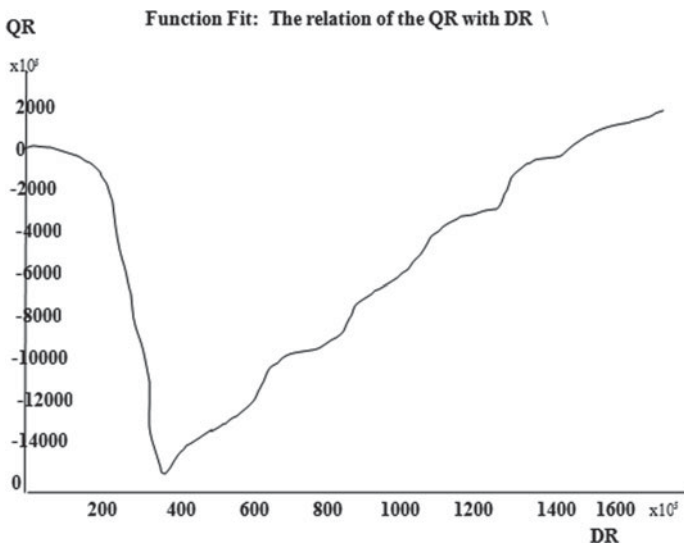


Fig. 11 The relation of the QR with DR. *Source* Authors' calculations

means a good liquidity position is associated with a high ROA, which means high profitability.

Figure 3 presents the relationship of the traditional measure QR as an indicator of the firm's liquidity, to the ROA, the return on assets ratio as an indicator of the

firm's profitability. The pattern indicates a positive relation partially with negative and partially with positive values. Based on the parametric results in Table 2, this relation was also found positive and significant [ $r = 0.125 (0.000)$ ]. The results from both non-parametric and parametric approaches indicate that a high quick ratio that means a good liquidity position is associated with a high ROA, which means high profitability.

Figure 4 depicts the relationship of the CCC as an indicator of the firm's liquidity to the ROE, the return on equity ratio as an indicator of the firm's profitability. The pattern indicates a changeable relation partially with negative and partially with positive values. Based on the parametric results in Table 2, this relation was also found not significant [ $r = -0.026 (0.283)$ ].

Figure 5 depicts the relationship of the CR as an indicator of the firm's liquidity to the ROE, the return on equity ratio as an indicator of the firm's profitability. The pattern indicates a positive relation in accordance to the parametric results in Table 2, where this relation was also found positive but not significant [ $r = 0.038 (0.110)$ ].

Figure 6 depicts the relationship of the QR as an indicator of the firm's liquidity to the ROE, the return on equity ratio as an indicator of the firm's profitability. The pattern indicates a positive relation. Based on the parametric results in Table 2, this relation was also found positive but not significant [ $r = 0.036 (0.128)$ ].

Figure 7 depicts the relationship of the CCC as an indicator of the firm's liquidity to the NPM, the net profit margin ratio as an indicator of the firm's profitability. The pattern indicates a changeable relation partially with negative and partially with positive values. Based on the parametric results in Table 2, this relation was found negative but not significant [ $r = -0.032 (0.185)$ ].

Figure 8 depicts the relationship of the CCC as an indicator of the firm's liquidity to the GP, the gross profit ratio as an indicator of the firm's profitability. The pattern indicates a changeable relation with a positive trend. Based on the parametric results in Table 2, this relation was also found positive but not significant [ $r = 0.026 (0.278)$ ].

Figure 9 depicts the relationship of the CCC as an indicator of the firm's liquidity to the DR, the debt ratio as an indicator of the firm's levered position. The pattern indicates a changeable relation with negative values but with a positive trend. Based on the parametric results in Table 2, this relation was also found negative and significant [ $r = -0.070 (0.001)$ ].

Figure 10 depicts the relationship of the CR as an indicator of the firm's liquidity to the DR, the debt ratio as an indicator of the firm's leverage position. The pattern indicates a negative relation partially with negative and partially with positive values. Based on the parametric results in Table 2, this relation was also found negative and significant [ $r = -0.349 (0.000)$ ].

Figure 11 depicts the relationship of the QR as an indicator of the firm's liquidity to the DR, the debt ratio as an indicator of the firm's leverage position. The pattern indicates a negative relation with a positive drift or persistence. Based on the parametric results in Table 2, this relation was also found negative and significant [ $r = -0.299 (0.000)$ ].



## 5 Summary and Concluding Remarks

This study tried to investigate the relations of liquidity, indebtedness and profitability for non financial listed companies in the Warsaw Stock Exchange by applying neural network analysis. Poland is a developing and transition economy as well as a member of the European Union and there have been other studies examining the above relations using parametric techniques. Therefore, it is intriguing and will lead to further insights, the investigation of these relations by a non parametric method such as the neural networks and compare the results. We compared our results to those of the Lyroudi and Rychter (2012) study where there were used parametric statistical methods such as correlation and regression analysis on the same exactly database.

Our results showed that the cash conversion cycle was positively related to the return on assets ratio but had a changeable relation with the return on equity, the net profit margin and the gross profit ratio. The current and the quick ratios were positively related to the return on assets and the return on equity ratios, supporting our hypothesis. Regarding the relation of liquidity with the indebtedness of the company we found that the cash conversion cycle was positively and negatively related to the debt ratio, in other words had a changeable relation, while the current and the quick ratios were negatively related to the debt ratio, supporting our hypothesis.

Our results compared to the relative literature indicated that the selected methodology (parametric vs. non-parametric) did not give any different results regarding the examined relations. Actually, they complemented each other clarifying the ambiguity of some results on the relations we obtain between the selected variables.

Our analysis is subject to the limitation of the unclear processes in the hidden layers or else the “black box” problem as it is called. We have enriched the pertinent literature for a developing and a transition economy, since most studies refer to developed markets. Therefore, an implication of the present study is that the inferences we obtained about liquidity, profitability and debt can hold not only for Polish companies, but also for the companies of the other transition economies in Europe.

Another direction for future research could be the examination of these hypotheses for more developed and developing markets in Europe, applying both parametric and non parametric methods and analyzing for the whole sample and by industry, because we will get better insights, since some sectors have their specialties in understanding how these relations are determined. We could compare the results of the developed versus the developing ones. We could also compare the results of the developed European markets with the US market as a whole and by industry sector. This thorough analysis will help the managers, the investors, the bank analysts and all the stakeholders that must examine the liquidity, profitability and the levered condition of the underlying companies in making better and more efficient decisions.

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# Financial Instability and Economic Growth in Transition Economies



Savvas Zachariadis

**Abstract** The paper focuses on the fiscal and financial position of European post-socialist countries prior to the Global Financial Crisis (GFC) of 2007–2009 and afterwards. It highlights the impact of the transmission of crisis and the changes that have been ensued in terms of the pattern of economic growth. For this reason, it reviews the relation of higher GDP growth rates and the deepening of financial development, a model that had been adopted by the majority of countries until the outbreak of the crisis. More precisely, emphasis shall be given to Bulgaria, Romania, and the Baltic States due to the fact that these countries had experienced the most intense effects. Furthermore, we incorporate Minsky's financial theory in order to identify the resemblances of the theory with their domestic financial systems and to reveal the weaknesses and vulnerabilities of their fiscal and financial stance. The scope is to indicate that the pursuit of a rapid accelerating GDP growth rates based solely on the financialisation of the economy does not constitute a panacea policy for total economy. Thus, we display relative macroeconomic data in relation with growth GDP rates *ex ante* and *ex post* the crisis. Hence, we address the issue that the advent of Global Financial Crisis has induced the countries under examination to moderate their economic policy of credit expansion and high indebtedness towards more balanced and steady growth pattern at the expense though of lower annual GDP rates.

**Keywords** Growth · Global crisis · Minsky · Financial · Instability · Capital flows

**JEL Classification** F43 · G01 · F36

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## 1 Introduction

The rapid growth model grounded on capital inflows has been inextricable intertwined with the financial deepening process. Romania, Bulgaria and the Baltic States have experienced rapid growth models until the outbreak of the crisis in 2008 when a plunge was ensued. Large capital inflows in association with greater financial integration, and domestic ownership of financial institutions consist of main features of the economies. However, during the period of accelerating growth until 2008, financial vulnerabilities were built up as well. Minsky in his theory has delineated the credit cycle process that bears resemblance with the course economies have traversed. By 2011 and onwards, economies have recovered but GDP growth rates have been relatively modest. Thus, the paper highlights the contradiction between these fiscal and financial positions.

## 2 The Impact of Financial System in Economic Growth

According to the dominant paradigm in economic theory, an efficient financial system can stimulate rapid economic growth. In general, financial intermediaries encourage the efficient allocation of capital to investment production and eliminate the liquidity risk. Thus, the financial system sways investment, saving, and ergo economic growth. Schumpeter (1911) mentioned the positive impact of financial development in economic growth, since banks provide financial assistance to entrepreneurs' investment projects. The same conclusion had been deducted later on (Gurley and Shaw 1955; Goldsmith 1969). King and Levine (1993) refer that an efficient financial system constitutes a key factor of economic growth. According to Beck et al. (2000) the development of an efficient financial system is an important determinant of economic growth. Levine (2005) suggests that financial markets can boost economic growth by providing payment services, liquidity, information, thus facilitating the trade of goods and services, by moving deposit capital to productive and tradable sector. Cojocaru et al. (2012) redounded that credit to the private sector is a positive factor in promoting economic growth except for periods of hyperinflation. As far as economies in transition are concern, they abuted that financial efficiency positively influences economic growth (Cojocaru et al. 2015).

Financial development boosts growth via the channels of capital accumulation, human capital, and total factor productivity. Each of these functions certainly depends upon regulatory and legal framework that is applied to each country. La Porta et al. (1997) consider the regulatory framework and institutional structure of each country as a crucial element of the positive impact of financial system on growth. The terms reform and liberalization were quite popular at the beginning of the 1990s in Bulgaria, Romania and the Baltic States. In this way, the policies that have been followed accommodated the development of a liberal financial sector under the standards of

foreign advanced countries. These policies involved legal and regulatory structures that encouraged the new financial system to grow.

### **3 Financial Development and Economic Growth in Romania, Bulgaria, and Baltic States**

The reform of the financial sector initiated in early 1990s and was accompanied with the transition process towards market economy. There has been a serious challenge to transform from a heavily regulated economy to an open and liberalized market. It was not the same case for all post-socialists countries but heavy regulation had been applied in Bulgaria, Romania and the Soviet Union (including Baltic States).<sup>1</sup> The countries were committed to strive towards structural reforms as a prerequisite to join EU, where their accession in 2004 and 2007<sup>2</sup> had been a contributor factor to pursue convergence with rest of EU countries. Romania and Bulgaria have traversed similar route towards European integration and accession. Accordingly, Latvia, Lithuania and Estonia had indicated impressive expansion, even referred as the Baltic tigers.

The countries started to alter their financial systems in accordance with international financial systems. The banking sector had been the driving force of financial sector. The new legal framework allowed the operation and development of private banks, which were entitled to trade, invest, cooperate, and generally to provide the financial services a regular commercial bank offers. Therefore, new private banks were permitted to operate internationally, attracting the interest of foreign financial institutions and investors. Within a decade, foreign banks<sup>3</sup> took control of the majority of domestic banks (Fig. 1), whereas Estonia displayed the highest share verging on 100%. The above fact had been catalyst for the expansion of banking sector.

The contribution of foreign banks to the development of their financial systems was notable. They totted the missing know-how methods, financial products, innovations, and newest technology to fit in the domestic banking system. The new foreign-owned banking environment enhanced the efficiency of domestic financial system, credit, competition, attracting foreign capital inflows and investments, and hence boosting economic growth.

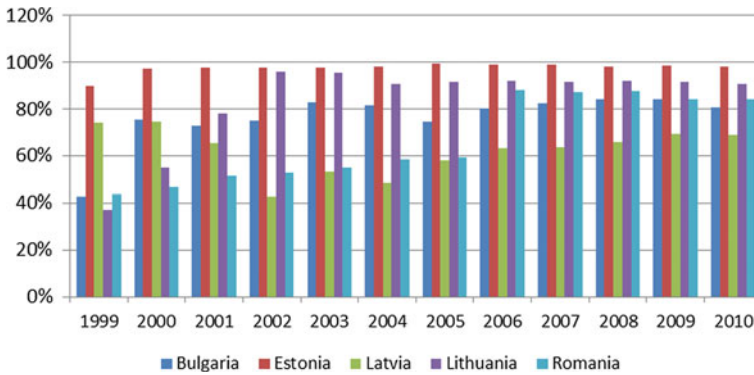
Therefore, economic growth has been accelerated from the beginning of 2000s and was mainly driven by credit growth and large capital inflows. The Baltic States performed an unprecedented GDP growth, exceeding even 10% (Fig. 2). Over the years 2000–2007, Latvia had recorded the highest GDP growth with average rate of

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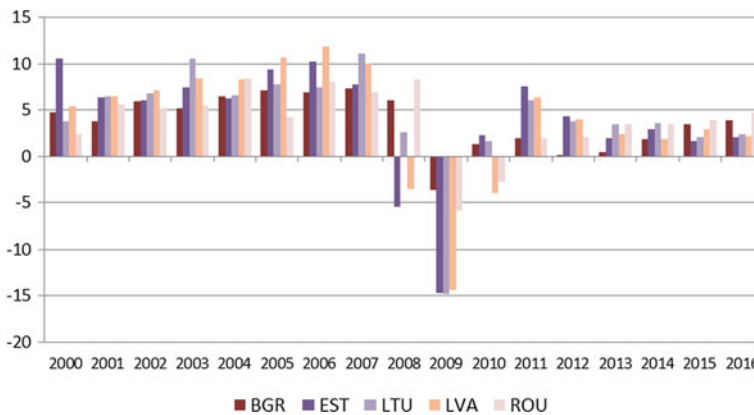
<sup>1</sup>During the Communist period not only all countries shared the same degree of centralization. For instance in Hungary, Poland and the former Yugoslavia some independence was given in firms but for Bulgaria, Romania and the Baltic countries, as members of the Soviet Union, the status quo was quite different.

<sup>2</sup>Romania and Bulgaria have joined EU during the second enlargement wave in 2007.

<sup>3</sup>Mainly by Austrian, Belgian, German and Italian banks.



**Fig. 1** Foreign ownership\* share %. *Source* EBRD Banking Survey. \*Foreign ownership defined as banks with assets of foreign ownership >50%



**Fig. 2** GDP growth rates. *Source* World Bank

8.5%, Estonia with 8%, and Lithuania around 7.5%. It should be noticed that Bulgaria and the Baltic States had fixed exchange rate parity to euro and that accommodated the impressive increase in GDP. Bulgaria and Romania had presented an average GDP growth of 5.9% and 6% respectively from 2000 to 2008. During the period of the transmission of crisis (second half of 2009), all countries had displayed negative or very low GDP rates. From 2011, all of them have positive rates but they have never reached the levels of pre-crisis period.

GDP per capita augmented even to 10%, particular in Baltic States and then plunged approximately to -14% (Lithuania) in 2009. Although Romania remained in floating rate regime, still, there was a 10% increment in 2008 (Fig. 3).

During the transition process, it is normal to present higher rates of growth as a result of the convergence process. Besides, neoclassical theory states that growth is higher for emerging economies, but also the faster a country grows, the further

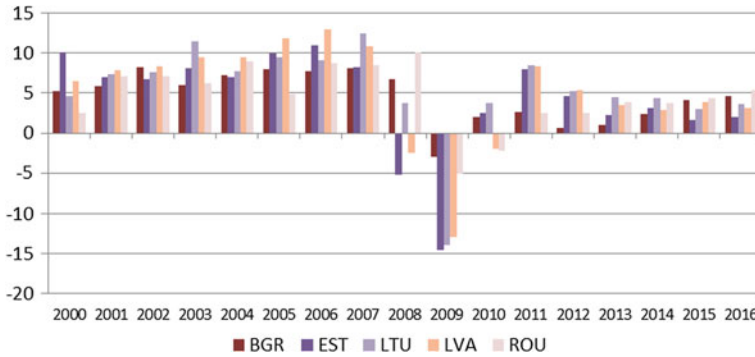


Fig. 3 GDP per capita growth. Source World Bank

away deviates from its steady state. Except for financial development, similarly the international trade, technological transfer, privatizations, higher competition, skilled labor force, deregulation, all of them have contributed to enhanced economic activity.

The gross fixed capital formation (GFCF) had reached an average of 30% but after the crisis it has been stabilized in an average rate of 20% (Fig. 4). However, private consumption had the major impact in growth between 2000 and 2008, as it is depicted in Fig. 5. Public and private consumption still comprises the highest GDP percentage for all countries exceeding an average rate of 75%.

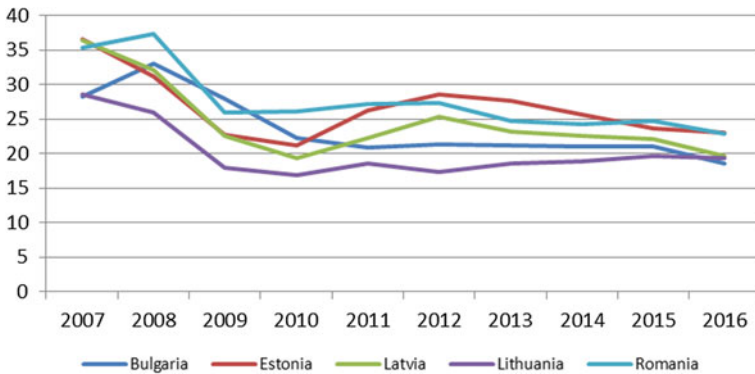


Fig. 4 Gross fixed capital formation (investment at current prices) % of GDP. Source World Bank

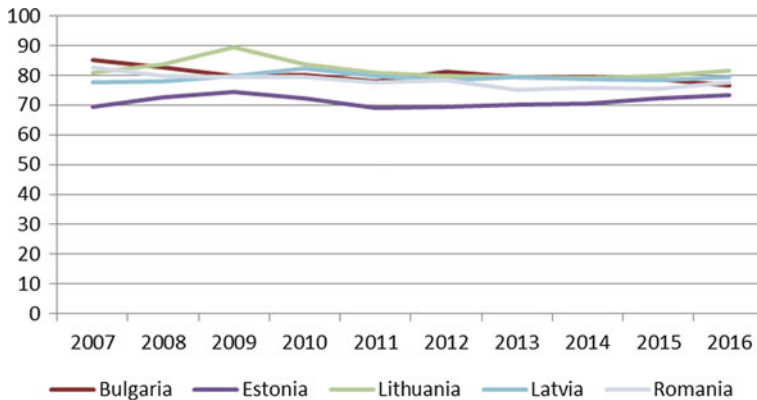


Fig. 5 Final consumption expenditure (% of GDP). Source World Bank

### 4 Credit Expansion and High Indebtedness

In Baltic countries, Romania and Bulgaria, the growth model was associated with greater external indebtedness. Becker et al. (2010) state lending had been the determinant factor of the enhanced domestic consumption until the onset of crisis. Capital inflows and credit expansion include foreign direct investment (FDI), cross-border borrowing by banks and non-financial corporations, speculative capital short-term flows for portfolio positions, where the latter is characterized as volatile flows for financial stability (Leigh et al. 2007). By contrast, FDI consists of investment that establishes a lasting interest in domestic economies. Bulgaria and Estonia have represented the largest flows of FDI until 2008, but hence the average rates have not surpassed 5% (Fig. 6). Bulgaria and Romania have been rather attractive for foreign investors who were interesting in labor intensive production.

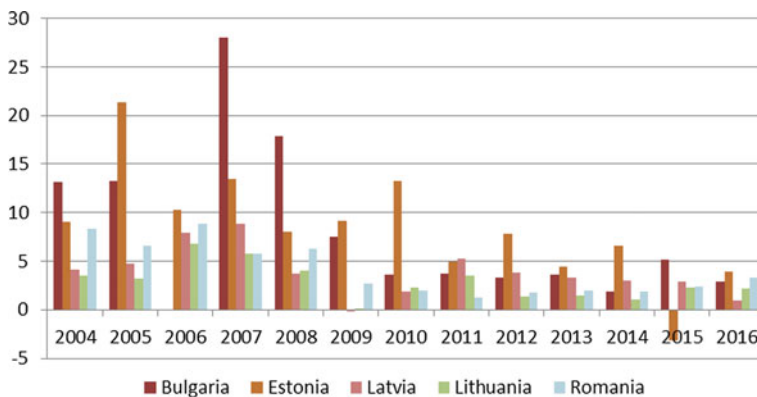
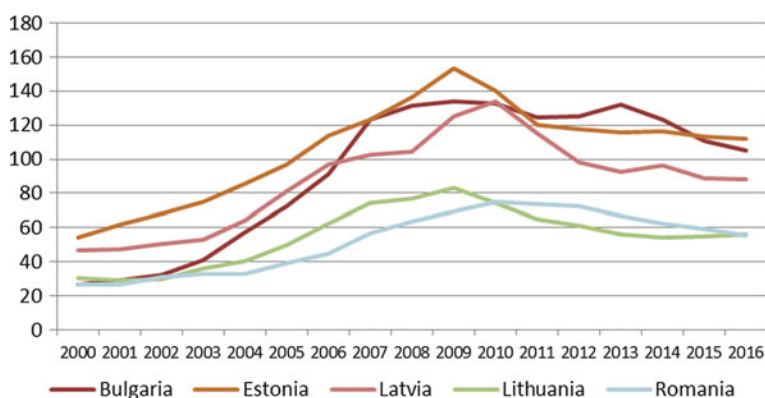


Fig. 6 Foreign direct investment (flows) % of GDP. Source Eurostat





**Fig. 7** Private sector debt % of GDP. *Source* Eurostat

Furthermore, agents and corporates were engaged in debt by acquiring the innovative financial products. Private sector lending has been one of main determinants of GDP growth. The debt of private sector<sup>4</sup> (firms and households) to GDP exploded (Fig. 7), which implies that domestic demand has been mainly financed externally in form of loans. By 2000, all countries indicated a private sector debt below 50% but until 2008 it soared up to 100% of GDP (Latvia, Bulgaria, and Estonia).

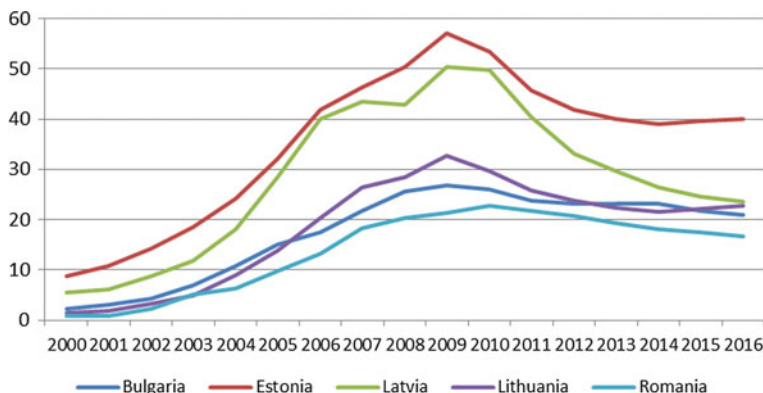
Additionally, the new banking sector inspired confidence to households inducing them to be engaged in more credit. Therefore, households were associated with indebtedness, especially in the forms of credit cards and mortgage loans<sup>5</sup> (Fig. 8). Estonia and Latvia presented household debts over 50% from 2008 to 2010. Households expected wage increases in near future as a result of income convergence policies but that also entails the deepening of current account deficit. The combination of low interest rates and higher income levels assisted households to increase their expenditure levels and validate their debts.

## 5 Vulnerabilities

Vulnerabilities involve the other side of the coin of rapid accelerating growth since they have been simultaneously enhanced. The financial system of Baltic States, Romania and Bulgaria could be regarded as bank-based oriented. That repeated cycle of credit growth expansion had led to economic growth, but was based on credit and capital inflows rather than in productivity. That process enables the augment of

<sup>4</sup>The private sector debt is the stock of liabilities held by non-financial corporations and households and non-profit institutions serving households. The instruments that are taken into account to compile private sector debt are loans and debt securities.

<sup>5</sup>The mortgage lending growth was also related to rapid growth in house prices resulting in an overvaluation of house prices.



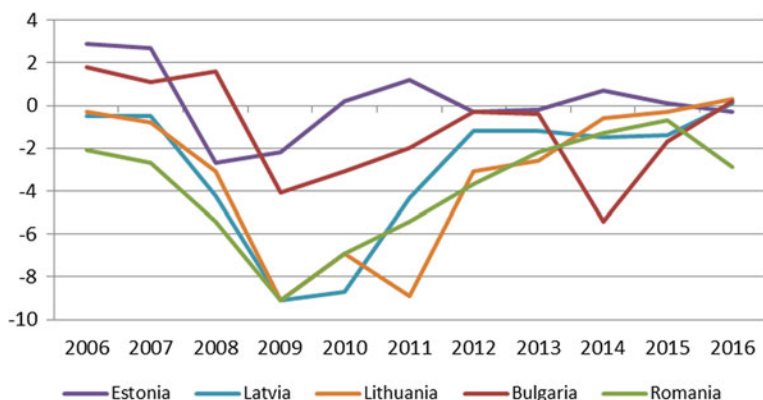
**Fig. 8** Household debt % GDP. *Source* Eurostat

growth rate in a rapid pace favoring short term financing but at the expense of long-term investment projects, resulted in large external imbalances. Government deficits were growing until 2009, deteriorating countries’ fiscal stance (Fig. 9).

The mixture of large capital inflows, credit expansions and loans led to aggravation of their current and financial account balance for almost all countries and higher inflation (Figs. 10, 11 and 12). The negative current account in Bulgaria and Latvia had overpassed 25% and 20% respectively in 2007.

Figure 12 summarizes the net borrowing position all countries had adopted prior to crisis. It indicates the sum of total current and capital accounts’ balances in the balance of payments. It had been negative from 2000 to 2008 showing that countries were in borrowing need with limited financial capacity.

The pegged exchange rate has attracted large inflows of short-term lending from European banks but that deteriorated trade balance and the balance of payments.



**Fig. 9** Government deficit/surplus % of GDP. *Source* Eurostat

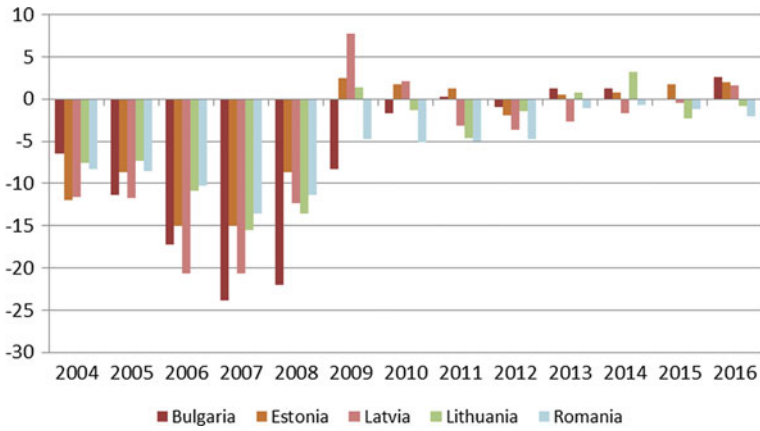


Fig. 10 Current account balance % GDP. Source Eurostat

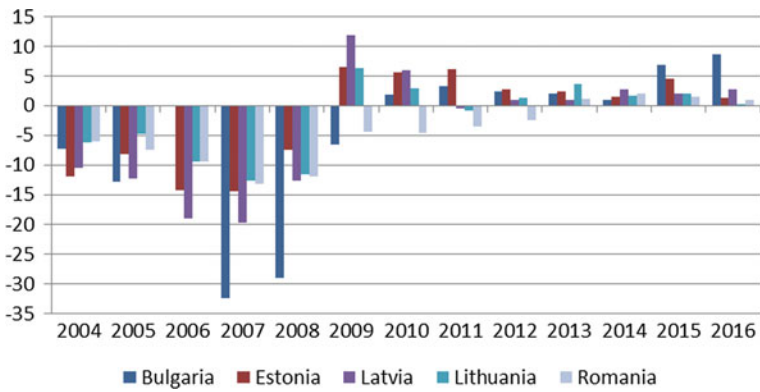


Fig. 11 Financial account balance % GDP. Source Eurostat

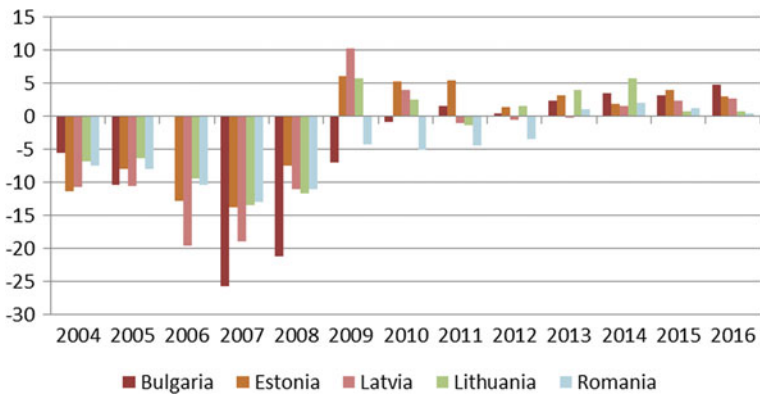
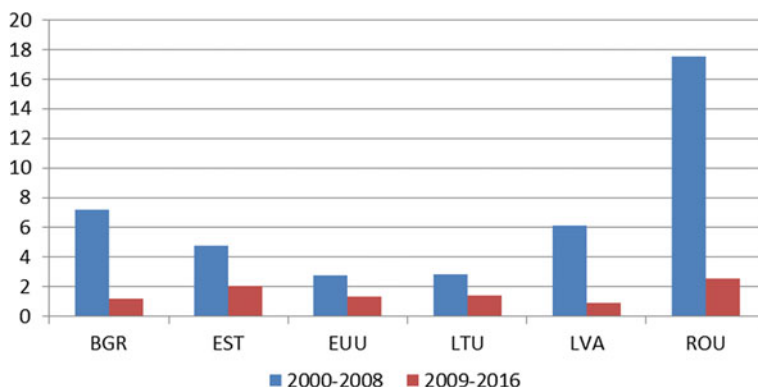


Fig. 12 Net lending/borrowing (current and capital account). Source Eurostat



**Fig. 13** Inflation, consumer prices %. *Source* World Bank

Bulgaria and the Baltic States with fixed exchange rates denoted higher credit expansions with relatively low interest rates. However, fixed rates would not facilitate these countries to deal with crisis by applying their monetary tools.

After the initial phase of credit expansion, banks become overconfident in terms of creditworthiness and optimism neglecting the implications of a distortion. As we have already mentioned, local banks were local subsidiaries and as a result there was increased reliance for loanable funds. Consequently, demand becomes dependent to domestic banking, which in turn was exposed to external factor. At banking sector vulnerabilities, the rising loan-to-deposit ratio (Fig. 14), especially for Baltic States, indicates that deposit growth could not keep the pace with credit growth.

Banks consist of the driving force of domestic economic activity. Notwithstanding, financial stability is not assured by financial development via foreign banks whilst their presence does not guarantee liquidity in times of distortions (Winkler 2009).<sup>6</sup> Therefore, liquidity may be withdrawn by subsidiaries from these emerging markets to meet their home banks' needs (Mihaljek 2009).

The domination of domestic banking by foreign banks automatically made them susceptible to any exogenous financial distortion and hence contagion effects. De Haas and Van Horen (2012) have shown that large international banks in financial crises can create cross border contagion effects across countries, potentially leading to reduction in their output. Even if there is insolvency avoidance or deposits guarantees policies, these cannot be sufficient enough in cases of contagion crisis in international level. The reason is the liquidity shortage and hence vast amount of funds will be required, since all products and financial transactions are internationally traded and cleared.

<sup>6</sup>An empirical example also stems from Peak and Rosengren (1997) who note that when Japanese banks experienced losses due to a decline in the stock market, their subsidiaries in U.S. have reduced lending more than the parent bank in home market. Also, when a foreign subsidiary bank in Croatia suffered large currency losses in 2002 the parent bank did not act as lender of last resort.

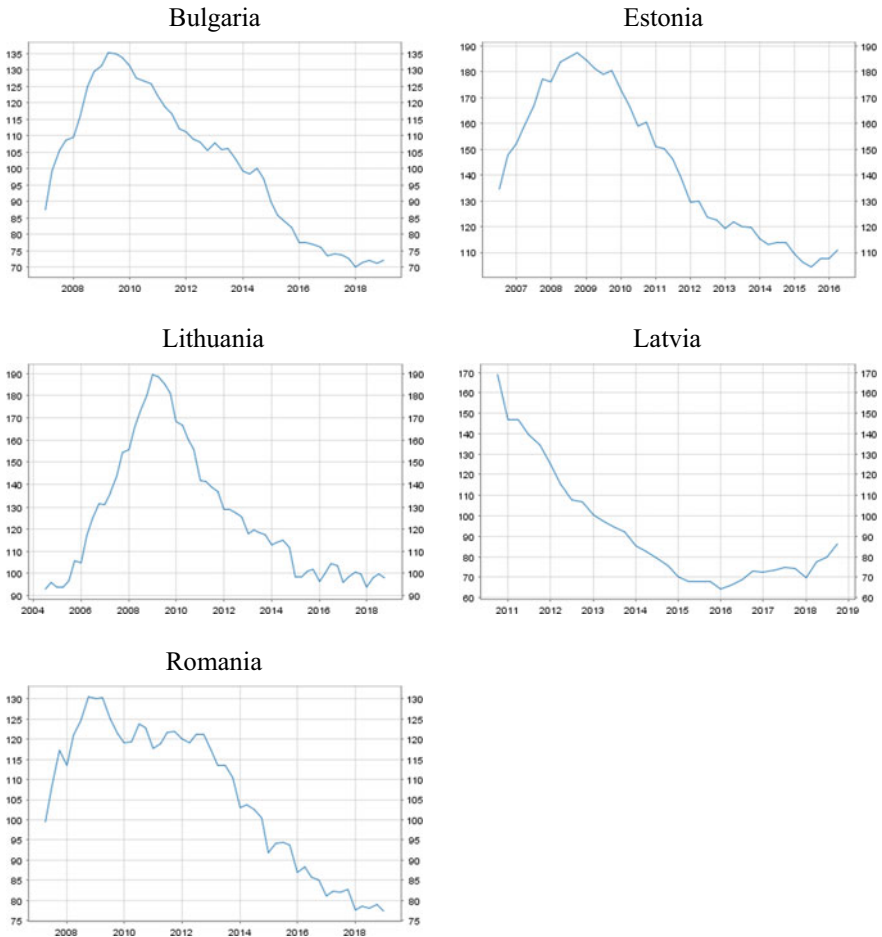


Fig. 14 Loans to deposits ratio. Source ECB

## 6 The Global Financial Crisis and Channels of Transmission

The global financial crisis was spread via international trade and financial linkages.<sup>7</sup> The Minskyan financial cycle was apparent in the US subprime crisis where the boom phase commenced with an enhanced securitization of mortgages, mainly debts as a result of the introduction of financial innovations and the bubbles in real estate sector.

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<sup>7</sup>A decrease in the price of a basic world-wide traded good, such as wheat or cotton, it is possible to influence markets, economies and domestic financial systems even if the initial shift in price has emerged somewhere else. That is because the determinant factor is the amount of the leverage of speculators and the vulnerability of these markets.

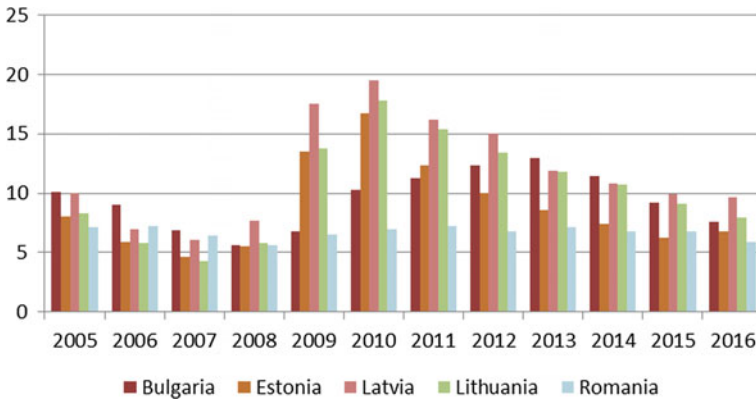
Even though the crisis originated from an advanced country, it provoked a cessation of external capital flows. International investors started to withdraw in their attempt to move towards safer positions. Whenever a financial disruptive takes place, the implications are not limited in the financial sector but it could carry away other sectors of real economy.

Contagion and spread effects have appeared to Bulgaria, Romania, and the Baltic States due to high trade and financial interdependence. The global financial crisis has influenced countries by means of various channels of transmission. The transmission channels are divided in direct, indirect, and second round effects. The direct channel operates via changes in assets' prices of financial institutions portfolios. The indirect financial channels, as well as second round effects, are arising whenever investors' confidence to domestic economy has been aggravated and is empirically denoted by retracting movements through capital flows, foreign exchange markets, real estate, money and debt markets. The transmitted channels transpired via foreign direct investments, international trade and monetary policy. The channel of international trade was evident because of the large degree of openness, due to trade integration with the EU, in the last two decades in terms of goods and services in their trade balance. In the exporting sector, the countries were rather competitive in terms of labor intensive products and raw materials. Thus, the domestic demand channel has had full impact because of the decline of external demand from the main export markets of goods and services produced in the region. The contraction of FDI has led to the deterioration of financial conditions in domestic credit. The interplay among monetary authorities and the adoption of identical monetary policy amounted to another reason which principally addressed to Bulgaria and the Baltic States with pegged to euro regimes.

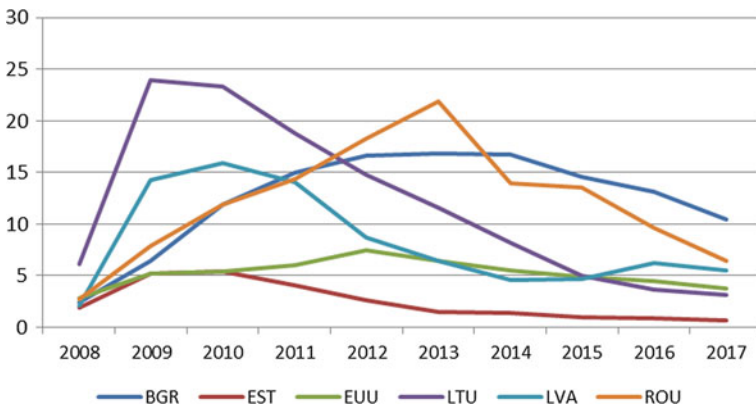
Consequently, financial institutions in Bulgaria, Romania, and the Baltic States were deleveraged and a contraction initiated as a result of the decline in foreign demand. The Baltic States, mostly, were subject to sudden capital inflows stops. Bulgaria and Romania, whose GDP growth was supplied largely by foreign capital inflows, felt sharply their reduction, because they counted on foreign capitals to finance credit expansion. Hence consumption and investment could not be easily refinanced, and unemployment (Fig. 15) had sharply increased.

The impact of global financial crisis has moderated credit and lending rates but has also deteriorated validate conditions. In Baltic States and Romania the credit growth fell by an average of more than 35% between the last quarter of 2008 and third quarter of 2009 (ECB 2010, p. 88). The high cost of financing of the economy and the further impairment in the economic perspective has forced banks to limit lending. In addition, labor market pressures render borrowers' ability to fulfill their payment commitments even more difficult. In Romania with floating rates, the depreciation in nominal exchange rates, in accordance with foreign currency, has also conduced to a rise of non-performing loans in total loans (Fig. 16). This increment was likewise noticeable in Latvia and Lithuania, where non-performing loans in total loans exceeded 20% in 2009.

A noticeable reason for contagion through expectations involves investors' psychology. The attitudes, perceptions, conventions are influenced by others actions,



**Fig. 15** Unemployment rates. *Source* Eurostat



**Fig. 16** Bank non-performing loans to total gross loans (% GDP). *Source* World Bank

in particular from those first suffered from a financial event. When psychology is modified and internationally spread, then contagion effects will probably take place to other economies as well. For instance, when agents consider the price of an asset as overpriced and wish to sell it, this attitude may be easily spread causing a massive liquidity need. This overoptimistic or pessimistic psychological behavior is not only transparent from borrowers' size but from lending size as well.

## 7 Alternative Theories of Financial Expansion and Minsky's Theory of Financial Instability

The prevailed economic theory implies that countries with more integrated financial sectors can stimulate economic growth and also are more resilient in times of crisis. However, many authors were quite reserved with this view. Arestis and Demetriades (1997) support that financial expansion and liberalization could result in a decline to savings deposits, as a consequence to an increase in interest rates driven by larger demand in capital markets. In addition, asymmetric information could cause addable problems with negative effects on savings formation, and hence, on economic growth. Prasad et al. (2003) argue that there is no clear evidence that financial integration augments economic growth in developing countries, but rather it intensifies consumption volatility. In case of transition economies, they suggest that the targets of financial supervisory, transparency, and corruption control, must be included in their agenda.

Counter to the widely held belief, Kroszner et al. (2007) refer that financial distortions have also a strong influence on real economy to the degree that amplifies the deepening of financial sector. Wagner (2010) cites that the unrelenting financial integration and diversification involve larger systemic risk. Wray (2011) states that financial liberalization and expansion may initially yield prosperity and economic growth but it could render the financial system unstable and susceptible to international financial events such as the global financial crisis of 2008. Following this view, we may now refer to Minsky's theory of financial instability.

Minsky has been an influential economist who focused on financial instability, with the interaction of finance and macroeconomics. Many of his insights could be used as a helpful tool to comprehend the financial boom and bust that had been occurred in Baltic States, Bulgaria and Romania. He made his contribution with his famous Financial Instability Hypothesis (FIH) (Minsky 1992) and his book of *Stabilizing an Unstable Economy*. Minsky noticed cycles as the outcome of an endogenous process in an inherently unstable economic system, where self-interest behavior prevails in complicated financial relations. He argued that "in order to understand short-term dynamics of cycles and the longer-term evolution of economies, it is necessary to understand the financing relations that rule, and how the profit seeking activities of businessmen, bankers, and portfolio managers lead to the evolution of financial structures" (Minsky 1993, p. 106).

According to Minsky's Financial Instability Hypothesis the financial system is unstable and becomes even more fragile in prosperity times. There are units of hedge, speculative, Ponzi.<sup>8</sup> When hedge finance is dominant, positive expectations implicitly emerge inducing all participants in financial system to be engaged in more debt. The fundamental assertion of the FIH is that "the financial structure evolves from

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<sup>8</sup>Speculative borrowers can only validate the interest payment but not the principal and thus must roll over the financing with another loan. Ponzi units cannot meet either the principal or the interest and the options left, expect for new borrowing, is to sell assets or dividends, lowering in that way the margin of safety.



being robust to be fragile over a period in which the economy does well” (Minsky 1991, p. 16). The financial instability hypothesis suggests that the economy could easily shift from hedge to speculative in times of euphoria. This phenomenon takes place in forms of risk aversion, reductions in margins of safety, as long as short term credit is easily accessed and there is a strong incentive of refinancing interest and positions, rather than the option of getting rid of debt burden. As economy expands, enterprises are willing to increase their debt levels since higher profits are coming in. Such success encourages other agents to imitate similar behavior. All the above characteristics could be traced in Baltic States, but in Romania and Bulgaria as well from 2000 to 2008. Minsky rejected the notion that financial issues are independent from the rest of the economy. When a financial incident occurs that entails to implications to real economy, which have been identified in terms of consumption, employment, investment and output, where all countries have presented a large decline.

The exchange of present capital to future, whereas present capital is used for current investment in production and future capital represents profits accrued to repay past loans. Thus, what matters in the real economy is the amount of all liabilities, loans and credit structure, and certainly asset holdings not only for the actual period but most importantly for a longer period. The latter phenomenon is significant since the shift of economy towards fragility and imbalance does not occur all of sudden but is the result of accumulated events, which had been taken place from 2000 to 2008 particular for Baltic States. Financial institutions supply the economy with credit, spending power, and thus, aggregate demand (Minsky 1986).

Minskian instability is established today in the behavior of the players. The danger of financial instability risk comes from the creditors’ side and not from debtors. It is the fear of Minskian approach that creditors cannot cope without the expected payments. It is the leverage of the creditor, not the leverage of the debtor that creates the crisis and contagion (Mayer 1999). That attitude was visible by capital outflows and deleverages process that had been observed in the countries from 2009 to 2011.

The forthcoming disruptive period or crisis as a result of the financial instability is apparent whenever borrowers can no longer finance their debts through normal channels and Ponzi units grow (i.e. increase of non-performing loans). That is where “Minsky moment”<sup>9</sup> appears, when everyone has become fully aware that indebtedness had reached its peak and repayments cannot be easily met. Apparently, Bulgaria, Romania and Baltic States have all experienced, to some extent, that moment in 2008. The access to finance became more expensive or attainable, putting pressure to firms, households and governments. The slowdown of capital inflows was operating adversely due to highly reliance on external funding.

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<sup>9</sup>Lahart (2007), ‘In time of tumult, obscure economist gains currency’, p. 1. The Wall Street Journal, August 8. The term Minsky moment was adopted by Paul McCulley, the managing director of Pacific Investment Management Company in 1998 during the Russian crisis (Lahart 2007). Hence, the term became popular even from newspapers to describe financial crises such as the sub-prime crises.

## 8 Cope with Crisis

In order to cope with crisis, measures had been taken in terms of monetary and fiscal policy. It should be noted that remedy is not similar for all countries. Fiscal expansion is feasible in advanced economy, by issuing government bonds and treasuries. Thus, agents could turn to state safety, contributing indirectly to fiscal expansion. By contrast, in developing countries, such as the Bulgaria, Romania and the Baltic states, the capital outflows render the remedy more complex. Most of the emerging economies do not have the option to expand their fiscal policy either of their large government debts/deficits, or-and from markets' unwillingness to lend them. Unfortunately, in developing countries, financial crises have the additional effects of exchange rate devaluations due to balance of payments adjustment and also a fiscal contraction. The above combination makes difficult for developing countries the application of fiscal expansion as counteractive policy. Latvia and Romania have requested and received financial assistance from IMF, EU, and other international financial institutions.

In monetary policy, interest rates were reduced to stimulate domestic demand. As far as exchange rates are concern, the central bank of Romania intervened through open market operations to defend national currency. The rest of countries with fixed exchange rates, central banks intervened in foreign exchange markets to avoid downward exchange rate trends. Perhaps exchange rate flexibility could reduce currency mismatches and help agent to consider more prudently the market prices risks.

## 9 Conclusion

Bulgaria, Romania and the Baltic States have almost adopted similar growth pattern, whereby strong capital inflows accompanied by credit expansion fuelled domestic demand and overheated the economies. Although the countries have been exporters of labor intensive products, the evidence imply that the accelerating economic growth prior to crisis was chiefly grounded on private domestic demand. The governments of Baltic States, Romania and Bulgaria have shown full confidence in the financial model.

The pattern had performed outstandingly prior to crisis. However, the impact of financial crisis has highlighted the accumulated vulnerabilities of financial instability and rapid economic growth. The global financial crisis has revealed the weaknesses not only in terms of their financial systems but also of growth based models. The financial systems were deregulated as a result of the transition period and the need to attract foreign capital. Interest rates differentials and plenty of investment opportunities have managed to accumulate foreign investors. As soon as the GFC started to unfold, contagion effects took place by means of trade and financial transmission channels, reducing capital inflows, external financing, exports, tax revenues, domestic demand, credit provisions, and also exchange rates.

Even though the presence of large foreign banks in their domestic banking systems could undoubtedly provide numerous advantages, there are also issues that need to be taken into serious consideration. The banks are subsidiaries and operate on the interests of parent banks and there is no guarantee that they will safeguard domestic financial systems or maintain credit and liquidity levels in times of financial distortions. Furthermore, they increase the possibility of spillovers effects since they automatically integrate domestic financial systems to the international level. Banking sector restructuring was further needed in accordance with adequate deposit guarantee laws and accounting methods to inspire confidence of the financial sector.

The Keynesian view suggests that in times of contraction fiscal policy should be expanded in order to sustain demand. However, public finance of Bulgaria, Romania, and the Baltic States could not afford that policy, bearing in mind the limitation of government revenues because of the restrained economic activity. In addition, financing from domestic or international markets was not an option due to the prohibitive costs of borrowing. The fact that governments had produced expansionary fiscal policies during the upward phase of credit cycle (2000–2008) has left them with rather less reserves to cope with downward phase. Advanced countries are better shielded against a financial crisis by means of greater reserves, a developed private and financial sector, greater share in international trade, and a fiscal budget ready to expand to maintain aggregate demand. The above fiscal and monetary tools of advanced countries do not apply in most developing and transition economies.

Considering the rapid economic growth countries had experienced prior to crisis, we notice that it was grounded on financial development, which has also emerged vulnerabilities. Thus, that model of economic growth was linked to financial instability that Minsky had described thirty years ago. It is the Minskyan credit cycle where higher GDP growth rates have brought confidence and optimism and an increment to most macroeconomic variables. Gazing deeper, notwithstanding, serious dynamic unstable financial indications had been nurtured. As Minsky (1986) cleverly pointed out, it is the illusionary stabilization of an unstable system. That signifies a fictitious GDP growth and stability that had actually yielded instability.

The emergence of crisis has nominated a lower but steadier growth pattern. That pattern involved emphasis in productivity and trade, deviating from high indebtedness and credit expansion. This debate arises not for the scope to disconnect economic growth to financial development but rather to pursue stability. That is a prerequisite to minimize or even avoid contagion effects to real economy in periods of adverse financial movements. Although financial globalization and liberalization was accepted by most of transition economies, the Global Financial Crisis has inducted a premonitory heed as far as the boundaries of financialisation to real economy and economic growth must be.

Finally, a rapid accelerating GDP growth model based solely on the financialisation of economy does not constitute a panacea policy since it unperceivably destabilizes the system, particular during the boom period. Bearing in mind that economic growth is desirable for each economy we observe a tradeoff between two policies. Firstly, a rapid acceleration GDP growth that could be achieved via capital inflows

and credit expansion and a modest growth pattern based primarily on domestic potentials. If one economy selects the first policy then instability is likely to rise, rendering the economy prone to international distortions. The benefits are clear, but likewise the risks. The second option reassures a sound and shielded economy, nevertheless, many years are required to attain real convergence. So how could a developing economy rapidly grow without being susceptible to financial instability? That would be an issue for further research.

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# InsurTech in CEE Region—Where Are We?



Jacek Lisowski and Anna Chojan

**Abstract** The impact of information technology innovation on development of financial markets is one of the most important trends observed in recent years. Enterprises offering such innovative solutions in finances are called FinTech (financial technology), and the branch of FinTech which focuses on insurance only is called InsurTech. Some of the most important activities that InsurTech try to improve are risk detection and risk prevention, insurance distribution or claims management process, personalization and development of on-demand insurance. The largest investments in InsurTechs are borne by countries like the USA, China, the United Kingdom or Germany, but we can observe activity in this field on smaller insurance markets too, especially in Central and Eastern European (CEE Region) countries such as Poland. The aim of this article is to review InsurTechs observed on the Polish insurance market and indicate the areas in which new technologies affect the shape of this market. The paper describes what Polish InsurTech market looks like in comparison to worldwide tendencies in this field. The conditions for InsurTech development in Poland in the face of the legal framework and act of the supervisor authority are presented. The paper describes the most important characteristics of Polish insurance markets, level of its digitization and outlines how insurance companies deal with new technologies, what solutions they introduce in their own structures and how the cooperation between InsurTech and insurance companies looks. The observed applications of new technologies on the Polish insurance market are described and the chosen InsurTech companies are briefly characterized. In the summary, the main trends in new technologies used by InsurTech are presented. The authors portray the potential future of InsurTech in Poland and compare it to technological development levels observed in other markets. The research methods adopted in the article include literature studies, analysis of information from online sources and inference.

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**Keywords** FinTech · InsurTech · Insurance

## 1 Introduction

One of the most important trends observed on financial markets is intensive development in the use of information technologies. Enterprises offering such solutions are called FinTechs (financial technology), and the branch of FinTech which focuses on insurance is called InsurTech. Big data, cyber security, Artificial Intelligence, blockchain and Internet of Things are top InsurTech trends and some of the most important issues that InsurTech tackles are risk detection and risk prevention, improving insurance distribution or claims management and processing, personalization and on-demand insurance.

Taking into account the relatively short duration of the InsurTech companies' operation, there is not many scientific publications on their functioning. Previous work, especially carried out by consulting firms or financial institutions, has only focused on the phenomenon of InsurTech, possibility of the industry's growth and possible attitude of predominantly conservative insurance markets to new technologies in the future. The most comprehensive work on the subject of InsurTech seems to be "The InsurTech book" that is a collection of dozens of short articles written mainly by startup and technology visionaries or insurance companies managers (Vanderlinden et al. 2018). None of the researches show the level of use of new technologies by Polish insurance companies and changes in this field. An interesting image of Polish insurance companies' attitude to new information technologies is given in a report published in 2018 by Accenture and Polish Insurance Association. The report "Digitization of insurance sector in Poland" presents the answers of insurance companies to key questions regarding the directions of further development in the field of digitalization (Accenture and Polska Izba Ubezpieczeń 2018). Nevertheless, the level of development of the Polish InsurTech market and the conditions of development are still not fully investigated.

The aim of this article is to indicate conditions for development of InsurTech on the Polish insurance market, especially in cooperation with insurance companies. The additional aims are to find how open insurance companies in Poland are to the use of new technologies in their structures and what Polish InsurTech industry looks like compared to worldwide leaders in this field.

The research methods adopted in the article include literature studies, analysis of information from online sources and inference.

## 2 Short History of Insurtech

The impact of information technology innovation on development of financial markets is one of the most important trends observed in recent years. This

phenomenon was initially called “financial technology” and then was reduced to the simpler form FinTech. It reflects the use of technological changes in the financial industry such as computer programs and other technology used to support or enable banking and financial services. The term “FinTech” was first used in 1993 by the president of Citicorp in the context of the research project initiated by this company (Kutler 1993). Since then, companies operating in the area of new technologies used for the development of the financial industry have gained the status of FinTechs, but there is no consensus among researchers about the unambiguous definition of this term. Worth noting is the definition proposed by Patrick Schueffel as a result of this research, namely: “*FinTech is a new financial company that applies technology to improve its operations*” (Puschmann 2017).

The technology-driven change in insurance industry could be observed from 1960 and 1970s when it was one of the first industries that used new technologies and faced the third industrial revolution, as coined by Jeremy Rifkin (Warburton 2018). Now we can see growing interest in the use of new information technologies in finances. FinTech in insurance industry, because of its common use, gained the name InsurTech. Some of the most important activities that InsurTech try to improve are risk detection and risk prevention, insurance distribution or claims management process, personalization and development of on-demand insurance.

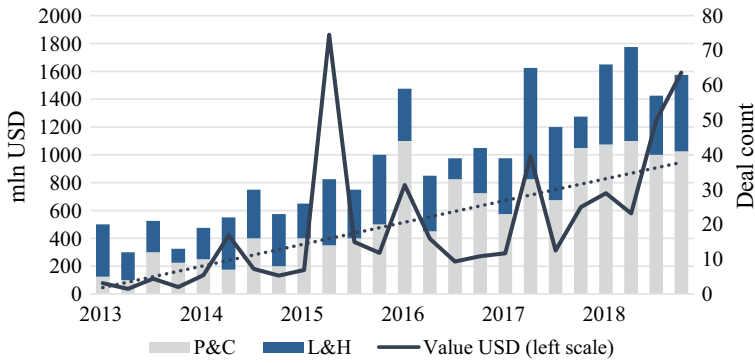
Taking the increasing prevalence of InsurTech into account, it is already possible to observe the main trends of its development. There is a possibility to divide these companies according to the technology or concept behind it, for example: sharing economy, blockchain, cyber security, big data, Internet of Things or Artificial Intelligence. Researchers at the Stockholm School of Economics have attempted to systematize InsurTechs by areas where they innovate, as follows: distribution, personalization, risk detection and prevention, on-demand insurance, Peer-to-peer solutions, underwriting, reinsurance and claim settlement and management process (Puertas et al. 2017).

According to a survey conducted by PwC, the most important trends in the development of the insurance industry using InsurTech are (PricewaterhouseCoopers 2017):

- Including more data and the complexity of models to better identify and assess risks,
- Creating products tailored to the individual needs of clients,
- Comparing products and services of various insurers,
- Outsourcing,
- Motor insurance (connected car apps, autonomous vehicles).

High expenditures incurred in the development of InsurTech are an important indicator of high interest in use of new technologies in insurance. Over the last years on the insurance market there has been a continuous increase in the number of functioning enterprises referred to as InsurTechs and an increase in investments in such enterprises. The scale of investment in InsurTech from the first quarter of 2013 to the fourth quarter of 2018, broken down into property (P & C) and life and health (L & H) insurance, is presented in Chart 1.

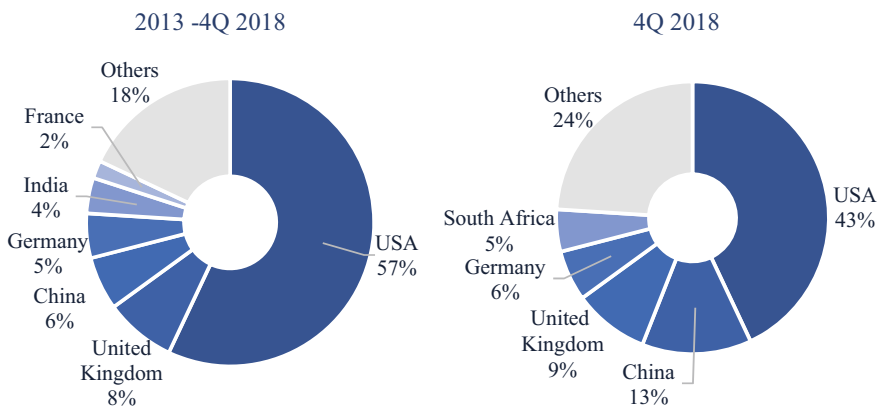




**Chart 1** InsurTech funding volume—all stages (million USD), 2013—4Q 2018. *Source* Willis Towers Watson (2018), Quarterly InsurTech Briefing Q4 2018

As presented in Chart 2, it can be seen that over the last five years leaders of InsurTech transactions (measured by value) are countries such as the USA, the United Kingdom, China, Germany, India and France. In the last quarter of 2018, the US domination over other countries was not so great as prior, whereas China’s or South Africa’s activity increased noticeably.

Confirmation of such a distribution can be found on the list of the top 100 InsurTech firms 2018 prepared by Post in association with Tällt Ventures. The methodology of assessment is based on three components: people (founding team and key principals), product (examination of core technologies, need of customers and users experience) and potential (market size, opportunities, company’s traction) (Carke 2018). 43 companies on the list come from the USA, 18 of them from Asia and 25 from Europe (12 from the United Kingdom), none of them from Central or Eastern



**Chart 2** Quarterly InsurTech transactions by target country. *Source* Willis Towers Watson (2018), Quarterly InsurTech Briefing Q4 2018

Europe. Despite this, InsurTechs also exist on such markets, in particular on the Polish market, which is described in Deloitte’s report “FinTech in CEE Region” as a market with “competitive prices, management, sales and consumer serving processes revamp” (Deloitte 2016).

The potential of CEE Region was noticed e.g. by Massachusetts Institute of Technology (MIT), which conducted 5 editions of MIT Enterprise Forum Poland, a program giving FinTech companies the support from leading Polish and international companies, possibility of presenting technologies to investors and gaining money for development. In the 5th edition there was a special path designed only for InsurTech companies—for the very first time (Fundacja na rzecz Nauki Polskiej 2018). In 2019 MIT decided to expand its action and in January 2019 started recruitment for the first edition of MIT Enterprise Forum CEE addressed to 15 countries in Central and Eastern Europe (CEO Magazyn Polska 2019b).

### 3 Polish Insurance Market

#### 3.1 Comparison with Other European Insurance Markets

Table 1 presents a few economic and development indicators in selected European countries. The volume of Polish economy measured by GDP per capita is less than half of the whole European Union. The greatest European InsurTech players belong to Best-developed European countries. GDP per capita in the United Kingdom, Germany

**Table 1** Economics and technology development indicators in selected countries in 2017

	Population (million)	GDP per capita	Smartphone penetration (%)	Internet access (%)	ICT development index
European Union	512.6	\$33,728	65	87	n.d
United Kingdom	66.04	\$39,720	71	94	8.65
Germany	82.79	\$44,470	71	93	8.39
France	67.19	\$38,477	68	86	8.24
Poland	38.4	\$15,751	67	82	6.89
Czech Republic	10.58	\$22,779	65	83	7.16
Slovakia	5.44	\$19,897	n.d	81	7.06
Hungary	9.8	\$15,648	n.d	82	6.93

Source Google Public Data Explorer, Newzoo’s Global Mobile Market Report 2018, ICT Development Index 2017, Smartphone penetration per capita in western Europe since 2000

or France is about twice as high as GDP per capita in countries in Central Europe (Poland, Czech Republic, Slovakia and Hungary).

When it comes to smartphone penetration indicator (percentage of the population owning a smartphone), Poland is on 20th place in the world (The United Arab Emirates have the best result with 82% penetration). Smartphone penetration level in Poland is higher than the score for the whole European Union and almost as high as in Western Europe countries. In 2017 82% of Poles had accessed the Internet from any device at least once, including mobile phones (the mean in developed countries is 81%). The ICT development index, based on internationally agreed information and communication technologies (ICT) indicators is published by the United Nations International Telecommunication Union and allows to compare the levels of network infrastructure and access to ICTs, use of ICTs in society and outcomes of effective ICT use among countries. The ICT development index is one benchmark measure based on 11 indicators, grouped in three clusters: access, use and skills (International Telecommunication Union 2017a). The maximum value of ICT index is 10 points and in 2017 Iceland got the highest score with 8.98 points. The values of ICT development index in selected CEE countries are at similar levels, but their values are lower than in Western Europe (International Telecommunication Union 2017b).

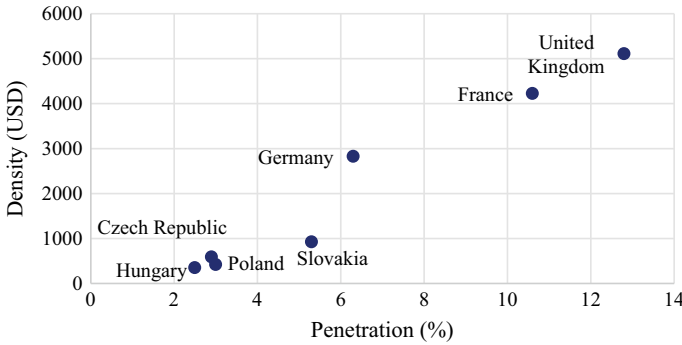
The European leaders of InsurTech development comprise the Best-developed insurance markets in the world. The analysis of insurance sector metrics in Table 2 shows that the United Kingdom, Germany and France gained in 2017 from about 19 to 24 times more total gross premium than Poland. From Table 2 and Chart 3 it can be concluded that insurance markets in Central Europe are characterized by similar levels of density and penetration.

Observations of Polish insurance markets indicate that InsurTech are a chance and a threat to insurers. On the one hand, they give an opportunity to create new insurance products, acquire new clients and develop the economy in general. On the other hand, insurance companies may fear stronger competition and market share loss (Zięba-Szklarska 2018). According to research carried out in 2016 by PwC, “Insurance’s new normal. Driving innovation with InsurTech”, almost 90% of insurance companies

**Table 2** Insurance sector metrics in chosen countries in 2017

	Penetration %	Density	Total gross premium	Market concentration of 5 top companies (2016)
United Kingdom	12.8	\$5112	\$394,100	n.d
Germany	6.3	\$2829	\$310,439	43%
France	10.6	\$4225	\$313,543	46%
Poland	3.0	\$420	\$16,499	67%
Czech Republic	2.9	\$590	\$6402	85%
Slovakia	5.3	\$925	\$5035	67%
Hungary	2.5	\$350	\$3484	58%

Source OECD Database (penetration, density, total gross premium), OECD Insurance Statistics, 2010–2017 (market concentration)



**Chart 3** Penetration and density in chosen European countries in 2017. *Source* Own study on the basis of OECD Database

believed that new technologies companies can be a threat to their income. Over half of them perceived innovations as a priority area of strategy (Digital&More 2017). Another research from 2016 carried out by Deloitte is summed up with the following statement: “*The Polish insurance sector is unlikely to completely reinvent itself and transform into a technology-driven, top-tier digital environment*” (Deloitte 2016). However, researchers expected incremental changes especially related to the improvement of legacy IT systems, back office, use of big data and offering insurance by mobile channels.

The studies on InsurTech in Poland carried out by HRK in 2018 found that 86% of the surveyed insurance companies see InsurTech as inspiration for organizations with established position on the market and create the possibility of synergy between innovative companies and traditional insurance companies (HRK 2018). Deloitte, in the report “A catalyst for change: How FinTech has sparked a revolution in insurance”, indicates that cooperation of InsurTech with insurers is necessary for the insurance industry to grow. The report shows four possible future scenarios of development: different sales channels, technology-based risk assessment, more flexible products and simple life insurance (Deloitte 2018).

### 3.2 Legal Framework for InsurTech Companies

On the European market there are many current regulations governing financial companies. Among the most important regulations concerning InsurTech sector and future directions of European authorities there are the following acts of law:

- The Payment Accounts Directive,
- The Payment Services Directive 1 and 2,
- General Data Protection Regulation,
- The Electronic Money Directive,

- Markets in Financial Instruments Directive.

In Poland, however, it can be observed that legal solutions are created to facilitate the functioning of new technologies on the financial market e.g. Regulatory sandbox KNF, Program Innovation Hub or new legal form of business.

In 2018, the Office of the Polish Financial Supervision Authority (UKNF), as part of the task of the Polish Financial Supervision Authority (in Polish “Komisja Nadzoru Finansowego”—KNF) which consists of undertaking activities aimed at supporting the development of innovation in the financial market, introduced a development program for the financial market under the name KNF regulatory sandbox. Recipients of this program are entities planning to start functioning on the financial market, which have an untested, innovative product or financial service based on modern information technologies (Komisja Nadzoru Finansowego 2018a). The conditions for participation in the project are as follows: the company’s headquarters must be placed in Poland, products or services must meet the requirements of financial institutions supervised by KNF or must be designed directly to support the activities of supervised entities, the proposed solution must have an innovative character, the company must have a real need to participate in the sandbox and must be willing to test the solution. The term of applications for admission to the sandbox expired in November 2018 and the effects of this initiative are still unknown, but the KNF already announced the next edition (Komisja Nadzoru Finansowego 2018c).

Another project proposed by KNF in 2018 is Program Innovation Hub dedicated to entities operating in the area of financial innovations. The aim of this program is to help entities, whose main barriers to business development are complex legal, regulatory requirements and ambiguity of their application in relation to innovative products or financial services (Komisja Nadzoru Finansowego 2018b). Companies can gain support from the Office of the Polish Financial Supervision Authority (UKNF) in identifying the applicable laws, regulations and supervisory recommendations applicable to a given entity, offered product or services. UKNF gives the entity information on the principles of supervision, the procedure for obtaining a permit to conduct a particular type of activity and documents and guidelines. In order to receive help an entity needs to fulfill contract forms available on the supervisor’s website.

Polish government, encouraged by Slovenian success (Leontiev 2019), decided to create a new legal form for commercial companies dedicated especially to FinTech, a simple joint-stock company (in Polish: “prosta spółka akcyjna”). The project of changes in the Commercial Companies Code was accepted on 5th February 2019 (Ministerstwo Przedsiębiorczości i Technologii 2018) and the first simple joint-stock company should emerge in the first quarter of 2020. The aim of arranging simple stock companies is to simplify the process of formation of companies and adjusting the legal form to the specifics of technology companies. According to the project, the most important changes are: minimum share capital is reduced to 1 PLN, possibility of flexible shaping of the company’s asset structure (including shares with no value), at the start-up stage: bringing know-how, work and service without complicated valuation, freedom in relation to the company’s bodies—introducing an alternative management and supervisor model, providing the founders with a greater impact

on the shape of relations with investors, electronic registration in 24 h, quick and uncomplicated liquidation of the company in case of failure or transformation into another capital company (Ministerstwo Przedsiębiorczości i Technologii 2018).

### 3.3 *New Technologies on Polish Insurance Market*

From the report of Polish Insurance Association in the topic of digitization of insurance in Poland we know that there is no fully omni-channel insurer, which means that none of the insurers could infiltrate the distribution channels and interaction with the customer, offering access to the same range of products and services using various channels (e.g. online, mobile, tablet, ATM, branch, telephone) but with the possibility of switching between channels during the sales and service process. The main reason for that is agents' reluctance to share their customers' contact data in fear of losing them for other distribution channels (Accenture and Polska Izba Ubezpieczeń 2018). Despite this, insurers place increasing emphasis on the use of the mobile channel and invest in customizing forms and websites to make their version responsive (Accenture and Polska Izba Ubezpieczeń 2018).

Taking great numbers of customers with internet connection and mobile phone users into account (look Table 1), the level of digitization on the Polish insurance sector is not high. As shown in Table 3, the possibility of buying insurance online directly on the insurer's website is rather limited. Only 59% of Polish non-life insurance companies offer some of their products online, but they are mainly just the simplest travel, motor third party liability, motor own damage and property insurance with no or limited additional options.

Only 12% of Polish life insurance companies offer the possibility of buying their products directly on their websites. Insurers sell online only the simplest life insurance—short-term, with low limits (maximum liability is 100,000 PLN) and not many additional options. The future may bring an increase in buying life insurance online as a result of cooperation of Vienna Life with InsurTech Autenti. The solution developed by these companies is going to give customers a possibility of authorization of the transactions by using an advanced electronic signature via the Internet, but at this moment this solution is unobtainable (CEO Magazyn Polska 2019a).

**Table 3** Possibilities of buying insurance and making claim notification online in Poland in March 2019

	Number of companies	Buying insurance online		Online claim notification	
		Number	Percentage	Number	Percentage
Domestic non-life companies	33	20	59%	26	76%
Domestic life companies	26	3	12%	21	81%

Source Own study on the basis of Polish insurer's websites and Google Play

About 80% of insurers give their customers possibility of notification claims online by using special form. Some of Polish insurers use mobile applications but they are dedicated to insurance agents and their aim it to simplify agents' work. In the non-life sector mobile applications for customers are offered by 14 companies (42%), but their usage is varied. Some of them can be only be used in case of damage liquidation (e.g. AXA in cooperation with Auto Online Inspection, Generali, Warta S.A. with application Warta Mobile), others allow to use telemetric (PZU S.A. with application PZU GO, Link4), some allow to make an appointment with a doctor (Zdrowie S.A., PZU S.A.) or manage policies. Good example of a user-friendly application is the one offered by Generali, which allows buying car insurance by using QR codes imprinted in a vehicle's registration documentation (Deloitte 2016). The dominant view among insurance companies is that the creation of large mobile applications, similar to the customer portal created by banks, is unprofitable, and a better solution is dedicated applications for individual process steps e.g. applications used solely to report damage or manage policies (Accenture and Polska Izba Ubezpieczeń 2018).

The observed way of policy management simplification and reporting damages is the use of chatbots. The first chatbot on the Polish insurance market was launched by Warta S.A. in second half of 2017 and gives the customers the possibility of reporting damage by Messenger (Dziubak 2017). Allianz enables buying motor third party liability insurance and motor own damage insurance by chatbot at Messenger (Allianz 2017).

The most popular insurance in Poland is motor third party liability insurance (MTPL) and the premium in this insurance is 40% of gross premium written in non-life insurance (Polska Izba Ubezpieczeń 2018). A lot of InsurTech observed on the Polish insurance market creates solutions dedicated to market insurance sector. Online price comparison engines (e.g. Rankomat, mfind and Comperia) gain increasing popularity among customers. One of the reasons for the growing interest of online searching for insurance was a significant increase in premiums for motor insurance, especially in 2016. Another trend observed on this market is use of telemetric in order to offer Usage Based Insurance (pay as you drive) to customers. This concept is based on assessing risk and adjusting costs based on the vehicle usage pattern, measured against time, distance, behavior and place. This possibility is offered by two Polish companies: Link4 (Link4 2019) and Ergo Hestia (under brand YU in cooperation with Yanosik (Nicz 2018) but there are other insurers who plan to offer telematics applications in the nearest future (e.g. in cooperation with FinTech Bacca). Ergo Hestia, selling telemetric insurance for a year, is optimistic about the future, because usage of YU's application allows to reduce damages by about 20%. The next step of YU on the Polish market is going to be pay-per-mile insurance (Uryniuk 2018).

Another problem of compulsory third party motor insurance in Poland is up-front payment of premium, which is frequently problematic to customers. Some of insurance companies offer installment payment, but usually these are much more expensive solutions. There are a few InsurTechs which allow to pay premium in installments and the loan is financed not by the insurer, but by the bank (Dziubak 2019). Cooperation of two Polish InsurTech companies: hiPRO and Braintri lead to

the creation of Connector platform, which is now tested by some of Allianz's agents. The platform allows to connect the agent with one of the banks taking part in this project (Alior and Inbank) and chosen bank carries customer's credit risk assessment (Dziubak 2018). This platform is going to expand on market, as customers already have the possibility of buying motor insurance with instalment payment in application Benefia24, offered by insurance broker Benefia Ubezpieczenia (Dziubak 2019).

An interesting trend observed on the Polish insurance market is cooperation of insurers and telecommunications companies. Play, the leader of Polish telecommunication market with 15 million active SIM cards, offers insurance by application Play Ubezpieczenia (Połowianiuk 2017). The offer includes simple products, such as health insurance, motor insurance, pet or electronic device (smartphone, laptop) insurance, that you can buy for any period. The offer is addressed to subscription customers and premium is added to the bill.

## 4 Conclusions

The past few years have been the time of fast development of new information technologies use on financial markets and in insurance industry. The USA, China, the United Kingdom, Germany and South Africa are the major players in InsurTech industry, but other countries with less developed insurance markets also try to introduce new technologies. Despite the fact that the insurance industry in Poland is smaller than in Western Europe countries, in recent years the increase in the use of modern technologies has been observed on the Polish market. Good conditions for development give relatively high results of indicators such as smartphone penetration and Internet access. These indicators show that Poland has potential for development in this field, especially in the face of the results of the analysis of Polish insurers' websites, which leads to conclusion that only part of them gives the customers an opportunity to buy insurance online, especially in life insurance sector (only 12%). Insurance offered online is usually of the simplest construction and with low limits of liability. Most of the insurance companies enable reporting damages online, but only some of them use not only an online form, but also mobile applications (usually in case of motor third party liability insurance) and chatbots, usually on Messenger.

A good factor supporting development of InsurTech in Poland are programs such as MIT Enterprise Forum Poland and MIT Enterprise Forum CEE, which gives InsurTech companies an opportunity to find investors and gain money for activity. Another factor facilitating InsurTech in the complicated law framework are initiatives by the Polish Financial Supervision Authority, e.g. regulatory sandbox and Program Innovation Hub. The new legal framework of running business (simple joint-stock company) may be a step in a right direction—simple joint-stock company, but the effects of the change will become obvious only in the future.

From the research carried out by Polish Insurance Association it could be concluded that the managing staff in insurance companies is aware of the importance of new technologies. Fear of losing clients and awareness of the possibilities



given by cooperation with InsurTech companies help the increasing popularity of new technologies use by insurance companies in Poland. Analysis of the cases of Polish insurance companies' cooperation with InsurTech companies show that Polish insurance market is changing and tries to go follow the biggest trends in the insurance industry. Taking successes of new initiatives such as YU or online price comparison engines into account, it can be assumed insurance companies will follow these trends.

The important thing is that Polish insurance market can be the beneficiary of solutions developed by international corporations which also run business in Poland. A good indication is Euler Hermes, a company owned by Allianz and specialized in trade credit insurance only. Euler Hermes appointed Euler Hermes Digital Agency (EHDA) whose aim is to reinvent trade finance and to allow all kinds of companies to manage their credit risk in the best possible way (Euler Hermes Digital Agency). EHDA test new solutions (such as single invoice cover) on more stable markets and in case of success and after some amendments expand with the solution to other countries. As a result, changes in trade credit insurance sector in Poland caused by insurance corporates worldwide are only a matter of time.

The Polish insurance market is facing a big challenge now. The insurance companies have a lot to improve in terms of providing clients with solutions based on modern technologies, but they have good insiders in the form of InsurTech companies. Considering the current speed of changes taking place on the insurance market, the high awareness of insurance managers and customers' expectations, it can be expected that modern technologies will become an indispensable element of the Polish insurance market.

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# Methods of Regulating Non-performing Loans. The Challenge for Greece



Paris A. Patsis and Konstantinos J. Liapis

**Abstract** When an economy faces financial crisis, a secondary problem occurs regarding the management of Non-performing Exposures. According to EBA and BoG, several restructuring methods have been created in order to address this problem. This paper aims to analyze all the possible methods, creating at the same time a methodology to pick the best method for each case. Using sensitivity analysis on the impact of the restructuring methods to the financial ratios of the firms we analyzed, we concluded to a technique of choosing the most appropriate method for each case. This paper has practical implications, since its findings can help distressed businesses that face liquidity, solvency and productivity problem to choose the most appropriate restructuring method in order to face financial healthier conditions, which at the moment doesn't exist.

**Keywords** Banking · Accounting · Corporate finance · Non-performing exposures

**JEL Classification Codes** G21 · M41 · G30

## 1 Introduction

High levels of NPL have a negative impact on bank lending to the economy as a result of balance sheet, profitability and capital restrictions faced by banks that experience these high levels of NPL. The deliberate and sustainable reduction of NPLs in the banks' balance sheets benefits the economy both from a micro-prudential and a macro-prudential point of view. At the same time, it is known that economic recovery is also an important factor in the final settlement of NPLs. One of the key priorities of the European Central Bank's (ECB) Banking Supervision is to address

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issues related to asset quality. This issue was dealt with for the first time in the frame of the comprehensive assessment of 2014, which consisted of two key pillars - asset quality control and stress test. Following the comprehensive assessment, the ECB's Banking Supervision intensified its work on NPL supervision. In the course of ongoing supervisory engagement, Joint Supervisory Teams (JSP) observed that banks are taking different approaches to identifying, measuring, managing and writing off NPLs. With this in mind, a high-level group was formed in July 2015, (consisting of ECB staff and national competent authorities) with a view to developing a uniform supervisory approach to NPLs. In addition, in its supervisory priorities, ECB Banking Supervision has highlighted two key risk factors for euro area banks, namely credit risk and increased levels of non-performing loans.

Without a proper management structure or an operational framework, banks will not be able to address issues related to NPLs either in a sustainable or an effective way. In accordance with international and national regulatory guidelines, the bank's governing body should approve of and monitor the institution's strategy.<sup>1</sup> For banks with high levels of NPLs, the NPL strategy and operational plan is a vital part of their core strategy. Therefore, it should be approved and coordinated by the governing body. More specifically, the governing body should:

- annually adopt and regularly review the NPL strategy, as well as the Operational Plan,
- oversee the implementation of the NPL strategy,
- set administrative targets (including a sufficient number of quality objectives) and incentives for NPL-setting activities,
- monitor periodically (at least on a quarterly basis) the progress achieved in relation to the objectives and milestones set out in the NPL strategy, including the operational plan,
- establish adequate approval procedures for NPL decisions - for large NPL exposures this should require the approval of the management body,
- approve NPL-related policies and ensure that they are fully understood by the staff,
- Ensure adequate internal controls on NPL management procedures (with particular emphasis on NPL-related activities, provisioning, collateral valuations and sustainability of regulatory measures);
- have sufficient expertise in NPL management.

The governing body and other relevant executives are required to devote part of their functions to issues related to the NPL arrangement. This should be in proportion to NPL risks within the bank. Especially when NPLs are growing in volume, the bank needs to establish and clearly document defined, efficient and consistent decision-making processes. In this context, there should be an adequate second line of defense available at all times.

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<sup>1</sup> See, also the document "SSM on the government and risk appetite", June 2016.

International experience shows that suitable operational models for NPLs are based on NPL modules that operate separately from the source of the loan. The underlying reason for this separation is the effort to eliminate potential conflicts of interest and to use specialist NPL knowledge from the level of staff to the level of senior executives. Banks with high levels of NPL should therefore constitute separate NPL workout units (WUs), ideally from the start of arrears—with a delay of up to 90 days— but no later than the classification of an NPL exposure. This split-up approach should include not only client relationship activities (e.g. negotiation of settlement measures with clients) but also the decision-making process. With this in mind, banks will have to consider establishing specific decision-making bodies for the arrangement of NPLs (e.g. an NPL committee). In cases of overlapping with the institutions, (it is rather inevitable with managers or experts involved in the lending process), the institutional framework should ensure that potential conflicts of interest are adequately constrained. It is recognized that for a number of business sectors or exposures (e.g. where specific know-how is required), the establishment of a fully segregated organizational unit may not be possible, or a longer integration period may be required. In such cases, internal controls should be applied to make sure that potential conflicts of interest are eliminated (e.g. an independent view on the creditworthiness of borrowers). Although NPL Work Units should be separated from the lending units, regular interaction between the two functions should be encouraged, for example, to exchange the information required for handling NPL inputs or to provide feedback gained from NPLs that may be important for the launch of new activities.

The purpose of this paper is to create a model that connects the Cash Flow Statement, the Profit and Loss account, the Balance Sheet the Additional Funds Need Model (AFN) (Spanos et al. 2019; Liapis and Trigkas 2019) and main Ratios. Then we will apply restructuring methods in order to evaluate how these methods affect a distressed business.

Our paper is organized as follows: After the introduction follows the Methods of addressing NPEs problem—Literature Review. Then the Methodology of addressing NPEs problem is presented followed by the Findings. Finally, conclusions are presented.

## 2 Methods of Addressing NPEs Problem

The main purpose of settlement measures<sup>2</sup> is to create appropriate conditions so that borrowers who are unable to pay their loans, can emerge from this situation or that borrowers paying their loans will not fall into the above-mentioned category. The aim of the settlement measures should always be to restore the exposure to a viable repayment condition. However, supervisory experience has shown that in many cases settlement solutions provided by banks to borrowers in financial difficulties are not fully in line with this objective and may therefore delay the implementation of actions needed in order to address quality issues of the assets, thus leading to an erroneous representation of asset quality in the balance sheet. This happens, for example, when regulatory measures include repeated periods of grace, but they do not address the fundamental issue of the borrower's excessive borrowing cost in relation to his capability of repaying it.

### 2.1 Settlement Options and Their Viability

When considering the various regulatory solutions, it is appropriate to distinguish between short and long-term settlement measures. Most solutions include a combination of different measures, possibly over a different time horizon, putting together short and long-term options. Short term regulatory measures are restructured repayment terms that are temporary and designed to deal with short-term economic difficulties, but do not deal with the final settlement of overdue debt unless combined with appropriate long-term measures. Such short-term measures should generally not last more than two years and, in the case of project finance and commercial property, one year. Short-term regulatory measures should be taken into account and provided when the borrower meets the following two criteria.

- The borrower faces a recognizable event that has temporarily compromised his liquidity. Such an event should be demonstrated in a formal manner (and not hypothetical evidence) by means of written documentation containing certain elements indicating that the borrower's income will recover in the short term or that, based on the bank's conclusion, it is not possible to provide long-term regulatory measures which are more general in nature or relate specifically to the borrower.

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<sup>2</sup>The guidance provided in this chapter relates to loan settlement as defined by EBA and explained in Sect. 5.3. See, the document "EBA Implementing Technical Standards on Supervisory Reporting on Forbearance and Non-performing Exposures under Article 99 (5) of Regulation (EU) No 575/2013". Under Commission Implementing Regulation (EU) 2015/227 of January 9, 2015, amending Implementing Regulation (EU) No. (EC) No 680/2014 laying down implementing technical standards on the submission of prudential reporting by institutions pursuant to Council Regulation (EU) 575/2013 of the European Parliament and of the Council (OJ L 48, 20.2.2015, p. 1).

- The borrower has demonstrated a good financial relationship with the bank in a tangible manner (e.g.: that he has repaid a significant part of the due capital before the incident) and a clear willingness to cooperate.

The contractual terms of settlement arrangements should stipulate that the bank has the right to review the agreed settlement measures if the borrower's situation improves and therefore it would be possible to impose more favorable terms for the bank (from regulatory arrangements back to the original terms of the contract). The bank should also consider including strict penalties in the contractual terms for borrowers who are unable to comply with the settlement agreement (e.g. additional security).

## ***2.2 Sustainable Versus Non-sustainable Regulatory Measures***

Banks and supervisors are clearly obliged to make a distinction between 'sustainable regulatory' solutions, i.e. solutions that actually help to reduce the balance of the borrower's credit facilities and 'non-sustainable' solutions. General supervisory guidelines for the classification of viable adjustment measures are presented below:

- Generally, a settlement solution including long-term measures should be considered viable only when:
  - The institution can demonstrate (with reasonably documented financial data) that the borrower has the financial capacity to realistically meet the settlement solution.
  - The settlement of arrears is fully dealt with and it is expected that the balance of the borrower's debt will be significantly reduced over the medium to long term period.
  - In cases where regulatory arrangements have been granted in the past, including past long-term settlement measures, the bank should ensure that additional internal controls are in place so that these follow-up measures meet the sustainability criteria as outlined below. These controls should, as a minimum, guarantee that the Risk Control Function is explicitly informed of such cases in advance. In addition, explicit approval should be sought from the appropriate senior decision-making body (e.g. the NPL committee).
- In general, a settlement solution including short-term measures should be considered viable only when:
  - The institution can demonstrate (with reasonably documented financial data) that the borrower has the financial capacity to meet the settlement solution.
  - The short-term measures are actually provisionally applied and the institution is satisfied and able to certify, based on reasonable economic data, that the



borrower demonstrates the ability to repay the original or agreed amount (on the whole of the principal and the interest) the short-term temporary adjustment.

– This solution does not result in multiple, successive regulatory measures for the same exposure.

- As stated in the criteria listed below, the viability assessment should be based on the economic profile of the borrower and on the regulatory measure to be granted at that time. It should also be noted that the viability assessment should be carried out independently from the source of the regulation (e.g. the borrower using regulation clauses contained in the contract, bilateral negotiation of the arrangement between the borrower and the bank, public program of measures regulation provided to all borrowers for a particular case).

### ***2.3 Types of Settlements and Final Arrangements Types of Short-Term Settlements***

Short-term types of settlement are the types of regulation with a lifespan of up to and including 2 years in cases where repayment difficulties are judged, well founded, temporary. Short-term types of regulation are the types of regulation with a maturity of up to and including 2 years in cases where repayment difficulties are judged, well founded and temporary.

- Capitalization of Overdue Debets: Capitalizing on arrears and adjusting the payout schedule of the outstanding balance.
- Arrangement of Overdue Payables: Agreement on repayment of debts arrears with a predetermined timetable.
- Reduced Payment Above Interest: Reduction of the repayment amortization rate to a level exceeding that corresponding to the repayment of interest only for a specified short-term period.
- Interest Only: Only interest is paid during a specified short-term period.
- Reduced Payment Below Interest Only: Reduction of the amortization installment to a lower level than that corresponding to the repayment of interest only for a specified short-term period. Unpaid interest is capitalized or settled.
- “Grace Period”: Suspension of payments for a predetermined period. Interest is capitalized or settled. Short-term arrangements last for less than 2 years. However, arrangements that include only short-term actions, such as those mentioned above for a specific period of time that is likely to exceed two years, will be included in the short-term arrangements.

## ***2.4 Types of Long-Term Settlements***

These are types of settlement with a lifespan of more than 2 years that aim to reduce the interest rate and/or debt. They are classified, taking into account conservative assumptions about the estimated future repayment ability of the borrower up to the expiration of the repayment deal.

- “Interest Rate Reduction”: Decrease in interest rate or interest rate margin.
- “Loan Term Extension”: Extension of the repayment term of the loan (i.e., shifting the contractual date of payment of the last installment of the loan at a period later than 2 years).
- Split Balance: Splitting the borrower’s debt into two tranches: the part of the loan that the borrower is estimated to be able to repay on the basis of his current and estimated future repayment capacity; and the remaining part of the loan, which is settled at a later date, through the liquidation of property or through another arrangement, agreed beforehand by the two parties.
- Partial Debt Forgiveness/Write Off: Final deletion of part of the total claim so that the remaining debt reaches a level which is more likely to be settled smoothly.
- Operational Restructuring: Restructuring the business, making it viable and capable of smoothly servicing its debts. The reorganization may include actions such as management change, sale of property, cost containment, corporate transformation, credit renewal and/or new loans.
- Debt/equity swap: Converting part of the debt into equity so that the remaining debt reaches a level that is estimated to be able to be settled smoothly.

## ***2.5 Final Settlement Solutions***

A final settlement solution is defined as any change in the type of contractual relationship between the financial institution and the borrower, or its termination, with the aim of finalizing the institution’s claim against the borrower. This solution may be combined with a handover (whether voluntary or mandatory) of the collateral to the institution in order to reduce the total amount of the claim or even to liquidate the collateral to settle the claim. There are several examples of solutions offered in the scope of international practices, but the adoption of each of them is examined at all times in relation to the provisions of the Greek law:

- Other Out-of Court Settlements: Extra-judicial actions that do not fall into one of the following categories.
- Voluntary Surrender of assets: The borrower, who cannot meet the repayment terms of a mortgage loan, voluntarily grants (i.e. without requiring a court action on behalf of the institution) the ownership of the pledged property to the creditor. The agreement clearly stipulates how any remaining balance is to be settled. This solution may concern a residential or commercial property.

- **Mortgage to Rent/Lease:** The borrower transfers the ownership of the property to the creditor, by signing a rental/leasing agreement, which allows the latter to lease the property for a certain period of time. This solution may concern a residential or commercial property.
- **Voluntary Sale of Property:** The borrower voluntarily makes a sale of the trusted property to a third party with the consent of the crediting institution. If the sale price falls below the total amount of the debt, the agreement clearly sets out how any remaining balance should be settled. This solution may concern a residential or commercial property.
- **Settlement of Loans:** An out-of-court agreement in which the creditor receives either a lump-sum cash payment (or cash equivalents) or a series of predetermined partial payments. Within the frame of the settlement, the crediting institution may partially waive the claim.
- **Settlement of Claims Against Terminated Contracts:** Selling the loan to another credit institution, financial institution or scheme.
- **Auction—Collateral Repossession:** The creditor wins the auction by acquiring the ownership of the mortgaged property or other collateral.
- **Auction-Collateral Liquidation:** The creditor completes the auction of tangible collaterals and collects the appropriate auction.
- **Under Legal Protection:** The loan has been handed over to Enforcement Law regulations (for example Law 3869/2010, Law 4307/2014, Bankruptcy Code, etc.) which are applied following a final court decision. To avoid misunderstandings, we note that this category does not include loans for which borrowers have already applied for legal protection and the verdict is pending. Provisional arrangements in the framework of an interim order for the payment of minimum amounts within the framework of Law 3869/2010 cannot be considered as regulations.
- **Full Debt Write-off:** The creditor decides to write off the debt as long as all out-of-court and regulatory actions have been exhausted and no further recovery is expected.

All the above-mentioned restructuring methods have been summarized in Table 1.

### **3 Methodology for Testing the Impacts of Restructuring Methods**

First, we created a model that connects a Cash Flow Statement, a Balance Sheet, an Additional Fund Need Model (AFN Model), a Profit and Loss Account and also some Ratios. Then we created a business that face financial problems (Gouma et al. 2018) in order to apply restructuring methods and see how these methods affect the business. The year noted at “t” is the baseline year the year noted as “t + 1” is the following year. Model inputs for Year “t” are calculated automatically from the Balance sheet and the Profit and Loss account (Historical Data-Brown Colour),

**Table 1** Restructuring methods

Rank	Types of settlements and final arrangements	
1	Short-term settlements	Capitalization of overdue debts
2		Arrangement of overdue payables
3		Reduced payment above interest
4		Interest only
5		Reduced payment below interest
6		Grace period
7	Long-term settlements	Interest rate reduction
8		Loan term extension
9		Split balance
10		Partial debt forgiveness/write off
11		Operational restructuring
12		Debt/equity swap
13	Final settlement solutions	Other out-of court settlements
14		Voluntary surrender of assets
15		Mortgage to rent/lease:
16		Voluntary sale of property
17		Settlement of claims against terminated contracts
18		Loan sale
19		Auction-collateral repossession
20		Auction-collateral liquidation
21		Under legal protection
22		Full debt write-off

Source ECB

while Model Inputs for Year “t + 1” are produced by us, manually (Green Colour) (Table 2).

After we put the Model inputs, the balance sheet, the Profit and Loss Account and the Cash flow Statement for Year “t + 1” are produced automatically. In addition, some other model outputs are produced and are showed in Table 3.

According to this table, this business needs additional funds of 311.000 thousand euros in order to continue the operational procedure smoothly.

Now, we will test how Debt to Equity method combined with operational restructuring (Rank 11 + 12 from Table 1) affect the business. According to the base model the AFN accounts for 311.00 euros. Using restructuring methods, we will try to eliminate the Additional Funds Needs of the company.

**Table 2** Base model inputs

Model inputs	t	t + 1
Target of sales (%)		5.00
Costs of goods sold as percentage of sales (%)	81.17	81.17
Depreciation expense % ratio of tangible assets (%)	6	6.00
Administrative expenses (%)	13	13.00
Amortizations—provisions (%)	1	1.00
Interest rate loans (%)	-7.65	-7.65
Interest rate for deposits and securities (%)	7	7.00
Losses from derivatives (%)	-25	-25.00
Revenues from subsidiaries and long term investments	16	16.00
Tax rate (%)	29	29.00
Cash target		80.000
Claims from customers (%)	4.67	4.67
Notes receivables (%)	3.00	3.00
Trading and AFS		120.000
Accounts receivable as percentage of sales		
Inventory as percentage of sales (%)	6.00	6.00
Accruals assets as percentage of sales (%)	0.47	0.47
Intangible assets		100.000
Tangible assets		1.600.000
Property assets in progress		16.000
Long term investments		40.000
Subsidiaries		52.000
Accounts payable as percentage of sales (%)	10.67	10.67
Notes payable as percentage of sales (%)	5.00	5.00
Accruals liabilities as percentage of sales (%)	0.53	0.53
Other short term liabilities (%)	0.80	0.80
Long-term loans and bonds		500.000
Other long-term liabilities		30.000
Derivatives fair value		16.000
Dividends to common		-
Common stock		80.000
Reserve above par		160.000
Other reserves		20.000

Source Authors own work

**Table 3** Base model outputs

Model outputs	t	t + 1
NOPAT	32.660	35.390
Net operating working capital	99.000	109.733
Total operating capital	1.355	1.449.433
Free cash flows (FCF)	–	59.043
AFN		311.065
Ratios	t	t + 1
Current ratio	0.98	0.67
Inventory turnover	13.53	13.53
Days sales outstanding	27.98	28.00
Total assets turnover	1.58	1.59
Debt ratio (%)	70.19	72.64
Profit margin (%)	0.00	0.03
Return on assets (%)	0.00	0.04
Return on equity (%)	0.00	0.25
(NOPAT/Total operating capital) (%)	2.41	2.44

Source Authors own work

## 4 Findings

As far as the operational restructuring is concerned, the firm decided to alter the Cash Target from 80.000 to 50.000, to sell some assets with value 200.000 and alter the Trading and AFS from 120.000 to 70.000. In addition, due to Debt to Equity method of restructuring, the long-term Loans and Bond account for 300.000 from 500.000 and the Common stock accounts for 280.000 from 80.000. The second column demonstrated the “t + 1” year as shown earlier and the third column the inputs after incorporating the 2 methods of restructuring (Green Colour) (Table 4).

As far as the Model outputs are concerned (Table 5), the main change we expected and occurred is that the debt ratio decreased from 72 to 41%. Return on Equity increased from 0.25 to 3.19%. These two are the main changes from the restructuring methods applied to the company. In Cash Flow Statement, the main difference is the opening cash balance. This is due to the change to the Cash Target we assumed as part of the operational restructuring. At last, very important is the AFN before and after the restructuring methods. Before the restructuring methods the company needed 311.000 euros while after the restructuring method the company needs – 7.528 euros allowing the company to increase its capital. This shows clearly how the restructuring methods influenced the financials of the company (Tables 6 and 7).

Table 4 Model inputs

Model inputs	t	t + 1 before restructuring	t + 1 after restructuring
Target of sales (%)		5.00	5.00
Costs of goods sold as percentage of sales (%)	81.17	81.17	81.17
Depreciation expense % ratio of tangible assets (%)	6	6.00	6.00
Administrative expenses (%)	13	13.00	13.00
Amortizations—provisions (%)	1	1.00	1.00
Interest rate loans (%)	-7.65	-7.65	-7.65
Interest rate for deposits and securities (%)	7	7.00	7.00
Losses from derivatives (%)	-25	-25.00	-25.00
Revenues from subsidiaries and long term investments (%)	16	16.00	16.00
Tax rate (%)	29	29.00	29.00
Cash target		80.000	50.000
Claims from customers (%)	4.67	4.67	4.67
Notes receivables (%)	3.00	3.00	3.00
Trading and AFS		120.000	70.000
Accounts receivable as percentage of sales			
Inventory as percentage of sales (%)	6.00	6.00	6.00
Accruals assets as percentage of sales (%)	0.47	0.47	0.47
Intangible assets		100.000	100.000
Tangible assets		1.600.000	1.400.000
Property assets in progress		16.000	16.000
Long term investments		40.000	40.000
Subsidiaries		52.000	52.000

(continued)

**Table 4** (continued)

Model inputs	t	t + 1 before restructuring	t + 1 after restructuring
Accounts payable as percentage of sales (%)	10.67	10.67	10.67
Notes payable as percentage of sales (%)	5.00	5.00	5.00
Accruals liabilities as percentage of sales (%)	0.53	0.53	0.53
Other short term liabilities (%)	0.80	0.80	0.80
Long-term loans and bonds		500.000	300.000
Other long-term liabilities		30.000	30.000
Derivatives fair value		16.000	16.000
Dividends to common		-	-
Common stock		80.000	280.000
Reserve above par		160.000	160.000
Other reserves		20.000	20.000

Source Authors own work



Table 5 New model cash flow statement

Cash flow statement	t + 1 before restructuring	t + 1 after restructuring
<i>Operating cash flow</i>		
Earnings before taxes (EBT)	1,222	25,308
<i>Adjustments for the reconciliation of net income to net cash flows from operating activities</i>		
Depreciations	102,300	96,300
Losses from derivatives	4,000	4,000
Revenues from subsidiaries and long term investments	-14,720	-14,720
Amortizations—provisions	31,500	31,500
Loans interest—interest and similar income from deposits and securities	59,343	41,257
<i>Increase/Decrease in</i>		
Claims from customers	7,105	7,105
Notes receivables	4,500	4,500
Inventories	9,000	9,000
Accrual assets	805	805
<i>Increase/Decrease in</i>		
Accounts payable	-16,105	-16,105
Tax liabilities	34,823	31,330
Notes payable	-7,500	-7,500
Accruals	-695	-695
Short and long term liabilities	-7,200	-7,200
<b>Cash from Operations</b>	<b>208,378</b>	<b>204,885</b>
<i>Investing cash flow</i>		
Intangible assets	-10,000	-10,000
Tangible assets	0	-200,000
Subsidiaries	0	0
property assets in progress	-8,000	-8,000
Long term investments	0	0
Trading & AFS	0	-50,000

(continued)

**Table 5** (continued)

Cash flow statement	t + 1 before restructuring	t + 1 after restructuring
<b>Cash from Investing</b>	<b>-18.000</b>	<b>-268.000</b>
<i>Financing cash flow</i>		
Increase (Decrease) Debt	-71.065	447.528
Increase of share capital after deducting expenses	15.000	-185.000
Repayment of loans (interest and capital) and other changes in funds	-114.312	-149.414
<b>Cash from Financing</b>	<b>-170.378</b>	<b>113.115</b>
<b>Net increase in cash, cash equivalent</b>	<b>20.000</b>	<b>50.000</b>
<b>Opening cash balance and cash equivalent</b>	<b>80.000</b>	<b>50.000</b>
<b>Opening cash balance and cash equivalent</b>	<b>100.000</b>	<b>100.000</b>
<b>Control point</b>		
183.645	183.645	183.645

Source Authors own work

Table 6 New model output

Model outputs	t	t + 1 before restructuring	t + 1 after restructuring
NOPAT	32,660	35,390	39,650
Net operating working capital	99,000	109,733	26,240
Total operating capital	1,355,000	1,449,433	1,147,940
Free cash flows (FCF)		-59,043	246,710
AFN		311,065	-7,528
<b>Ratios</b>	t	t + 1 before restructuring	t + 1 after restructuring
Current ratio	0.98	0.67	0.88
Inventory turnover	13.53	13.53	13.53
Days sales outstanding	27.98	28.00	28.00
Total assets turnover	1.58	1.59	1.87
Debt ratio (%)	70.19	72.64	41.64
Profit margin (%)	0.00	0.03	0.57
Return on assets (%)	0.00	0.04	1.07
Return on equity (%)	0.00	0.25	3.19
(NOPAT/Total operating capital) (%)	2.41	2.44	3.45

Source: Authors own work

Table 7 New model balance sheet

ASSETS	t	Differences	t + 1 before restructuring	Differences	t + 1 before restructuring
<b>Current assets</b>					
Cash	100.000	20.000	80.000	50.000	50.000
Claims from customers	140.000	-7.105	147.105	-7.105	147.105
Notes receivables	90.000	-4.500	94.500	-4.500	94.500
Inventories	180.000	-9.000	189.000	-9.000	189.000
Trading & AFS	120.000	0	120.000	50.000	70.000
Accrual assets	14.000	-805	14.805	-805	14.805
<b>Total current assets</b>	<b>644.000</b>		<b>645.410</b>		<b>665.410</b>
<i>Fixed Assets</i>					
Intangible assets	110.000	10.000	100.000	10.000	100.000
Tangible assets	1.600.000	0	1.600.000	200.000	1.400.000
Accumulated depreciations	-570.000	-101.700	-468.300	-83.700	-486.300
Net fixed assets	1.030.000		1.131.700		913.700
property assets in progress	24.000	8.000	16.000	8.000	16.000
<b>Total fixed assets</b>	<b>1.164.000</b>		<b>1.247.700</b>		<b>1.029.700</b>
<i>Other non current assets</i>					
Long term investments	40.000	0	40.000	0	40.000
Subsidiaries	52.000	0	52.000	0	52.000
<b>Total assets</b>	<b>1.900.000</b>		<b>1.985.110</b>		<b>1.687.110</b>
<i>Liabilities</i>					
<i>Current liabilities</i>					
Short term loans + AFN	110.000	-311.065	421.065	7.528	102.472

(continued)

Table 7 (continued)

ASSETS	t	Differences	t + 1 before restructuring	Differences	t + 1 before restructuring
Accounts payable	320.000	-16.105	336.105	-16.105	336.105
Tax liabilities	35.000	34.823	177	31.330	3.670
Notes payable	150.000	-7.500	157.500	-7.500	157.500
Accruals	16.000	-695	16.695	-695	16.695
Other short-term liabilities	240.000	-1.200	252.000	-1.200	252.000
<b>Total current liabilities</b>	<b>655.000</b>		<b>956.743</b>		<b>641.641</b>
<i>Long-term liabilities</i>					
Long-term loans and bonds	740.000	240.000	500.000	440.000	300.000
Provisions	104.000	-31.500	135.500	-31.500	135.500
Other long-term liabilities	24.000	-6.000	30.000	-6.000	30.000
Derivatives fair value	16.000	0	16.000	0	16.000
<b>Total long-term liabilities</b>	<b>884.000</b>		<b>681.500</b>		<b>481.500</b>
<i>Equity</i>					
Common stock	80.000	0	80.000	-200.000	280.000
Reserve above par	175.000	15.000	160.000	15.000	160.000
Other reserves	20.000	0	20.000	0	20.000
Retained earnings	86.000	-867	86.867	-17.969	103.969
<b>Total Equity</b>	<b>361.000</b>		<b>346.867</b>		<b>563.969</b>
<b>Total Liabilities</b>	<b>1.900.000</b>		<b>1.985.110</b>		<b>1.687.110</b>
Required assets			1.985.110		1.687.110
Specified sources of financing			1.674.045		1.694.638
Additional funds needed (AFN)			311.065		-7.528

Source: Authors own work

## 5 Conclusions

Non-performing Exposures is a problem of great importance. All the methods proposed by the ECB and the banking supervising authorities are very important. In our example we showed clearly that the methods have actually impact on the company. This model can be used also for Business Plans, budgets, restructuring plans.

In future analysis we are going to test all the methods separately in order to see how these affect the distressed companies. In addition, we are going to use sensitivity analysis to test also these methods under uncertainty conditions. This research may be very helpful for banks and businesses since it may help them to make the best choices when firms face financial problem in order to restructure them.

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# Qualitative Criteria and the Performance of the Global Economy



Efstratios Kyriotelis, Nikolaos Arnis, and Georgios Koliass

**Abstract** The economic analysis of the crises has shown that humanity is confronted with the crises with accumulated experience, the world view and the tools of the science. The 2008 crisis is global and requires universal solutions. This was done through the cooperation in global level, on an economic basis, imposed by economic laws. Global society requires global governance, and a scientific management system that can be implemented and operated as a whole. Cooperation at a global level is objectively imposed, and it has been institutionalized in the G20, the birth of continuing and worsening crises. Governance using quantitative economics alters the qualitative characteristics, alleviating the strong local coherence, promoting false historical truth, dismantling the state economic structure, dissolving the productive potential of economies, and turning states into consumers, rather than producer states. The handling of the 2008 general economic crisis, by a new mechanism, is not traditionally but consistent with economic security, as part of the global security. This is a completely new approach in regulating the economy, putting new qualitative characteristics in the directorate sphere. The new issues arising here is that for the first time, the handling of the economic problems is not traditional; it is not proposing economic policies in correcting quantitative indicators, i.e. monetary policy, taxation, increase or decrease of production, investment, consumption, circulation of money etc. Instead, new qualitative measures are proposed to regulate the economy on the basis of global security. The issue of global security is also intertwined with the issue of investment in the global economy. Capital, labor and technical progress are moving together, and this movement is complex, it is balanced or counterbalanced and is associated with their asymmetric or symmetrical development. Thus, for an

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aggregate evaluation of the global economic performance it is necessary to have certain criteria to evaluate the results of the actions taken.

**Keywords** G20 · Economic security · Globalization · International institutions · Governance

**Jel Classification Codes** F20 · F40 · F50

## 1 Introduction

The issue of global governance of the unified world economy that manifests itself in the two economic systems becomes central, and to a certain extent has become a question of a global political economy. The role of the political economy remains irreplaceable in the new world reality and is a measure of quality and use of economic laws, providing the exact knowledge with the dialectics between politics and the economy.

The global economy is dismantled and capitalism is turning to the pursuit of monopolism, where it puts all its strength. The general crisis of capitalism, however, resulted in the linking of conditions with the crisis, but also at the same time the influence of the outcome on the conditions and causes that create the crisis. Thus, the crisis is transformed into an open system that evolves dynamically and is backed by the results it generates. This mechanism radically alters the system's operation, subordinates it and dictates its own terms, which in turn exert a tremendous influence on the movement of the system. This in turn leads to tensions and conflicts and aggravates world-wide crises. Thus, all subjects perceive to one degree or another the need for the democratization of these new processes. The forces of the existing international institutions of both economic systems are involved as regulating mechanisms. These institutions, and the mechanisms that can be set up between institutions, will determine the political economy in the sphere of directorate, control and governance.

The objectives of the study are to investigate the new characteristics of the globalized economy. One of the most important areas affected by globalization is the economy and specifically the management system, the governance and control mechanisms of the global economy. In this case the target of this paper is to contribute in the issue of global security as a new method to regulate the global economy. Under this new approach, evaluation of global economy trends under quantitative and new qualitative criteria proposed. This article, is not proposing economic policies in correcting quantitative indicators, i.e. monetary policy, taxation, increase or decrease of production, investment, consumption, circulation of money etc. Instead, new qualitative measures are proposed to regulate the economy on the basis of global security. It traces the measures proposed and the performance of the economy, under certain economic criteria, quantitative and qualitative. Adhered to this, the relation between the qualitative solutions proposed and the quantitative performance of the economy is investigated.



## 2 Deregulation and Geostrategic Regulation of Global Economy

Globalization refers primarily to the integration of national economies into a global economy, triggering the process of “deleting” national borders, while internationalization is a product that stems from the diffusion of national into the international. Integration signifies the fusion of two parts to compose a new one, resulting thus in the decomposition of the parts from which it has been created. The erosion of national structures and the squandering of productive sources is no longer a national problem affecting each country separately, but impacts global society as a whole. The validity of the universal economic laws takes precedence over the fragmentary and piecemeal development of the different countries and markets, while the relationships between countries and markets are the vascular system through which these laws are expressed in the economy. The acceleration and regulation of global development processes, or their delay and deregulation, are directly dependent on the texture of the vascular system, the system of relationships.

The dissolution of the global markets is a contradictory movement, assuming different forms and going beyond deregulation in the sphere of management, circulation and production. The markets lost their identity and began to operate as a basis for the dominant powers which were in a position to promote their own interests. At the same time as the international markets, the fragmentation of the domestic markets transferred its effects into the international sphere.

The deregulation of global movement is caused by anarchic capital flight from the countries and regions; the labor force also moves in an anarchic way in search of capital, and this is manifested in the violent migration of both capital and labor force. This process is under geostrategic regulation of the economy and is subordinated in the supranational capital. The supranational capital is lacking from management methods, which are able to provide a global directorate system. Geostrategy is being developed as the subsystem of economic regulation in basic line of fulfillment of unipolar global governance. For that reason, the supranational class is recourse to geostrategy to manage the global economy. Geostrategy is connected with unipolar governance, which is destroys the productive forces and threatens the man-nature system. This direction is that of geostrategy, the line of achieving its goals with no regard for the cost to the productive forces, deregulating the global economy and distorting the movement of capital and the labor force. Geostrategy is continuous, long-term and flexible, similar to planning but with a different content.

The problems that arise have complex repercussions and there is no previous experience on how to resolve them. There is, however, the historical accomplishment which provides suggestions on resolving the basic problems in a scientifically valid way. The unified orientation and universal conception of the problems has already begun to be shaped in the global consciousness. The global economy contains a potential that is not the sum of the local economies but exponentially larger, because the quality of synergy operates through the cooperation and complementarity of the markets and the international division of labor. This direction is that

of the New Political Thinking based on the New View of the world and the Program of General and Complete Security (PGCS), which is manifested in a special way in the economy. A new element under the conditions of the 2008 GECC is that two messages are broadcast, formally realist and determinist, which are initially accepted by the supranational capitalist class and supranational capital, and resort to the institutional guarantee of the G20.

### 3 Global Economy and Security

The 2008 crisis checked the aims of supranational capital and unipolarity in global governance, forcing the US to request the assistance of the international community to handle the crisis. Having recourse to cooperation is an objective movement with specific significance, as well as the fact that this cooperation was institutionalized in the G20, an institution born of the 1990s crises and confronted with the general crisis of 2008.

The G20 imposes from its core the universal nullification of this tension and violence. From this same core derives the change of the geostrategic line of supranational capital in its geopolitics and geoeconomics, resolving the crisis. In this context a reevaluation of the control of global economy is recommended, i.e. their necessary regulation, both functional and structural. This process has also been on the G20 agenda since the appearance of the 2008 general crisis and its first accords. This is the implementation of the relevant concern during the decades preceding the 2008 crisis, which matured rapidly during the great upheavals caused by the crisis. It is apparent from the establishment of the G20 that the peace dividend expected from these accords was already a basic programmatic aim, while the logical approach to the dialectical unity of this analysis of the issues it handles is based on the theoretical-methodological practice, the New View, the New Political Thought and the PGCS. Consequently, the logic of this agenda approaches the objective assessment of the supranational capital, initially as a complex, difficult function beyond the limits of elementary, market-based and anarchic bourgeois thought and practice.

The G20 document that emerged from the 2009 London summit does not mention the general crises and associated issues, but it is based in *global security*. In other words, the handling of the 2008 GECC is not traditionally bourgeois, but consistent with the PGCS and one of its components, *economic security* (University of Toronto). The regulation concerns economic security, which touches upon the issue of investment in the global economy, and constitutes a structural reform against neoconservative development, which is summarized in intelligent entrepreneurship, the military industry (The Strategic Defense Initiative 2015), and the virtual economy, where the defining quality of money of buying everything is applied in the invented Enron-type (Encyclopedia Britannica) investment field of creative accountancy. Economic security also covers the intelligent management of the “model” advisor on business, entrepreneurship, development and all such things, with offshore companies,

NGOs, the dead ends of *tax havens* (Broomfield 2016), where dollars, euros and other currencies are laundered and stagnate.

The negotiation of ecological security from G20 was, as expected, a multifaceted and nuanced issue. This, together with the reduction of the above and the environmental crisis to a parameter of the 2008 GECC, confirms, separately and together, the identity of the latter. The geostrategically steered condensation of this reduction into *green growth*, (International Bank for Reconstruction and Development), although obviously far from expressing its full meaning,<sup>1</sup> reveals the dead ends of market mechanism, regarding virtual development. Moreover, the ecological dimension of security or environmental regulation of the environment presupposes a universalist approach (ICAO Environment, Emission Trading System), which was established as such in global public discourse decades earlier, particularly in the first five years of the 1970s in connection with the 1974–75 general crisis.

At the G20 Summits, the self-evident and front-line management of another dimension of the 2008 general crisis was also raised, that of *humanitarian security*, the starting point of which is the right to work and decent working conditions. As in the case of the General Environmental Crisis (GEC), the content of the new arrangement is the answer of the G20, indeed of humanity, to the labor problem. The G20 London Summit resulted in a conciliatory document, in line with the participating interests and their structure and quality, the conflicts among which create and perpetuate this problem. This compromise does not, of course, solve the problem of humanitarian security, much less from the point of view of the workers. The question also remains open regarding the measures, programs, policies, financial aid packages, etc. intended to handle humanitarian security, since their starting-point is the reduction of unemployment, and also regarding the threats to the system from rising unemployment and the surge in migration. It is also a given that the most condensed development index of a capitalist country is the rate of wage labor in the active population, and that capital, before producing a profit, inevitably creates the conditions for wage labor, which is a deterministic process. In summary, the problem of humanitarian security is not resolved in the aforementioned conciliatory document. This would be impossible to do within the limits of the participants in the mechanism regional and universal conflicts.

Capital, labor and technical progress are moving together, and this movement is complex, it is balanced or counterbalanced and is associated with their asymmetric or symmetrical development. At global level, reality puts the issues more specific and distinct, because the applies the law of continuity, where everything that comes out throws its unsustainable elements, keeping only the sustainable ones.

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<sup>1</sup>Green growth means dismantling agricultural production of semi-colonial countries for export food to US. Sustainable development is synonymous with the dismantling of agricultural production in the region of non-development countries. The comparative advantages have been shifted—desertification of industrial areas (Pennsylvania – Pittsburgh). Sustainable, clean growth-economy is a trait of monopolies. exit from the crisis by boosting demand (new classical economy). Technological pessimism (uninhabited planet, uninhabited countries, climate-environment phobia). This pessimism is a denial of Scientific – Technical Progress capabilities.

This global reality includes the interdependence of the two socio-economic systems, both in their confrontation and in their co-operation. The explanation of this interdependence lies in the action of the subjects and the influence of the objective laws, and this interaction will determine the form of the globalized economy. The form will also be judged by the contrast between the class approach that is outdated and as a remnant of the outdated urban, classical way of thinking and the supreme, new ecumenical. They are, however, two realities, with class-based thinking being an obstacle to the second, ecumenical and distorting the move towards globalization. It is, of course, a joint conclusion, but it does instill real-world issues that cannot be hidden either in class or ideological. This was done through the cooperation of the two systems, on an economic basis, imposed by economic laws.

Therefore, cooperation at a global level is objectively imposed, and it has been institutionalized in the G20, which is the “sprout” of continuing and worsening crises. G20 has reassessed global security arrangements as a basic prerequisite for the liberation of the productive forces and their development. The application of the above law is not automatic, and its unsustainability is an obstacle to growth and the fleeing of mankind forward. The world community is showing signs of compromise when problems are also global and are seeking universal solutions.

The new issues arising here is that for the first time, the handling of the economic problems is not traditional; it is not proposing economic policies in correcting quantitative indicators, i.e. monetary policy, taxation, increase or decrease of production, investment, consumption, circulation of money etc. Instead, new qualitative measures are proposed to regulate the economy on the basis of *global security*.

## 4 Qualitative Versus Quantitative Criteria

Thus, for an aggregate evaluation of the global economic performance it is necessary to have certain criteria to evaluate the results of the actions taken. The criteria proposed are a combination from the commonly considered, modified in globalized economy and new, which are derived from the previous analysis.

The criteria commonly considered include, among others, the following (Bornstein 1979):

1. The level of output (revised: for the global economy.)
2. The rate of growth of output (revised: for the global economy.)
3. Stability (of output, employment, prices.)
4. Economic security of individuals, (security of income and/or employment— Revised: at the level of nation-state.)
5. Equity (involving both an “appropriate” degree of inequality of income and wealth, and equality of opportunity. – Revised: at global level.)

The new criteria proposed are the following:

1. FDI equality (the rate of FDI change between developed and underdeveloped countries is presupposed to be the same when there is investment security.)

2. The rate of industrialization by country, (the rate must have a tendency towards the world average for every country.)
3. The percentage of businesses integrated Corporate Social Responsibility in their operations.
4. Number of embargoed and sanctioned countries.
5. Rate of emission reduction. (with further consideration and/or revision, and development.)

The new qualitative measures are proposed to regulate the economy on the basis of global security. The qualitative proposed criteria concern each one and all together the regulation of the global economy and the basic content of the economy. Economic security regulates the movement of capital in global economy. The FDI net inflow indicates this movement among countries and is connected with the issue of investment security. The rate of industrialization by country is also concerns the quality of the economy and it is also connected with the issue of economic security. The humanitarian security, concerns the regulation of movement of labor force, concerning the reduction of unemployment and the balancing of migration. In this work we propose an additional quantitative criterion, the *net migration*. Rate of emissions is connected with the ecological dimension of security or environmental regulation of the environment. The issue of corporate social responsibility concerns the socially conscious society and business, social issues management, public policy and business, stakeholder management, corporate accountability. Corporate social responsibility is connected with the includes corporate citizenship and corporate sustainability. Both corporate social responsibility and rate of emissions concern the issue of preservation of social wealth and the man-nature system. This is the regulation and the rational development and use of scarce resources. Finally, the number of sanctioned and embargoed countries are connected with the global security. Global security arrangements are the basic prerequisite for the liberation of the productive forces and their development.

#### ***4.1 Materials and Methods***

The engagement of the unity of the objective or subjective criteria of economy performance no longer requires the cognitive quantitative analysis but also is a key factor the interconnection of them, which constitutes a sphere covering the global sphere. This perception recognizes the possibility arises from a specific economic action as the initiator for another, so the isolation and abstractive analysis to become very difficult, ignoring the dynamics of the intertwined development at global level. Each economic action can be lurking in the outburst of firing of another variable regardless of their geographic, financial or social proximity, so as to address the economic phenomena in the globalized economy it might lead to a global reflection and create a new situation which cannot be explained but only by its association. It becomes multi-level challenge the explanation to global economic effects and the more multilevel

interference from corporations, states, international institutions the more effective is the identification of each variable and its interconnections, in confronting the causes as well as solution's initiation.

Examining the affinity between the quantitative and qualitative criteria an aggregate evaluation of the global economic performance will be made. The performance of the global economy under the consideration of the proposed qualitative criteria in this work is a first attempt of assessing their efficiency in order to explain the intertwined globalized economy, the movement of capital and labor force at global level and can be extended in several ways.

This paper compares the two groups of criteria in regard of their ability to illustrate the quality of the global economy and its quantitative performance. The analysis is based on three out of the 5 listed qualitative criteria, namely the FDI equality, the rate of industrialization and the emission rate, adding the new proposed criterion, the net migration. Qualitative indicators: FDI net flows refers to direct investment equity flows. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy. The industry value added is the indicator used to represent the rate of industrialization. Industry corresponds to International Standard Classification of All Economic Activities ISIC divisions 10–45 and includes manufacturing, mining, construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. Net migration is the net total of migrants during the period, that is, the total number of immigrants less the annual number of emigrants, including both citizens and noncitizens.

The group of countries are selected according to World Bank ranking and G20 countries as separate group, when there a sum of G20 countries then Germany, France, United Kingdom, Italy are not counted at the G-20 total because they are included in the EU total. For the current 2019 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method: low income economies, including 34 countries; middle-income economies, including 103 countries; high-income economies, including 81 countries.

Quantitative indicators: GDP, GDP rate of growth, unemployment, income vulnerability, and Income inequality are compared in the following group of countries: G-20, High income, Middle income, Low income, Least developed countries-UN classification and heavily indebted poor countries. Data are in current U.S. dollars. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used. Aggregates are based on constant 2010 U.S. dollars. Unemployment refers to the share of the labor force that is without work but available for and seeking employment. Vulnerable employment is contributing family workers and own-account workers as a percentage of total employment. Data for income inequality retrieved from OECD research, and presented a summarized conclusion, concerning the world income inequality. Emphasis is placed in year presentation, starting from 1999, the year of G20s first summit and inclusion of 2008, year of the

general crisis and the following years 2009 and 2010. Where data were available for year 2017 and 2018, these are included, otherwise the last year is 2016.

## 4.2 *Quantitative Criteria—Indicators*

Table 1 represent the results obtained GDP for G20 countries and high, low, middle income and least developed and poor countries, respectively, and the percentage of each group of the world total. GDP increase at world level and for all the other group of countries from high income to the least developed countries and poor countries. There is a decrease in G-20 GDP from 90% in 1999 to 85.7% in 2017. In the opposite there is an increase for poor and least developed countries, from 0.5% and 0.6% to 0.9% and 1.3% respectively.

The rate of GDP growth is greater as we move from G-20 and high income countries towards least developed and poor countries (Table 2).

Unemployment for all countries remained close to the level of 5%, as percentage of total labor force. Unemployment to G-20 countries is higher and the percentage is fluctuating from 8.22 in 1999 to 7.10 in 2018 (Table 3).

Vulnerable unemployment is higher as we move from G-20 and high income countries towards least developed and poor countries. The difference between them is significant, from 22.10% and 11.50% for G-20 and high income countries to 68.5 and 64.4% for poor and least developed countries (Table 4).

Analysis on income inequality indicates that the more unequal incomes are distributed in high income and G-20 countries. The income of the household is attributed to each of its members, with an adjustment to reflect differences in needs for households of different sizes. According to the OECD data based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive, inequality ranges from perfect equality to perfect inequality (OECD 2019). The OECD's statistical analysis shows higher inequality for high income and G-20 countries than low income and poor countries. The indicator for USA, UK and South Africa for example is 0.39–0.35 and 0.62 in comparison to Slovak Republic, Poland and Slovenia with 0.24–0.28 and 0.24 respectively. (Range between 0 in the case of perfect equality and 1 in the case of perfect inequality).

## 4.3 *Qualitative Criteria—Indicators*

International production is still expanding, but the rate of expansion is slowing, resulting in decrease of the percentage of industry value added in GDP (Table 5).

Production as percentage of GDP is increasing for poor income countries and remains stable for developing countries but decreases for G-20 and high-income countries. It is also decreasing for middle income countries (Table 6).

**Table 1** GDP (Current US\$ X 1.000.000.000)

	1999	2002	2006	2008	2009	2010	2012	2016	2017
World	32,540.3	34,686.2	51,446.0	63,574.9	60,267.1	65,965.9	74,993.7	75,997.4	80,737.6
G-20	29,275.6	31,111.8	45,400.9	55,191.9	52,418.0	56,906.6	63,976.0	65,139.3	69,214.4
G-20%	0.900	0.897	0.882	0.868	0.870	0.863	0.853	0.857	0.857
High	27,338.3	28,605.1	39,949.1	46,482.0	43,561.1	45,719.3	49,466.8	49,281.3	51,479.4
High (%)	0.840	0.825	0.777	0.731	0.723	0.693	0.660	0.648	0.638
Middle	5,066.4	5,928.4	11,252.5	16,747.3	16,350.0	19,856.8	25,052.9	26,189.8	28,708.9
Middle (%)	0.156	0.171	0.219	0.263	0.271	0.301	0.334	0.345	0.356
Low	124.6	145.3	236.2	342.2	360.5	392.9	482.1	538.6	575.4
Low (%)	0.004	0.004	0.005	0.005	0.006	0.006	0.006	0.007	0.007
Least	182.8	214.5	390.8	580.7	582.5	667.3	823.7	961.4	1,074.1
Least (%)	0.006	0.006	0.008	0.009	0.010	0.010	0.011	0.013	0.013
Poor	148.0	163.1	295.5	425.9	428.4	473.4	568.5	672.7	742.6
Poor (%)	0.005	0.005	0.006	0.007	0.007	0.007	0.008	0.009	0.009

Source World Bank



**Table 2** GDP growth (annual %)

	1999	2000	2002	2004	2006	2008	2009	2010	2012	2014	2016	2017
G-20	2.98	5.05	2.46	5.73	5.36	3.25	-1.11	5.71	3.20	2.84	2.08	3.03
High	3.22	4.00	1.46	3.32	3.04	0.35	-3.43	2.99	1.25	2.02	1.66	2.23
Middle	3.37	5.78	4.74	7.72	8.03	5.70	2.47	7.46	5.25	4.54	4.21	4.89
Low	3.10	2.17	2.34	5.46	4.78	4.89	5.26	7.26	6.38	5.79	3.21	5.11
Least	4.08	4.22	5.30	6.91	7.70	7.15	4.59	6.24	6.03	5.50	3.72	4.88
Poor	3.04	2.76	3.52	5.56	6.04	6.05	4.24	5.86	5.76	5.59	4.48	5.22

Source World Bank

**Table 3** Unemployment, total (% of total labor force) (modeled ILO estimate)

	1999	2000	2002	2004	2006	2008	2009	2010	2012	2014	2016	2017	2018
G-20	8.22	7.67	8.43	7.89	7.13	6.80	7.94	7.69	7.14	7.06	7.37	7.34	7.10
High	7.15	6.80	7.40	7.18	6.23	5.91	7.97	8.22	7.92	7.24	6.23	5.68	5.26
Middle	6.14	6.00	5.90	5.71	5.37	5.27	5.42	5.08	4.99	4.96	5.34	5.41	5.37
Low	6.25	6.28	6.08	6.02	5.93	5.98	5.79	5.94	5.82	5.64	5.69	5.70	5.70
Least	6.01	5.99	5.88	6.04	5.70	5.63	5.64	5.41	5.19	5.18	5.25	5.28	5.31
Poor	7.08	7.05	6.63	6.36	6.07	5.97	5.92	6.03	5.59	5.39	5.45	5.48	5.49

Source World Bank

**Table 4** Vulnerable employment, male (% of male employment) (modeled ILO estimate)

	1999	2000	2002	2004	2006	2008	2009	2010	2012	2014	2016	2017	2018
G-20	27.6	27.1	27.6	26.6	25.3	24.3	24.4	23.9	22.8	22.4	22.2	22.2	22.1
High	13.6	13.3	13.4	13.6	13.1	12.5	12.6	12.5	12.0	11.8	11.6	11.5	11.5
Middle	56.3	55.8	56.4	54.5	52.3	50.7	50.1	49.3	47.5	46.8	46.3	46.4	46.4
Low	72.9	73.0	72.9	72.8	72.5	71.7	71.4	71.1	70.3	70.3	69.7	69.9	69.9
Poor	74.6	74.5	74.1	73.4	72.9	72.3	71.7	71.6	69.9	69.3	68.6	68.5	68.5
Least	71.0	70.7	70.6	69.8	69.1	67.9	66.6	66.2	65.7	65.2	64.3	64.5	64.4

Source World Bank

**Table 5** Industry (including construction), value added (% of GDP)

	1999	2000	2002	2004	2006	2008	2009	2010	2012	2014	2016	2017
G-20	31.72	32.15	31.56	32.10	32.96	32.77	30.90	31.10	31.29	30.38	28.65	29.83
High	25.93	26.02	24.69	24.77	25.17	24.78	23.25	23.77	23.78	23.73	22.90	
Middle	35.74	36.36	35.56	36.82	37.82	37.63	35.67	36.24	35.74	33.94	31.60	32.11
Low	22.93	25.02	23.96	26.13	25.82	23.07	22.93	22.20	23.55	23.98	25.19	25.39
Least	28.41	27.52	25.90	27.37	28.51	29.58	26.88	28.23	27.94	26.97	27.23	27.47
Poor	21.09	22.18	22.41	23.98	23.91	24.92	22.98	23.73	22.21	22.98	22.49	23.23

Source World Bank

**Table 6** CO<sub>2</sub> emissions (metric tons per capita)

	1999	2000	2002	2004	2006	2008	2009	2010	2012	2014
G-20	7.96	8.32	8.24	8.72	8.83	8.96	8.72	8.95	9.03	8.85
High	11.64	11.93	11.80	12.04	11.91	11.65	10.96	11.27	10.86	10.71
Middle	2.26	2.29	2.38	2.75	3.05	3.33	3.38	3.55	3.90	3.87
Low	0.41	0.41	0.36	0.39	0.40	0.40	0.39	0.39	0.33	0.32
Least	0.16	0.17	0.18	0.21	0.22	0.24	0.25	0.27	0.28	0.31
Poor	0.16	0.16	0.17	0.18	0.19	0.20	0.20	0.22	0.24	0.27

Source World Bank

**Table 7** Net migration

	1992	1997	2002	2007	2012	2017
High	11,110,216	14,216,196	18,128,698	22,333,459	15,916,583	14,628,870
Middle	-12,341,085	-11,669,511	-16,830,710	-19,504,106	-9,392,228	-10,964,072
Low	1,196,162	-2,594,875	-1,397,124	-2,792,486	-6,481,500	-3,675,622
Least	1,156,580	-3,923,419	-4,028,366	-9,450,809	-5,849,388	-5,247,506
Poor	2,721,675	-2,624,944	-1,306,201	-3,965,036	-2,838,760	-2,453,870

Source World Bank

The new data, from researchers at the Global Carbon Project (GCP), show a rapid increase in 2018. This year, the largest increases have occurred in China. US emissions have also increased markedly in 2018. The table shows the significant difference between G-20, high income countries and low income, poor countries (Table 7).

Migration flows to high income economies from low, middle and low income economies. Despite the vast number of immigrant flows to high income economies the absolute value has decreased from 2002 to 2017. The comparison of data on migration flows indicates that the number of net migration flows in least and poor countries have decreased for the same period (Table 8).

Global foreign direct investment (FDI) flows fell in 2017. FDI flows to developing economies remained stable according to UN, world investment report for 2008 (World investment report 2018). FDI flows to developing countries remained stable and in structurally weak and vulnerable economies remained fragile and flows to the least developed countries increased. FDI flows fell in G-20 and in high income economies.

This elementary analysis show that poor, least developed, low- and middle-income countries increase participation in global GDP, they have higher GDP growth, lower unemployment rate than the high income and/or G20 countries. They have also lower income inequality than high income and G-20 countries. They have low performance in employment vulnerability. Accordingly, the poor, least developed, low- and middle-income countries have lower emission rate, industrialization is increasing for

**Table 8** Foreign direct investment, net inflows (BoP, X 1,000,000,000 current US\$)

	1999	2000	2002	2004	2006	2008	2009	2010	2012	2014	2016	2017
World	961.9	1,461.0	744.1	1,015.0	2,160.5	2,460.0	1,373.1	1,863.6	2,118.7	1,860.6	2,458.3	1,949.6
G-20	834.5	1,269.3	656.1	820.1	1,785.9	2,020.3	985.3	1,412.7	1,564.0	1,337.7	1,902.6	1,450.6
High	833.3	1,325.0	592.2	802.3	1,773.2	1,841.4	949.2	1,252.8	1,467.1	1,195.7	1,898.3	1,412.2
Middle	126.7	134.0	149.0	208.6	381.6	606.2	414.1	595.9	630.7	648.8	544.3	522.1
Low	2.0	1.9	2.9	4.0	5.7	12.4	9.9	15.0	20.9	16.1	15.7	15.2
Least	5.6	3.8	5.9	8.8	9.1	18.6	15.4	18.2	24.5	28.2	26.3	21.5
Poor	5.2	4.1	5.9	7.1	10.3	19.4	15.6	23.8	32.5	29.6	24.8	26.4

Source: World Bank

the poor, least developed and low income countries and remains stable for middle income countries. FDI, in these countries, is increasing significantly from 1999, although they remain fragile. Net migration is only positive for high income countries. In summary the analysis show that countries with better performance in qualitative criteria have better quantitative performance. This is consequent with the qualitative approach in handling the regulation of global economy.

## 5 Conclusion

The creation of the G20 is a landmark in global evolution. Its importance arises from the participation of the countries producing more than 80% of global product, and its political and economic orientation. The innovation lies here in the inclusion, in this intervention of the world community interests. The above-mentioned arrangements set in motion by the G20 already give the measure of its significance and, far more importantly, its dynamic. They move in the spirit of the Modern Era, within which has been launched a movement towards the restructuring, reconfiguration and organizational and functional rearrangement of the elements of the global system, first and foremost as the objective laws of socioeconomic development require. The deepening involvement of the G20 in issues of global security is the most important element in the above historical creation, regarding innovation in the governance system, providing the G20 institution with the necessary elements for the creation of a global economic directorate mechanism.

The intervention of G20 is universal, addresses all components of 2008 general crisis, the unity of production and management methods, on a holistic approach. The handling of the 2008 general economic crisis, by G20, is not traditionally but consistent with economic security, as part of the global security. This is a completely new approach in regulating the economy, adding in it qualitative directions in conjunction with the quantitative measures. The mechanism approaches the problems of globalized economy, through the global security, concerning economic security, which is directly associated with the issue of investment. This is the regulation of secure *movement of capital in global economy*. Another issue is the environmental security, concerning the preservation of social wealth and the man-nature system, which is associated with the *regulation and the rational development and use of scarce resources* under a universalist approach. The humanitarian security comprises the programs, policies, financial aid packages, etc., concerning the labor force, the reduction of unemployment and the balancing of migration. Thus, humanitarian is associated with the *regulation of movement of labor*.

This paper analyzes the new qualitative measures are proposed to regulate the economy on the basis of global security. Qualitative criteria are focused in understanding the economic base quality of a country and how it is related with its quantitative performance. This elementary and simple comparison between quantitative and qualitative criteria is to measure the performance of the economies to be compared. This evolves many other problems of world comparisons, such as difference between

high income and least developed and poor countries. Although this approach is difficult, it is yielding a direction towards the economic system is directed. It is shown the difference in performance, which is to be explained by the further analysis of the causes and the operation of each country's economic system. An interesting extension on the current work would be the reassessment of the possible qualitative criteria and their further sophisticated statistical analysis in order the conjunction between the qualitative criteria and the economic performance could be evaluated.

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# A Framework for Information Mining from Audit Data



Aikaterini Ioannou, Dimitrios Bourlis, Stavros Valsamidis,  
and Athanasios Mandilas

**Abstract** Companies seek new technologies to enhance their business processes. As information systems in companies become more complex, the traditional audit trail is diminished or eliminated. The importance of audit automation and the utilization of IT in modern audits has grown significantly in recent years due to both technological developments and changing regulatory environment. Automation of business processes has inevitably led to changes in auditing procedures and standards. Additional drivers of audit automation adoption include the ever growing complexity of business transactions and increasing risk exposure of modern enterprises. Therefore, the audit's purpose, which is namely to examine the true and fair view of financial statements, is heavily increasing in complexity. On the other hand, the prevalence of the data paradigm has manifold impacts on the accounting-relevant processes. To cover the requirements to Audit Information System, we strive for the development of a framework for information mining from audit data. In this paper, we report on the framework we have developed in the department of Accounting and Finance. Our study identifies the management of audit alarms and the prevention of the alarm floods as critical tasks in this implementation process. We develop an approach to satisfy these requirements utilizing the data mining techniques. We analyse established audit data from a well-known data repository considering the dimensions of the data paradigm. This led us to a tentative proposal of a conceptual mechanism for an integrated audit approach. With the increasing number of financial fraud cases, the

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application of data mining techniques could play a big part in improving the quality of conducting audit in the future.

**Keywords** Framework · Audit data · Data mining techniques

**JEL Classification Codes** G21 · L86

## 1 Introduction

The paradigm of audit data has tremendous impacts on both IT and auditing departments (Ghasemi et al. 2011). Financial statements are produced in automated Accounting Information Systems (AIS) and the auditor is faced with risen complexity and risks due to an increasing processing of ever-growing data (Vasarhelyi et al. 2015; Cao et al. 2015; Adamyk et al. 2018). Over the past 30 years, both information systems and auditing have undergone radical changes (Moffitt and Vasarhelyi 2013). Standards and regulations have also become frustratingly complex. But there's a powerful remedy for today's auditing headaches: continuous auditing and reporting (Singleton and Singleton 2005).

Financial statements are not as important to investors as they once were, as technology has changed the way companies create value today (Gallegos et al. 2004). While these changes pose serious threats to the economic viability of auditing, they also create new opportunities for auditors to pursue (Gangolly 2016). With the real-time accounting and electronic data interchange popularizing, Computer-Assisted Audit Tools (CAATs) are becoming even more necessary (Zhao et al. 2004). While they continue to acquire IT technical knowledge and skills, many auditors do not have the time or interest in becoming programmers. In the most based case, auditors in the new millennium need to understand the basics of computerized systems, including the core hardware components of a computer system and the basic concept for every computer program (input-process-output). At the same time, there is a lot more to understanding technology, including the basics of systems development, systems lifecycles, process flowcharting, programming logic, and writing scripts for analytics. These skills should exist in some aspect of the staffing or be outsourced (The Institute of Internal Auditors Research Foundation 2015).

Murphy and Groomer (2004) proposed how information technology (IT) frameworks, such as extensible markup language (XML) and Web services can be utilized to facilitate auditing for the next generation of accounting systems. The alternative architectures for auditing that have been proposed in both the research and practice environments are explored by Kuhn and Sutton (2010). They blend a focus on the practical realities of the technological options and ERP structures with the emerging theory and research on continuous assurance models. The focus is on identifying the strengths and weaknesses of each architectural form as a basis for forming a research agenda that could allow researchers to contribute to the future evolution of both ERP system designs and auditor implementation strategies.

Vasarhelyi et al. (2012) discussed the need for AIS to accommodate business needs generated by rapid changes in technology. It was argued that the real-time economy had generated a different measurement, assurance, and business decision environment. Three core assertions relative to the measurement environment in accounting, the nature of data standards for software-based accounting, and the nature of information provisioning, formatted and semantic, were discussed.

An implementation of the monitoring and control layer for monitoring of business process controls (CMBPC) in the US internal IT audit department of Siemens Corporation is described by Alles et al. (2018). Among their key conclusions is that “formalizability” of audit procedures and audit judgment is grossly underestimated. Additionally, while cost savings and expedience force the implementation to closely follow the existing and approved internal audit program, a certain level of reengineering of audit processes is inevitable due to the necessity to separate formalizable and non-formalizable parts of the program.

Lenz and Hahn (2015) find first, common themes in the empirical literature are identified. Second, the main threads into a model comprising macro and micro factors that influence audit effectiveness are synthesized. Third, promising future research paths that may enhance audit value proposition were derived. The “outside-in” perspective indicates a disposition to stakeholders’ disappointment in audit: audit is either running a risk of marginalization or has to embrace the challenge to emerge as a recognized and stronger profession (PWC 2013). The suggested research agenda identifies empirical research threads that can help audit practitioners to make a difference for their organization, be recognized, respected and trusted and help the audit profession in its pursuit of creating a unique identity.

Audit is defined as the process of examining the financial records of any business to corroborate that their financial statements are in compliance with the standard accounting laws and principles (Cossierat and Rodda 2004). Generally, audits are classified into two categories as internal and external auditing (Cossierat 2009). Internal-audit, although is an independent department of an organization, but resides within the organization. These are company-employees who are accountable for performing audits of financial and nonfinancial statements as per their annual audit plan. External audit is a fair and independent regular audit authority, which is responsible for an annual statutory audit of financial records. The external audit company has a fiduciary duty and is critical to the proper conduct of business.

There are many issues related to Audit and Decision Support Systems (Socea 2012; Schaltegger and Burritt 2017). Since the prime goal of an auditor during an audit-planning phase is to follow a proper analytical procedure to impartially and appropriately identify the firms that resort to high risk of unfair practices, predictive analytics by using data mining techniques could provide actionable insights for the auditing. According to a research by Tysiac (2015), data analytics has benefited internal auditing more as compared to advancements it has contributed for the external audits. One of the most common applications of predictive analytics in audit is the classification of suspicious firm. Identifying fraudulent firms can be studied as a classification problem. The purpose of classifying the firms during the preliminary



stage of an audit is to maximize the field-testing work of high-risk firms that warrant significant investigation.

Data mining techniques have already been applied for accounting information systems (Gelinas et al. 2017). Data mining techniques are providing great aid in financial accounting fraud detection, since dealing with the large data volumes and complexities of financial data are big challenges for forensic accounting (Sharma and Panigrahi 2013). The authors propose a framework based on data mining techniques for accounting fraud detection. Automated accounting fraud detection is presented also by Wang (2010). He categorizes, compares, and summarizes the data set, algorithm and performance measurement in published technical and review articles in accounting fraud detection. Data mining techniques accomplish the task of management fraud detection that could facilitate the auditors (Kirkos et al. 2007). The applications of data mining techniques in accounting and the proposal of an organizing framework for these applications is explored by Amani and Fadlalla (2017). They create a framework that combines the two well-known accounting reporting perspectives (retrospection and propection), and the three well-accepted goals of data mining (description, prediction, and prescription). The proposed framework revealed that the area of accounting that benefited the most from data mining is assurance and compliance, including fraud detection, business health and forensic accounting. The ensemble machine learning method is also applied successfully for improving the classification accuracies of the auditing task (Kotsiantis et al. 2006).

The objective is to make the use of data analytics a sustainable, efficient, and repeatable process (Zhang et al. 2015). As with most uses of software technology, it is not a magic bullet. It requires attention to people and process issues, from management's commitment and support through training and the assignment of roles (Lientz and Larssen 2012).

The basic data analysis can be performed using a range of tools, including spreadsheets and database query and reporting systems (Antipova and Rocha 2018). There are certainly risks from using spreadsheets, apparent to any auditor because of the difficulty of ensuring data integrity. General purpose analysis tools also have their own limitations (Henry and Robinson 2009). It is clear that the analytics process must be managed in order to be relied upon by auditing, which is why accounting-specific analysis software should include capabilities such as: (i) Maintaining security and control over data, applications, and findings (ii) logging all activities (iii) analysis techniques designed to support accounting objectives and (iv) automated creation and execution of tests (Bellino et al. 2007).

The open source R software has one of the largest libraries of applications available. Free software such as R and Weka are used nationwide in university courses and by some research and technology firms, but are somewhat frowned upon by auditing firms because they are not validated (Appelbaum 2017). These concerns are not without merit, since open source software can be clumsier and less user friendly than proprietary software, but their utility should not be ignored. In addition, while a basic knowledge of statistics and information technology is becoming essential for all auditors; other, more specialized functions can be contracted to other experts, perhaps online.

Proprietary tools such as Audit Command Language (ACL) and Interactive Data Extraction and Analysis (IDEA), as well as generic statistical software such as Statistical Analysis System (SAS) and Statistical Package for the Social Sciences (SPSS), are frequently used by large businesses and large firms (Singleton 2006; Tysiac 2015). Furthermore, the capabilities and scope of these packages are constantly evolving, requiring that accountants and auditors have sufficient knowledge of analytics (Appelbaum et al. 2016). This convergence will likely take place with the emerging statistical and visualization toolsets being developed.

In this paper, we implement the aforementioned data mining techniques on the audit data of an existing audit organization of government firms of India, using the WEKA software package (Weka 2018). The outcomes support the decision-making process regarding the companies it audits (Hooda et al. 2018). The training and testing of a risk detection and management model will contribute to covering an existing research gap. The addressing of the above problems required the use of either specialized software such as ACL and IDEA, or general statistical packages such as SAS and SPSS with difficulty in adjusting and customizing audit data. It is worth noting that all of the aforementioned packages are commercial while WEKA is free software.

## 2 Background Theory

Data mining is an iterative process of creating predictive and descriptive models, by uncovering previously unknown trends and patterns in vast amounts of data, in order to extract useful information and support decision making (Kantardzic 2003). The most popular techniques for data mining (DM) are clustering, classification and finding association rules (Han et al. 2011).

*Classification* methods use a training dataset in order to estimate some parameters of a mathematical model that could in theory optimally assign each case from a new dataset into a specific class. In other words, the training set is used to train the classification technique how to perform its classification (Witten et al. 2016). There are various classification methods implemented in WEKA, like ZeroR, OneR, PART etc. The algorithm OneR uses the minimum-error attribute for prediction, discretizing numeric attributes (Holte 1993). In this technique, the attribute/s which best describe (s) the classification will be discovered.

*Clustering* refers to methods where a training set is not available. Thus, there is no previous knowledge about the data to assign them to specific groups. In this case, clustering techniques can be used to split a set of unknown cases into clusters. The clustering step contains digitalization clustering with the use of the k-means algorithm (MacQueen 1967; Kaufmann and Rousseeuw 1990) for unsupervised learning, called SimpleKMeans in WEKA. K-means is an efficient partitioning algorithm that decomposes the data set into a set of k disjoint clusters. It is a repetitive algorithm in which the items are moved among the various clusters until they reach the desired set of clusters. With this algorithm a great degree of similarity for the items of the

same cluster and a large difference of items, which belong to different clusters, are achieved. Furthermore, the algorithm automatically normalizes numerical attributes when doing distance computations.

According to Linoff and Berry (2011) relationship mining is a technique which discovers relationships between variables, in a data set with a large number of variables. There are four types of relationship mining: association rule mining, correlation mining, sequential pattern mining, and causal data mining. In this paper we focus on association rule mining (Liu et al. 1998). *Association rule mining* is one of the most well studied data mining tasks. It discovers relationships among attributes in databases, producing if-then statements concerning attribute-values (Agarwal et al. 1993). An association rule  $X \rightarrow Y$  expresses a close correlation among items in a database, in which transactions in the database where  $X$  occurs, there is a high probability of having  $Y$  as well. In an association rule  $X$  and  $Y$  are called respectively the antecedent and consequent of the rule. The strength of such a rule is measured by values of its support and confidence. The confidence of the rule is the percentage of transactions with antecedent  $X$  in the database that also contain the consequent  $Y$ . The support of the rule is the percentage of transactions in the database that contains both the antecedent  $X$  and the consequent  $Y$  in all transactions in the database. There are several association rule-discovering algorithms available but Apriori algorithm is preferred as the most popular and effective algorithm for finding association rules over the discretized accounting data table (Agrawal and Srikant 1994). Apriori is the best-known algorithm to mine association rules. It uses a breadth-first search strategy to counting the support of item sets and uses a candidate generation function, which exploits the downward closure property of support. Iteratively reduces the minimum support until it finds the required number of rules with the given minimum confidence.

There are different techniques of categorization for association rule mining. Most of the subjective approaches involve user participation in order to express, in accordance with his/her previous knowledge, which rules are of interest. One technique is based on *unexpectedness* and *actionability* (Liu and Hsu 1996; Liu et al. 2000). Unexpectedness expresses which rules are interesting if they are unknown to the user or contradict the user's knowledge. Actionability expresses that rules are interesting if users can do something with them to their advantage. The number of rules can be decreased to unexpected and actionable rules only. Another technique proposes the division of the discovered rules into three categories (Minaei-Bidgoli et al. 2004). (1) *Expected and previously known*: This type of rule confirms user beliefs, and can be used to validate our approach. Though perhaps already known, many of these rules are still useful for the user as a form of empirical verification of expectations. (2) *Unexpected*: This type of rule contradicts user beliefs. This group of unanticipated correlations can supply interesting rules, yet their interestingness and possible actionability still requires further investigation. (3) *Unknown*: This type of rule does not clearly belong to any category, and should be categorized by domain specific experts. The Weka system has several association rule-discovering algorithms available (Hipp et al. 2000). The Apriori algorithm will be used for finding association rules over discretized data (Agrawal and Srikant 1994).

### 3 Approach

The proposed approach consists of five steps (Fig. 1):

1. Target data finding.
2. Data pre-processing.
3. Classification.
4. Clustering.
5. Association rule mining.

#### 3.1 Dataset

The dataset in which the methodology will be applied is in the world-wide known machine learning repository UCI. 463 datasets are included in a wide range of applications (UCI1 2018). In particular, for Audit, there is a set of data to be used in the

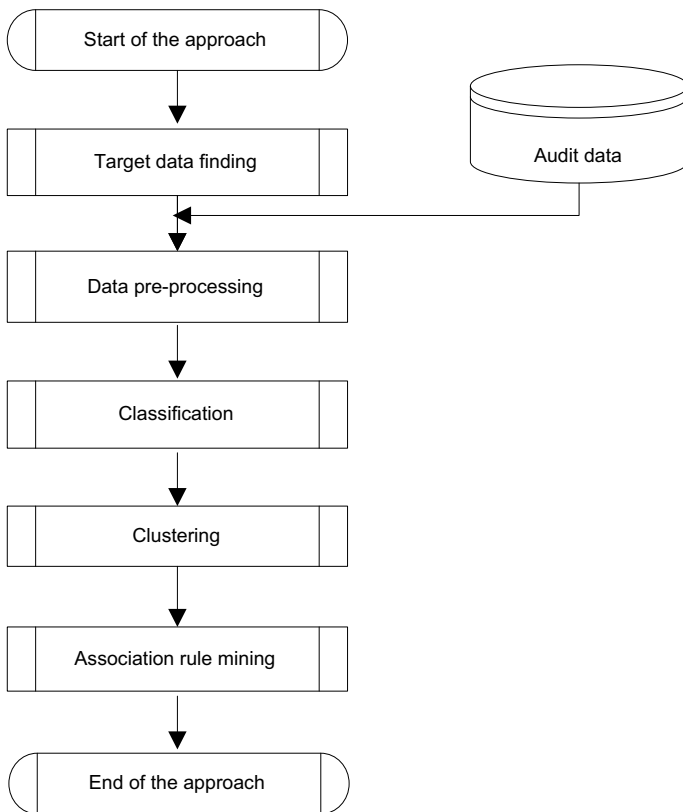


Fig. 1 Approach of five steps

The screenshot shows the UCI Machine Learning Repository interface. At the top, there is a navigation bar with the UCI logo and search options. Below the header, the page title is 'Audit Data Data Set' with links for 'Download', 'Data Folder', and 'Data Set Description'. A table provides key statistics: 777 instances, 14 classes, 18 attributes, and 2310 total files. A table below lists 14 sectors: Agriculture, Automobile, Banking, Chemicals, Education, Entertainment, Food, Health, Insurance, Manufacturing, Media, Retail, Services, Telecommunications, and Transportation. The page also includes sections for 'Sources', 'Data Set Information', 'Attribute Information', 'Relevant Papers', and 'Citation Request'.

**Audit Data Data Set**  
 Download [Data Folder](#) [Data Set Description](#)

**Abstract:** Exhaustive one year non-confidential data in the year 2015 in 2016 of firms is collected from the Auditor Office of India to build a predictor for classifying suspicious firms.

Data Set Characteristics:	Instances	Number of Instances	777	Class	14
Attribute Characteristics:	Real	Number of Attributes	18	Date Donated	2/10/17 14
Associated Tasks:	Classification	Missing Values?	Yes	Number of Web Sites	1/0/1

**Sources:**  
 Nishita Hooda, CSE2, TIFT Patna

**Data Set Information:**  
 The goal of the research is to help the auditors by building a classification model that can predict the fraud/firm or the loss (the present and historical risk factors). The information about the sectors and the counts of firms are listed respectively as: Irrigation (114), Public Health (77), Buildings and Roads (32), Forest (75), Corporate (7), Animal Husbandry (35), Communication (1), Electrical (6), Land (5), Science and Technology (5), Tourism (1), Fisheries (1), Industries (2), Agriculture (22).

**Attribute Information:**  
 Many risk factors are examined from various areas like past records of audit office, audit paras, environmental conditions reports, firm reputation summary, on-going issues report, profit-value records, loss- value records, follow-up reports etc. After an in-depth interview with the auditors, important risk factors are evaluated and their probability of existence is calculated from the present and past records.

**Relevant Papers:**  
 Hooda, Nishita, Soham Ghosh, and Prashant Singh Rana. "Fraudulent Firm Classification: A Case Study of an Central India." *Applied Artificial Intelligence* 32, 4 (2018): 40-54.

**Citation Request:**  
 This research work is supported by Ministry of Electronics and Information Technology (SERFI), Govt of India.

**Fig. 2** Audit data from the repository UCI

study (UCI2 2018). The general information for that particular dataset is shown in Fig. 2.

Comptroller and Auditor General (CAG) of India is an independent constitutional body of India. It is an authority that audits receipts and expenditure of all the firms that are financed by the government of India. While maintaining the secrecy of the data, exhaustive one year non confidential data in 2015 and 2016 of firms is collected from the Auditor General Office (AGO) of CAG. There are total 777 firms from 46 different cities of a state that are listed by the auditors for targeting the next field-audit work. The target-offices are listed from 14 different sectors. The information about the sectors and their counts are summarized in Table 1.

Many risk factors are examined from various areas like past records of audit office, audit-paras, environmental conditions reports, firm reputation summary, on-going issues report, profit-value records, loss- value records, follow-up reports etc. After an in-depth interview with the auditors, important risk factors are evaluated and their probability of existence is calculated from the present and past records. Tables 2 and 3 describe the various examined risk-factors that are involved in the case study. Various risk factors are categorized, but combined audit risk is expressed as one function called an Audit Risk Score (ARS) using an audit analytical procedure. At the end of risk assessment, the firms with high ARS scores are classified as “Fraud” firms, and low ARS score companies are classified as “No-Fraud” firms.

### 3.2 Tool

The WEKA (Waikato Environment for Knowledge Analysis) computer package was used in order to apply classification, clustering and association rule mining methods to the dataset (Witten et al. 2016). WEKA is open source software that provides a collection of machine learning and data mining algorithms. Figure 3 shows the basic

**Table 1** Target sectors

Sector ID	Target sector	Information	Number of target firms
1	IR	Irrigation	114
2	P	public health	77
3	BR	Buildings and roads	82
4	FO	Forest	70
5	CO	Corporate	47
6	AH	Animal husbandry	95
7	C	Communication	1
8	E	Electrical	4
9	L	Land	5
10	S	Science and Technology	3
11	T	Tourism	1
12	F	Fisheries	41
13	I	Industries	37
14	A	Agriculture	200

**Table 2** Risk factors classification and other features in model

Feature	Information	Feature	Information
Para a value	Discrepancy found in the planned-expenditure of inspection and summary report A in Rs (in crore).	Sector score	Historical risk score value of the target-unit in the Table 1 using analytical procedure
Para B value	Discrepancy found in the unplanned-expenditure of inspection and summary report B in Rs (in crore).	Loss	Amount of loss suffered by the firm last year
Total	Total amount of discrepancy found in other reports Rs (in crore).	History	Average historical loss suffered by firm in the last 10 years
Number	Historical discrepancy score	District score	Historical risk score of a district in the last 10 years
Money value	Amount of money involved in misstatements in the past audits		

**Table 3** Other features

Feature	Information	Feature	Information
Sector ID	Unique ID of the target sector	Location ID	Unique ID of the city/province
ARS	Total risk score using analytical procedure	Audit ID	Unique Id assigned to an audit case
Risk class	Risk class assigned to an audit-case		

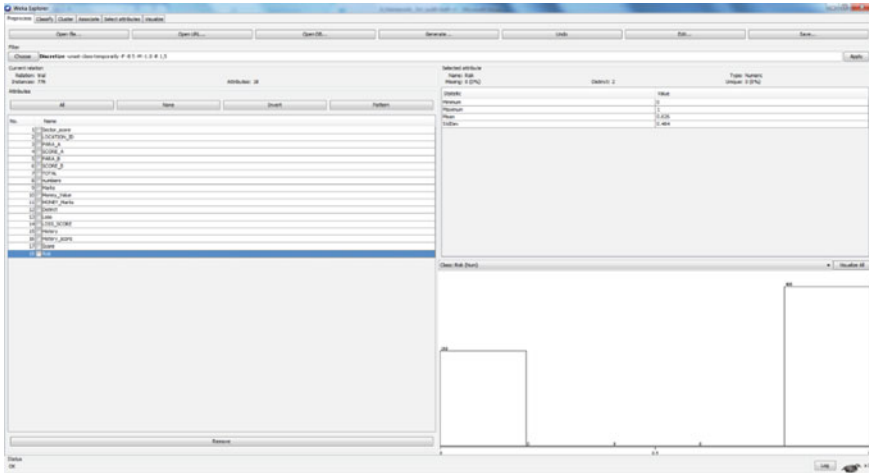


Fig. 3 WEKA environment

Graphical User Interface (GUI) of WEKA. One of the main objectives of WEKA is to mine information from existing datasets; the main reason for choosing Weka is that provides a collection of machine learning and data mining algorithms for data pre-processing, classification, regression, clustering, association rules, and visualization (Hall et al. 2009).

## 4 Results

As it is depicted in Fig. 2, the dataset contains 777 instances. There are no missing values for all the attributes.

In WEKA environment data is depicted as in Fig. 4.

### 4.1 Pre-processing

The first step before applying the described data mining techniques is the pre-processing of the data in order to prepare them for data analysis.

Certain filters were applied on the data. Firstly, the filter Remove was applied on the attributes PARA\_A, PARA\_B, Money\_Value, Loss, History and Score, since they obviously are dependent on the attributes SCORE\_A, SCORE\_B, Money\_Marks Loss\_Score, History\_Score and Risk respectively (Fig. 5).

The filter *NumericalToNominal* was applied on the attributes SCORE\_A, SCORE\_B, Marks, MONEY\_Marks, District, LOSS\_SCORE, History\_score and

No.	Sector_score	LOCATION_ID	PARA_A	SCORE_A	PARA_B	SCORE_B	TOTAL	numbers	Marks	Money_Value	MONEY_Marks	District	Loss	LOSS_SCORE	History	History_score	Score	Risk
	Numeric	Nominal	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric
1	3.8923.0	4.18	6.0	2.5	2.0	6.68	5.0	2.0	3.38	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.4	1.0
2	3.896.0	0.0	2.0	4.83	2.0	4.83	5.0	2.0	0.94	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
3	3.896.0	0.51	2.0	0.23	2.0	0.74	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
4	3.896.0	0.0	2.0	19.8	6.0	19.8	6.0	6.0	11.75	6.0	2.0	0.0	2.0	0.0	2.0	2.0	4.4	1.0
5	3.896.0	0.0	2.0	0.08	2.0	0.08	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
6	3.896.0	0.0	2.0	0.83	2.0	0.83	5.0	2.0	2.95	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.2	0.0
7	3.897.0	1.1	4.0	7.41	4.0	8.51	5.0	2.0	44.95	6.0	2.0	0.0	2.0	0.0	2.0	2.0	3.2	1.0
8	3.898.0	8.5	6.0	12.03	6.0	20.53	5.5	4.0	7.79	4.0	2.0	0.0	2.0	0.0	2.0	2.0	4.2	1.0
9	3.898.0	8.4	6.0	11.05	6.0	19.45	5.5	4.0	7.34	4.0	2.0	0.0	2.0	0.0	2.0	2.0	4.2	1.0
10	3.898.0	3.98	6.0	0.99	2.0	4.97	5.0	2.0	1.93	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.4	1.0
11	3.898.0	5.43	6.0	10.77	6.0	16.2	5.0	2.0	4.42	2.0	2.0	0.0	2.0	0.0	2.0	2.0	3.6	1.0
12	3.898.0	15.38	6.0	40.14	6.0	55.52	5.0	2.0	0.96	2.0	2.0	1.0	4.0	1.0	4.0	4.0	1.0	1.0
13	3.898.0	5.47	6.0	7.63	4.0	13.1	5.0	2.0	10.43	6.0	2.0	0.0	2.0	1.0	4.0	3.6	1.0	1.0
14	3.898.0	1.99	4.0	0.35	2.0	1.44	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.2	1.0
15	3.898.0	0.0	2.0	0.84	2.0	0.84	5.0	2.0	0.007	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
16	3.8913.0	1.95	4.0	9.01	4.0	10.96	5.0	2.0	9.0	4.0	2.0	0.0	2.0	0.0	2.0	2.0	3.0	1.0
17	3.8937.0	8.54	6.0	31.63	6.0	40.17	5.0	2.0	41.28	6.0	2.0	0.0	2.0	1.0	4.0	4.2	1.0	1.0
18	3.8937.0	4.18	6.0	4.83	2.0	9.01	5.5	4.0	14.03	6.0	2.0	0.0	2.0	0.0	2.0	2.0	3.2	1.0
19	3.8937.0	1.81	4.0	1.03	2.0	2.84	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.2	1.0
20	3.8937.0	4.86	6.0	46.78	6.0	51.64	5.5	4.0	63.18	6.0	2.0	0.0	2.0	0.0	2.0	2.0	4.4	1.0
21	3.8924.0	6.26	6.0	14.1	6.0	20.36	5.0	2.0	34.24	6.0	2.0	0.0	2.0	1.0	4.0	4.2	1.0	1.0
22	3.893.0	0.82	2.0	5.94	4.0	5.96	5.0	2.0	0.01	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.6	1.0
23	3.893.0	5.31	6.0	22.79	6.0	28.1	5.0	2.0	205.19	6.0	2.0	0.0	2.0	1.0	4.0	4.2	1.0	1.0
24	3.893.0	0.94	2.0	0.01	2.0	0.95	5.0	2.0	0.1	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
25	3.894.0	5.78	6.0	57.92	6.0	63.7	5.0	2.0	11.16	6.0	2.0	0.0	2.0	0.0	2.0	2.0	4.0	1.0
26	3.894.0	7.42	6.0	2.24	2.0	9.66	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.4	1.0
27	3.894.0	0.0	2.0	1.1	2.0	1.1	5.0	2.0	0.007	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
28	3.8914.0	6.85	6.0	31.76	6.0	38.61	5.0	2.0	1.46	2.0	2.0	0.0	2.0	0.0	2.0	2.0	3.6	1.0
29	3.8914.0	0.0	2.0	1.03	2.0	1.03	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
30	3.891.0	0.0	2.0	0.79	6.0	0.79	5.0	2.0	6.78	4.0	2.0	0.0	2.0	0.0	2.0	2.0	2.2	1.0
31	3.8937.0	2.4	6.0	16.63	6.0	19.03	5.0	2.0	1.16	2.0	2.0	0.0	2.0	0.0	2.0	2.0	3.6	1.0
32	3.895.0	0.0	2.0	0.05	2.0	0.05	5.0	2.0	152.41	6.0	2.0	0.0	2.0	0.0	2.0	2.0	2.4	1.0
33	3.895.0	0.0	2.0	1.76	2.0	1.76	5.0	2.0	1.08	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
34	3.895.0	6.0	2.0	2.97	2.0	2.97	5.0	2.0	2.84	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
35	3.895.0	0.0	2.0	0.43	2.0	0.43	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
36	3.895.0	0.0	2.0	0.94	2.0	0.94	5.0	2.0	0.9	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
37	3.8920.0	9.01	6.0	19.82	6.0	28.83	5.0	2.0	9.67	4.0	2.0	0.0	2.0	0.0	2.0	2.0	3.8	1.0
38	3.8919.0	0.0	2.0	0.05	2.0	0.05	5.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0
39	3.8919.0	11.95	6.0	30.9	6.0	42.85	5.0	2.0	32.68	6.0	2.0	0.0	2.0	0.0	2.0	2.0	4.0	1.0
40	3.8919.0	7.97	6.0	17.18	6.0	25.15	5.0	2.0	935.03	6.0	2.0	0.0	2.0	0.0	2.0	2.0	4.0	1.0
41	3.8919.0	0.0	2.0	3.71	2.0	3.71	5.0	2.0	29.63	6.0	2.0	0.0	2.0	0.0	2.0	2.0	2.4	1.0

Fig. 4 The dataset in WEKA environment

Risk in order to convert numeric variables and their values to nominal. The attributes number 3, 4, 7–12 are converted to nominal (Fig. 6).

Furthermore, the filter *Discretize* was applied in order to discretize numeric variables *Sector\_score* and *TOTAL* and make them nominal. Figure 7 depicts all the variables used in our analysis.

The Discretization Options are portrayed in Fig. 8.

By visualizing all, it is possible to display the graphical representations of each attribute in relation to any other attribute as portrayed below (Fig. 9).

## 4.2 Classification

In the classification step, the algorithm OneR is applied. The attribute “Risk” is used as a class. Figure 10 presents the overall accuracy of the model computed from the training dataset and is equal to 84.4072%. The worst performance for the Precision on the class 0 and equals 70.6%, whereas the best performance is also for the Precision but on the class 1 and equals 100%. Confusion matrix validates that the precision for class 1 (variable b) is 100%. On the other hand, 121 instances were faulty not classified in class 0.

The results indicate that the attribute which describes the classification is variable *SCORE\_A*. This means that variable *Risk* is more closely related to the variable *SCORE\_A* than the other variables.



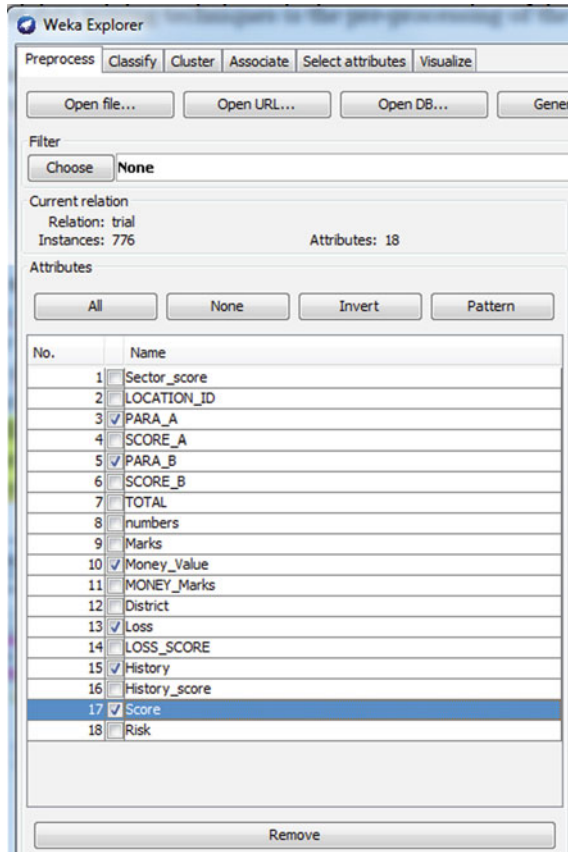


Fig. 5 The filter remove

### 4.3 Clustering

The clustering step was performed using the k-means algorithm (SimpleKmeans in the context of WEKA). The number of clusters is set to 2, since the variable “Risk” was used to compute the accuracy of the clustering and inspect the audit data. Figure 11 shows the results of the clustering based on variable “Risk”. The clustered instances are 433 (56%) and 343 (44%) respectively. It is also evident from the cluster centroids that “Risk” has value 0 in the first cluster and value 1 in the second cluster.

The differences between the two clusters are focused on attributes: Sector\_score, LOCATION\_ID, SCORE\_A, TOTAL and Risk.

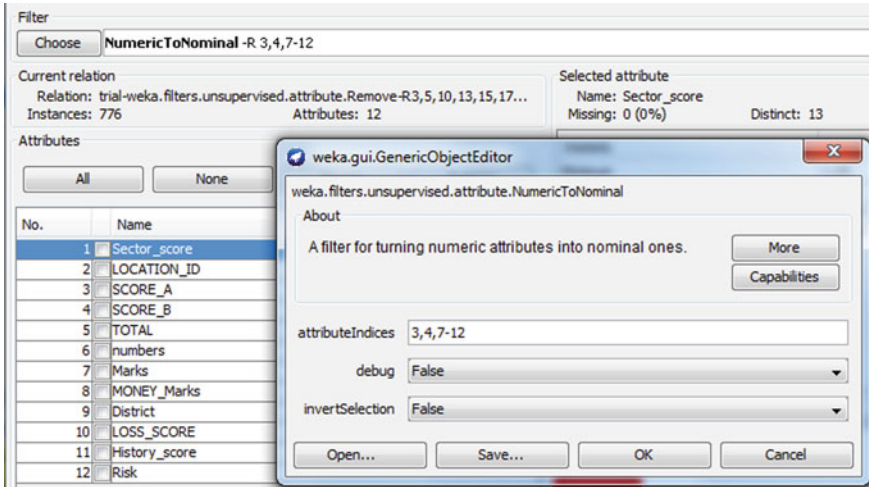


Fig. 6 The filter numerical to nominal

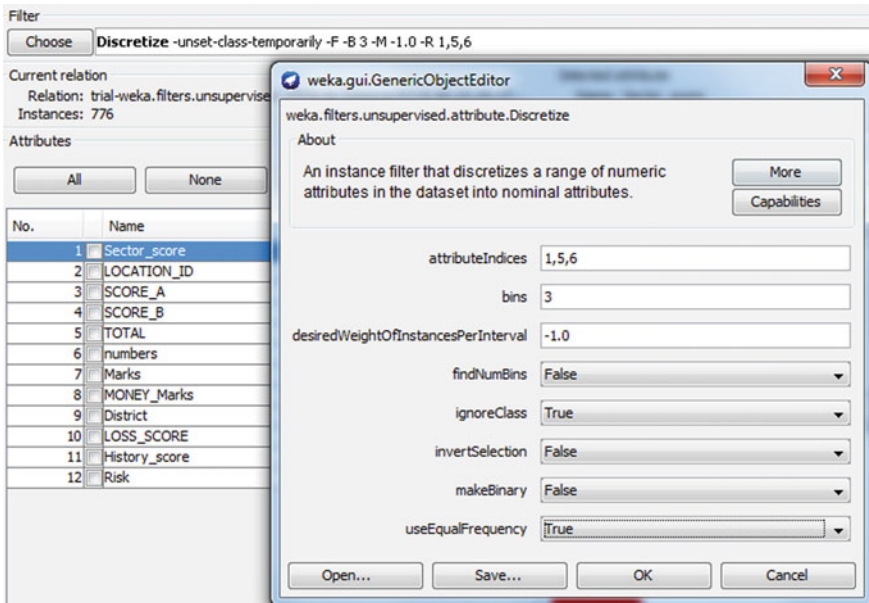


Fig. 7 The filter discretize

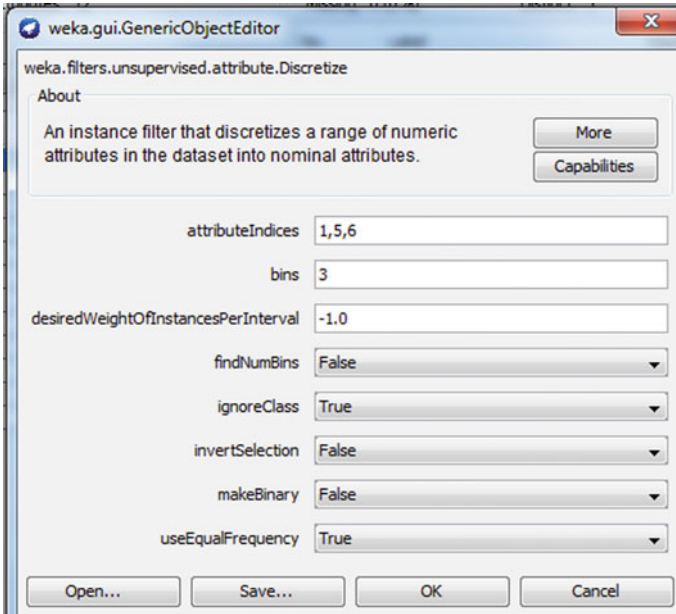


Fig. 8 Discretization options

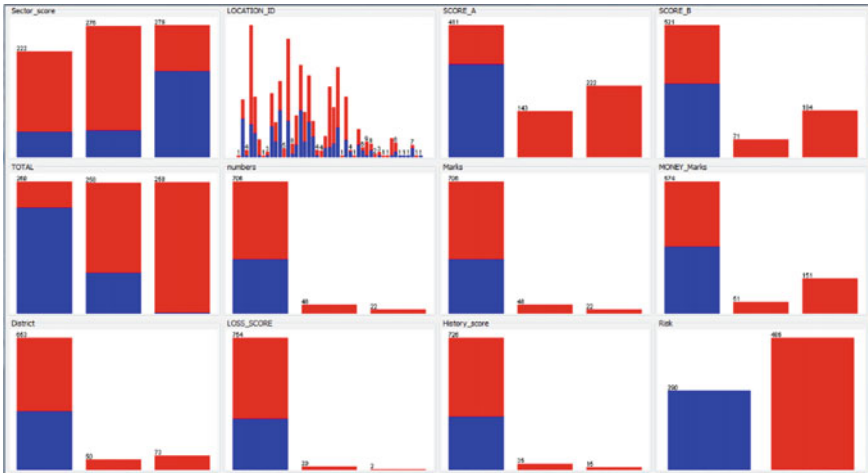


Fig. 9 Visualization of the attributes with class variable “Risk”

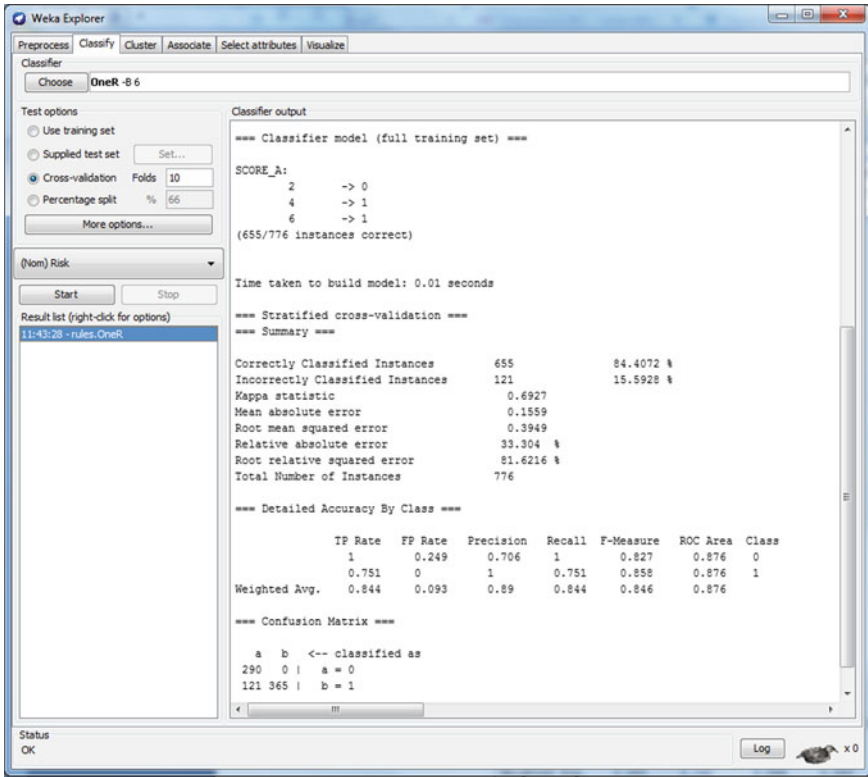


Fig. 10 Classification results using variable “Risk” as class

### 4.4 Association Rule Mining

The Apriori algorithm (Agrawal et al. 1993) was used for finding association rules for our dataset. The WEKA produced a list of 15 rules (Table 4) with the support of the antecedent and the consequent (total number of items) at 0.1 minimum, and the confidence of the rule at 0.9 minimum (percentage of items in a 0 to 1 scale). The application of the Apriori algorithm for association provided useful insights into the audit data. Table 4 shows how a large number of association rules can be discovered.

There is couple of uninteresting rules regarding the aim of the research, like the similar rules 1 and 2 which show expected or conformed relationships. If Marks = 2 then numbers is between 0 and 5.25 and vice versa. These are also symmetrical rules since the antecedent element and the consequent element are interchanged.

There are some similar rules, rules with the same element in antecedent and consequent but interchanged (3 and 4, and 5 and 6). The variables Marks and numbers appear in antecedent and consequent elements but they are interchanged. There is also a symmetric triad of rules (10, 11 and 12) where Marks and numbers appear also in antecedent and consequent elements interchanged.

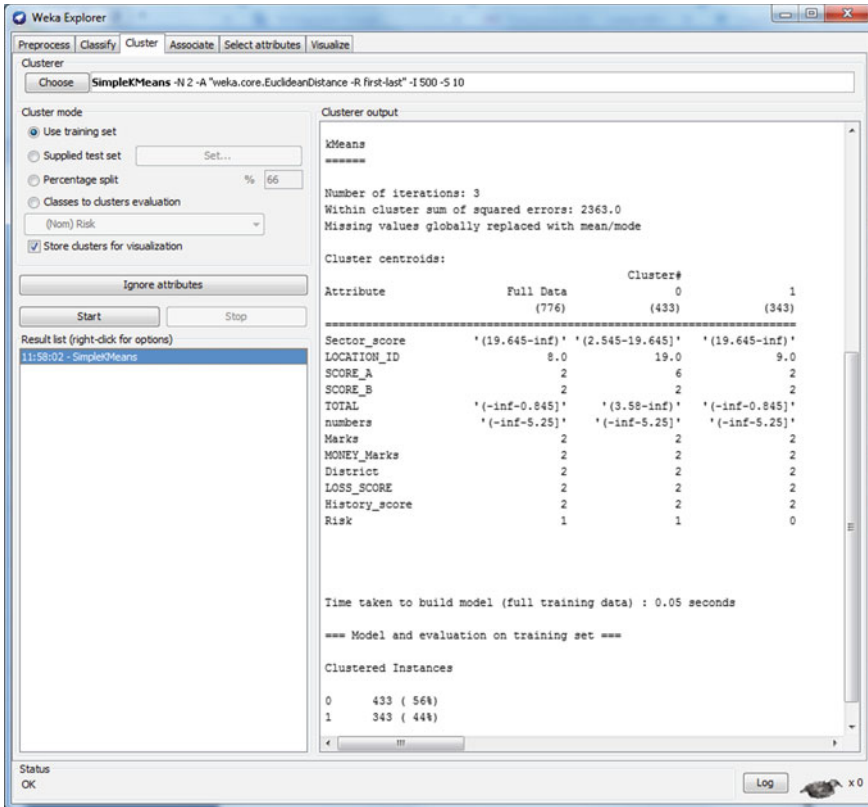


Fig. 11 Clustering results. Variable “Risk” is used for assessing the clustering

There are also an uninteresting or redundant rule (rules with a generalization of relationships of other rules, like rule 15 with rules 13 and 14).

But there are also interesting rules such as 7, 8 and 9 which offer actionability for an auditor. These three rules are useful for an auditor, since s/he can pay more attention to the companies with History\_score = 2, numbers between 0 and 5.25 and Marks = 2.

Summarizing the results from the classification, the clustering and the association rule mining methods, it can be concluded that:

1. The attribute which best describes the classification is the variable SCORE\_A. The attribute “Risk” (Fraud/Non fraud) is used as a class.
2. Using “Risk” as class attribute in clustering, the results show that companies which belong to the second cluster having better values in the parameters regarding the Risk.
3. For companies with History\_score = 2, numbers between 0 and 5.25 and Marks = 2, an auditor must pay more attention.

**Table 4** Best rules found with Apriori algorithm based on confidence metric

Best rules found:
1. Marks = 2 706 ==> numbers = '(-inf-5.25]' 706 conf:(1)
2. numbers = '(-inf-5.25]' 706 ==> Marks = 2 706 conf:(1)
3. Marks = 2 LOSS_SCORE = 2 688 ==> numbers = '(-inf-5.25]' 688 conf:(1)
4. numbers = '(-inf-5.25]' LOSS_SCORE = 2 688 ==> Marks = 2 688 conf:(1)
5. Marks = 2 History_score = 2 673 ==> numbers = '(-inf-5.25]' 673 conf:(1)
6. numbers = '(-inf-5.25]' History_score = 2 673 ==> Marks = 2 673 conf:(1)
7. History_score = 2 726 ==> LOSS_SCORE = 2 710 conf:(0.98)
8. numbers = '(-inf-5.25]' 706 ==> LOSS_SCORE = 2 688 conf:(0.97)
9. Marks = 2 706 ==> LOSS_SCORE = 2 688 conf:(0.97)
10. numbers = '(-inf-5.25]' Marks = 2 706 ==> LOSS_SCORE = 2 688 conf:(0.97)
11. Marks = 2 706 ==> numbers = '(-inf-5.25]' LOSS_SCORE = 2 688 conf:(0.97)
12. numbers = '(-inf-5.25]' 706 ==> Marks = 2 LOSS_SCORE = 2 688 conf:(0.97)
13. numbers = '(-inf-5.25]' 706 ==> History_score = 2 673 conf:(0.95)
14. Marks = 2 706 ==> History_score = 2 673 conf:(0.95)
15. numbers = '(-inf-5.25]' Marks = 2 706 ==> History_score = 2 673 conf:(0.95)

## 5 Discussion and Conclusions

In this paper, a framework is proposed for audit, accounting, financial, and risk management executives. It identifies the management of audit alarms and the prevention of the alarm floods as critical tasks in the implementation process. The developed framework solves these problems by using the data mining techniques. The audit data originated from an existing audit organization stored in a well known data repository and the used software package was WEKA. With this pilot application of audit data, an audit process is carried out and the proposed decision support framework is able to assist an auditor to decide on the size of work required for a particular company or organization, or even omit to visit low-risk companies. Predicting fraud in a company is an important step in the preliminary planning stage of the audit, as high-risk companies are targeted to maximize audit research.

Since, the implementation of auditing is a recognized challenge among researchers and practitioners, and traditional audit tools and techniques neglect the potential of data analytics, the development of an appropriate audit framework based on data

mining tools and techniques is imperative need. We analyzed established audit data considering the dimensions of the data paradigm in this paper. This led us to a proposal of a conceptual architecture for an integrated audit approach. The proposed framework is independent of the particular dataset and can be applied to other similar datasets by using the same data mining techniques. The outcomes support the decision-making process regarding the companies it audits. The training and testing of a risk detection and management model contributes to cover an existing research gap. With the increasing number of financial fraud cases, the application of data mining techniques could play a big part in improving the quality of conducting audit in the future.

The question of whether the proposed framework can be applied to other financial and administrative applications can only be answered satisfactorily once it will be tested to them as well. The use of the method requires users with specific capabilities and knowledge. That is to know to use in depth audit and data mining techniques.

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# Determinants of Profitability: Evidence of Renewable Energy Companies



Fatbardha Morina, Chrysanthi Balomenou, and Uğur Ergün

**Abstract** Energy in the world is being provided using fossil fuels as a source because they have the lowest costs and it is considered that we are living in an era of fossil-fueled economies. But due to global warming and climate change, it is necessary to find alternative sources in order to provide energy for future generations and to end the age of fossil fuels. The demand and consumption of the energy is increasing but the resources are limited. In this way, it is generating interest in renewable energy in order to reduce the negative effects on the environment and to create sustainable development. The question is how profitable, and which are the risks that renewable energy companies face? In this way, the aim of this paper is to examine the effect of firm-specific characteristics and macroeconomic determinants of renewable energy companies using the Fixed Effects Model spanning the period 2005–2018. The empirical result shows that internal factors that depend on firm management are significant and have a positive impact on profitability. The profitability is affected positively by capital, size, and capital productivity while leverage of the firm has a negative impact. Additionally, it is investigated the effect of macroeconomic factors that seems to be insignificant in profitability. This study suggests some policies that should follow by policymakers in order to promote renewable energy companies and to create suitable conditions for sustainable development. The development of renewable energy companies is associated with economic, social development, climate changes mitigate that reduce emissions in the environment and have a positive effect on health.

**Keywords** Profitability · Risk · Renewable energy · Sustainability · Clean energy

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## Jel Classification Codes Q40 · Q43 · Q50

# 1 Introduction

Energy is the source of sustainable development since all production industries and individual activities are related to energy as a requirement in daily activity. The need for energy and its related activities to satisfy human social, welfare and health is increased due to the economic and technological development all over the world. Although, people that live without energy accounted for around 1.06 billion (14% of the global population) and about 2.8 billion people live without clean energy (REN21 2018). For many years, fossil fuels have been the main drivers of electrical energy production, but in the future, a shortage of fossil fuels will cause problems in the completion of energy demand. The lack of energy prevents economic growth and for highlight all over the world because the clean energy has become the preferred power source for many countries in order to reduce emissions, mitigate climate change and to provide a clean environment. The performance of renewable energy companies is fundamental to the sustainable growth of this sector and to contribute to the overall economic growth and to fulfil the increasing energy demand worldwide and to think for future energy. In the literature is increased the number of studies that evaluate the performance of renewable energy stock price and the effect of systemic risk during the late 90s when the world was affected by shock from oil products in the form of price hiking by the OPEC group (Abbasi et al. 2011; Sadorsky 2012). Return from renewable energy stocks are uncertain since their performance depends on weather conditions, energy policies that affect the behaviour of investors in this industry.

This paper investigates the effect of firm-specific characteristics and macroeconomic factors on the profitability of renewable energy companies that compose the global stock index RENIXX<sup>®</sup>. The effect of the first group of determinants that describe the firm-specific characteristics is related directly to the results of the managerial decision. The second group of determinants describes macroeconomic factors that are external factors which are not the direct result of the firm decision. As a representative sample of global renewable energy, we have obtained data for 26 largest companies that compose the global stock index RENIXX<sup>®</sup> by market capitalization. The Fixed Effect model for the period between 2005 and 2018 shows that the profitability of renewable energy depends on the managerial decisions. The profitability of those companies is positively affected by capital, size, and capital productivity while the leverage of the firm has a negative effect. Additionally, in the analysis was investigate the effect of macroeconomic factors that seems to be insignificant in profitability. This paper aims to suggest some policies that should follow by policymakers in order to promote renewable energy companies and to create suitable conditions for sustainable development. In the following, Sect. 2 describes the traditional theories and empirical studies related to profitability. Section 3 discusses the available risk in renewable energy companies and the methods to mitigate risk to ensure the sustainability that provides energy for the future generation. Section 4

explains the methodology. Section 5 shows empirical results and Sect. 6 summarizes and gives some policy.

## 2 Literature Review

Firms that operate in the market want to earn in order to survive and grow over a long period of time. In this way, profit is considered as a key objective of the firms, but the profitability is the best indicator that suggests an organization is doing things right as well as the primary measure of organizational success (Megginson et al. 1994). Profitability means the ability to generate income by using available resources in the market and when the generated profits are higher they are the engine that drives their growth (Mukhopadhyay and AmirKhalkhali 2016).

The long-establish theories that explain the determinants of firm profitability are market-based view (MBV) and resource-based view (RBV). The former indicates that the performance of firms depends on the structure of its industry (e.g., concentration, economies of scale and entry and exit barriers). Part of the market-based view is the structure conduct performance (SCP) paradigm that was established as a way to analyze the effect of industry structure on the behavior and strategies of competing firms in the industry. The latter explains that firms' specific resources and capabilities influence performance because the resources that firms have in their disposal differ among firms and these resources and capabilities would make a firm to take advantage due to its inimitability (Knecht 2013). However, the large literature that study firm profitability has identified different factors that can be categories into three groups: firm-specific, industry-specific and market related factors.

### 2.1 Firm-Specific Determinant

Hawawini et al. (2003) analyze the researcher from the past in order to determine if the performance of the firm is driven by industry or firm-specific factors. They use value-based measures (economic profit or residual income and market-to-book value) instead of ROA to measure performance and, they concluded that the performance of the leaders and destroyed in the market is affected by firms' specific factors and for other firms that do not outperform or underperform, industry-specific is dominant.

Goddard et al. (2005) seek that even the formation of the European Single Market in goods and services in early 1991, the abnormal profit persist from year to year and the strong competition does not settle back normal within a one-year time span. They identify that the size and risk to the default of firms have a negative and significant effect on profitability. The market share and liquidity accelerate profitability. In contrast Gschwandtner and Cuaresma (2013), investigate the determinants of profit persistence (POP) in the short-run and long-run for 151 US manufacturing companies in the period 1950–1999 by using a time-varying approach. Different from previous

studies that consider the persistence of the profit fixed for a long period of 20 years and upwards, they developed a new methodology that measures the profit in a more accurate way and identifies the factors that vary with the time that affect the persistence parameter that is not constant over time. They conclude that concentration as industry characteristic has a positive effect on profit persistence, while market share and risk as company features appear negative influence.

In the case of renewable energy companies, Tsai and Tung (2017) study the profitability of 93 companies that rely on 34 different countries by extracting data from the Bloomberg database. The indicators that are used to measure the performance of the RE firms during the period 2008–2013 are returned on assets, gross profit margin and interest coverage. The results show that shares of renewable energy and energy consumption have a negative effect on ROA while market capitalization has a positive significant effect. Also, market capitalization has a positive effect on interest coverage. Capital intensity has a positive effect on gross profit margin. Lastly, in order to measure accurately, the firm performance is to find the appropriate indicator. According to Delen et al. (2013) find that the most important financial ratio that determines the company performance is the Earning before Tax-to Equity Ratio and Net Profit Margin. These financial ratios are a measurement of profitability that provides information regarding the way in which the company manages costs and benefits.

## ***2.2 Industry Specific Determinants***

The global economic development has increased the competition between firms that push industries to be increasingly perspective in order to create value added. Every company should invest in innovation and redefine business models in order to gain sustainable competitive advantages. But all industries are faced with challenges due to changes in the business environment which are characterized by fast changes in consumers, technologies, and competition. The life cycle of the products and services have a significant effect on the profitability and growth of the company. The most difficult phase of the product is when they achieve a mature stage that accompanies slow growth and cost efficiency becomes the key determinant of profitability. Pătări (2010) identifies and analyzes the country and industry level factors that affect the profitability of bioenergy business, its value creation potential and forest and energy industry' forecasting effect on it. Due to difficulties to find historical and financial data in forest energy is used the Delphi technique that consists of direct interviews with experts in the field during the latter half of 2006. He concludes that the bioenergy sector has increased attention because the price of raw materials is increasing, and investors are looking for alternative sources which means that changes happen more quickly on industry level than on the company level. The collaboration between forest and energy industry is more profitable for the development of bioenergy business which can use the existing infrastructure and knowledge.

### 2.3 *Market Related Determinants*

In a liberalized energy market, the support of government is fundamental for green energy. Tradeable green certificates system was introduced in 2001 by the government to offer the opportunity for consumers to be free in green suppliers chosen. Fiscal policies that the government use to intervene provides a long sustainable development for the environment and society. The regulated energy tax introduced by The Netherlands since 1996 promotes the renewable energy sector with zero tariffs for green. These investments have a higher cost of capital and they need funds to buy renewable energy equipment. Three schemes that can follow to facilitated investments in the green sector are green funds, accelerated depreciation, tax credit (Kwant 2003). The promotion of renewable energy from the electricity production system is supported by two market-based instruments such as Tradeable Green Certificates (TGC) and Feed in Tariffs (FIT) in the case of European Union countries. In the case of FITs policies set a guaranteed price on renewable electricity to drive renewable energy sources deployment. Tradeable Green Certificates policies introduce a quantity restriction that determines the market price of renewable electricity.

Jaraite and Kažukauskas (2013) analyze how the policies implemented to promote renewable energy affect the profitability of energy production firms. The study includes firms of energy generating sector that operate in twenty-four EU countries during 2002–2010 and they conclude that countries that have adopted Tradeable Green Certificates systems are more profitable than firms operating in countries that have introduced Feed-in Tariffs. This result is related to the fact that due to market imperfections, namely because of higher investment risk, capital contains and higher transaction costs, investors require the higher capital returns that will be associated with excess profit for renewable energy generating firms. The positive effect of EU ETS is found for energy generating firms operating in countries that have TGC policy. Similarly Eyraud et al. (2013), show that economic growth, low-interest rate, and high fuel prices boost green investment. The intervention policies such as feed-in-tariffs and carbon pricing schemes have a positive impact on green investment.

In recent years, due to the market liberalization of energy, firm producers of energy are facing competition that makes the investors be uncertain related to the decision of other competitors and thus uncertain prices. These renewable technologies have a high level of capital intensity and they provide an uncertain rate of returns because the amount of energy produced depends on the number of sunny days, the speed of the wind, etc. Although, the cost of renewable technologies is declining, and they reduce the level of carbon emission and create jobs they need support from public administration to promote renewable energy companies. The public incentives such as feed-in tariffs, subsidies, tax credits, portfolio requirements, and certificate systems boost investment in renewable energy companies. Reuter et al. (2012) investigate the behavior of investors in wind farm companies in Germany that are considered as the most successful under the policy and regulatory uncertainty using a real option model. The ratio between investment in a coal-fired power plant and a wind farm is 3:1. The investments in renewables technologies are related to environment uncertainty

such as the changeability of renewable loads that affect the decisions of investors to expand or to implement a new utility. The policy uncertainty for these companies is a crucial factor that affects the decisions to invest in renewables. In cases of European companies, what will be the future of feed-in tariffs? Will it continue to support the development of green investment?

Fagiani et al. (2013) evaluate the performance of support schemes such as feed-in tariffs and certificate markets on renewable energy taking into account the effect of risk version. The investor that is risk aversion undertake a riskier project only if the expected returns will be higher compared to the initial costs. In order to measure the effect of two policies on the project's risk, a system model that simulates the progress of the power sector for 39 years from 2012–2050 and the Continuous Value at Risk are used. The analysis shows that the feed-in tariffs mechanism can achieve better cost-efficiency than certificate markets when they operate under the same market share of renewable energy. The feed-in tariffs could result in either low effectiveness or over-investment because they operate under the regulator's decision that affects the level of tariffs. Instead, certificate markets are based on putting targets related to the share of renewable energy that increases investment in renewable technologies in the future years. The performance of feed-in tariffs and certificates benefit from high social discount rates and lower rates respectively.

Milanés-Montero et al. (2018) investigate the influence of FITs on the profitability of photovoltaic energy companies in four developed European countries during 2008–2012. The analysis shows that Germany has the highest level of CO<sub>2</sub> emissions, photovoltaic capacity and electricity consumption compare to Italy, France, and Spain and at the same time, photovoltaic German companies are more profitable. The profitability is affected positively by FITs because this support scheme promotes RE companies in Europe. When these companies enlarge their activity in terms of assets, they increase the competition in the market and make more profitable since large companies take advantage of economies of scale. Contrary to other studies the leverage ratio promotes profitability because they use the borrow funds to invest in technology that provides profits in the future. They conclude that FITs need a transformation in order that EU energy policies being according to the liberalization of the energy market.

### 3 Risk and Sustainability of Renewable Energy Companies

Renewable energy companies are considered as more riskier companies because they are capital-intensive, and they require investment in technology. Risk can be described by the negative impact which the uncertainty that investors percept in renewable energy projects related to future events would have on the financial value of a project or investment. The uncertainty in relation to future events affects behavior in the decision making of investors because the future financial value of the investment can be both positive or negative compared with the expected value (Cleijne and Ruijgrok 2004).

Various studies deal with the risk of renewable energy companies and management risk. Sadorsky (2012) investigates the determinants of systematic risk in 52 renewable energy companies listed on Wilderhill Clean Energy ETF (PBW) for the period 2002–2007. The results of the OLS regression show that the sales growth of the company has a negative impact on the risk of the company, while the increases price of oil has a positive impact on risk. Other factors such as firm size, the debt to equity ratio, and R&D expenditure to sales ratio that cause the risk are not statistically significant. However, Inchauspe et al. (2015) find that renewable energy stock (NEX) prices are influenced by the world equity index MSCI and technology stocks (PSE). The influence of changes in oil prices in NEX returns is less significant than the MSCI and PSE index. Global financial crises of 2008 have caused underperformance of renewable energy companies because investors did not believe in further acceleration of alternative energy and the gap that exists between innovation, adoption, and diffusion in renewable energy technology makes hard competition with the technology sector.

Apart from market risk, Gatzert and Kosub (2016) conclude that policy and regulatory risk are the main barriers for renewable energy investment. Especially, related to support schemes that would abandon or modify due to the changes in government priorities that can be destroyer for companies.

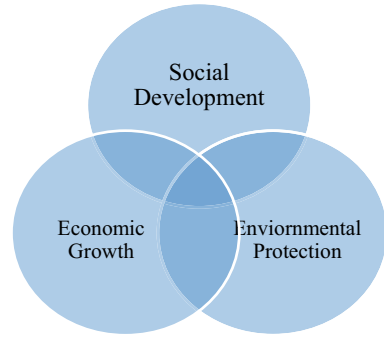
The operational risk that renewable energy companies would face is related to damage from large natural catastrophe events, the equipment performs worse than anticipated, fire, etc. In this way Montes and Martín (2007), study the profitability of wind energy and identifies the short-term risk factors and they emphasize the importance of insurance products to transfer these risks.

In the future, the cost of renewable energy technologies should decrease more rapidly than traditional energy because the market of green energy will mature and the government is following policies such as feed-in tariffs, capital subsidies, tax credits, feed in premiums and tradeable green certificates to support the growth of the sector. Yet, the government of developed countries but not only are putting long-run targets regarding the level of consumption of energy produced by renewable resources compared to conventional energy. In order to provide long-term sustainability of renewable energy projects, it is vital to de-risk cash flows by using the adequate insurance and risk management to attract institutional investors such as insurance companies and pension funds (Turner et al. 2013).

Renewable energy sustainability is related to the achievement of three aspects of sustainability such as economic, social and environmental sustainability (Fig. 1). In this way, the shift from fossil fuel-based energy sources to renewable energy sources ensure energy security, energy access, social and environmental development, climate change mitigation and reduction of environmental and health impact. Although opportunities associated with renewable sources, renewable energy companies face barriers such as high capital cost, replacement cost, operation and maintenance cost, market failures that prevent sustainable development. According to Owusu and Asumadu-Sarkodie (2016) seek that in order to create a sustainable development of renewable energy to ensure sustainable energy for the future generation it is necessary international cooperation with least developed and developing



**Fig. 1** Renewable energy sustainability



countries to access renewable energy sources and technologies. This cooperation will help to decrease the cost of investment and barriers that will face. The deployment of renewable energy sources in a global market affects the trade of technology equipment and fossil fuels that decrease the demand for fossil fuels. The positive effect of doubling the share of renewables in the global energy mix by 2030 would reflect with increase of global GDP by up to 1%, new jobs opportunity that could reach 24.4 million employed people and ensure the improvement of human well-being (IRENA 2016).

## 4 Methodology and Data

The 30 largest companies of the renewable energy industry worldwide by market capitalization that compose the global stock index RENIXX<sup>®</sup> are taken in the analysis as a representative sample of global renewable energy companies to identify the key determinants of profitability. These companies operate in various generation fields such as wind energy, solar, hydropower, geothermal, bioenergy or fuel cell technology and their entities are geographically spread between developed and developing countries. However, the analysis is focused on a global scale and does not analyze the profitability of companies according to the sources that they use to generate energy.

The annual data retrieve form financial statements of each company spanning the period 2005–2018. Thus, for each company is obtained balance sheet, income statement, and key ratio matrix. Thomson Reuters Eikon is used to obtain the data and it is considered as a reliable source. All financial data are annualized and standardized in US dollars and thousands. Four companies are excluded due to a lack of data. The data related to the CPI index are obtained by the International Monetary Fund (IMF) while gross domestic product data from World Bank Data.

The model used to analyze the determinants of profitability is as follows:

$$ROAA_{it} = \alpha + \beta_1 EA_{it} + \beta_2 DE_{it} + \beta_3 PG_{it} + \beta_4 OE_{it} + \beta_5 CP_{it} + \beta_6 S_{it}$$

$$+ \beta_7 CPI_{it} + \beta_8 \ln GDP_{it} \quad (1)$$

where  $N$  companies are observed over  $T$  periods and  $i$  refers to an individual company and  $t$  refers to year.

The term ROAA represents company profitability measured as the ratio of net profit on average assets. The variable (EA) represents capital measured as equity to assets, (DE) represents leverage of the company measured as debt to equity. The productivity growth (PG) measured as the natural logarithm of real gross total revenue over the number of employees is used as an indicator of employees' qualifications. Expenses management (OE) measured as operating expenses over total assets is an indicator that shows the outcome of management. Also, in the profitability, is investigated the effect of capital productivity (CP) and size (S) of the company measured respectively as gross total revenue to equity and as the natural log of total assets. Apart from firm-specific determinants, we have used and macroeconomic variables such as inflation (CPI) measured as the growth rate of CPI index and gross domestic product (GDP) measured as the natural logarithm of GDP.

In order to provide evidence in favor of the robustness of the model we check the following issues: first, we test multicollinearity between regressors. Correlation matrix (Table 1) shows that all correlation coefficients between each pair of variables are below the stated threshold of 0.8 that means no multicollinearity between the explanatory variable.

The second issue is the stationarity of variables in panel data and by using the Fisher test the null of non-stationarity is rejected the 5% level for all variables.

The third issue is the choice between Fixed Effects and Random Effect, as it is indicated by the Hausman test (Table 2) the difference in coefficient between Fixed Effects and Random is systematic, proving evidence that the appropriate model in this case is Fixed Effects by rejecting the null hypothesis. When estimating via Period Fixed Effects specification method, the final model results to be highly statistically significant. This model allows to include time effects as well to control for heterogeneity or individuality among the companies under analysis, allowing each country

**Table 1** Correlation matrix

Variable	EA	DE	PG	OE	CP	S	CPI	GDP
EA	1.0000							
DE	-0.4430	1.0000						
PG	0.0083	-0.0474	1.0000					
OE	-0.2069	0.0545	0.2246	1.0000				
CP	0.2233	0.1484	0.1498	-0.0107	1.0000			
S	-0.1396	-0.0228	-0.0174	0.1610	-0.1021	1.0000		
CPI	0.0678	-0.0482	0.1327	0.0080	0.0097	0.2284	1.0000	
GDP	0.0674	0.0051	0.3500	-0.0153	0.0039	0.0017	0.1537	1.0000

**Table 2** Hausman test results

Correlated random effects—Hausman test			
Test period random effects			
Test summary	Chi-Sq. Statistic	Chi-Sq d.f	Prob
Period random	34.636245	8	0.0000

a constant value of itself. This constant is invariable in time, so this effect removes the effect of invariant characteristics of the time.

Lastly, the joint significance of the unobserved time effects is tested by the  $H_0: \lambda_{1=} \lambda_{2=...} \lambda_T = 0$ . The F-test shows that  $H_0$  is rejected at the 95% confidence level ((F13, 218) = 4.08,  $p$ -value = 0.000), implying that the period fixed effect is selected in the model.

## 5 Empirical Results

The present study uses an unbalanced panel of renewable energy companies for the period between 2005 and 2018. The results of fixed effects estimation with period fixed effect are reported in Table 3 using return on average assets (ROAA) as the dependent variable. The result shows that the impact of capital turns out to be positive and statistically significant reflecting the sound financial condition of renewable energy companies. It means that companies with a sound capital position have opportunities to extend their business and are more flexible to deal with problems arising from different financial situations, thus promote profitability.

The leverage ratio comes out with a negative impact on profitability. It means that companies should utilize part of their earnings to pay off the large interest cost. The productivity growth shows a positive impact on profitability that means an increase in productivity growth increases profitability but it is not statistically significant. Capital productivity influence positively profitability and the utilization of equity by those companies increase its revenue that creates mores funds available for further.

The size of the firms as expected is positively related to company profitability and is statistically significant that means that the management quality of these companies is high and they are efficiently using the assets to generate profits.

Operating expenses is a determinant factor for the profitability but the estimated coefficient of operating expenses turns out to be negative and not significant means that these companies have a lack of competences in expense management.

Lastly, the impact of macroeconomic factors such as inflation and the gross domestic product seems to be insignificant in their profitability.

**Table 3** Fixed effects estimation (ROAA dependent variable)

Independent variable	Fixed effects model with time dummies	
	Coefficient	t-statistic
Constant	3.186	(1.25)
Capital (EA)	0.231**	(3.87)
Leverage (DE)	-0.011**	(-3.31)
Productivity growth (PG)	0.023	(-1.43)
Expenses management (OE)	-0.000070	(-0.06)
Capital productivity (CP)	-0.0006**	(7.37)
Size (S)	0.064**	(6.02)
Inflation (CPI)	0.005	(1.60)
Gross domestic product (GDP)	-0.144	(-1.59)
R-squared	0.50	
F statistic	16.69	
Prob (F-statistic)	0.000**	
Time dummies joint significance	F (13.218) = 4.08**	

*Notes* \*\*significant at the 5% level (two-tailed test); t ratios are in parentheses. Standard errors are heteroscedasticity robust

Variable Definition: *EA* Equity divided by total assets, *DE* debt divided by equity, *PG* Gross total revenue divided by the number of employees, *OE* Operating expenses divided by total assets, *CP* gross total revenue to equity *S* The natural log of total assets, *CPI* Inflation, *GDP* The natural log of gross domestic product

## 6 Conclusion

The challenge of countries to increase economic growth with low emission has pushed countries to look forward to an alternative solution to improve economic performance with low greenhouse gas emissions. Renewable energy is seen not only as a solution to decarbonize economies but as a source to create jobs, increase economic growth and to improve health. In this way, the study of renewable energy sources that ensure energy for the future generation with no net emission is fundamental because mitigate climate changes and improve health. The aim of this paper is to find out if renewable energy companies are profitable and to identify the factors that drive profitability, risk, and sustainability. The review process includes papers and books in the scope of the study. The study identifies that the performance of renewable energy companies is driven by internal and external factors. The most important factor is the support schemes by the government because without the support they will face many barriers in order to develop their activity and to get market share. The main problem related to support schemes in European Union is the fact that if the government will continue to support these companies or not, because of the renewable energy project last 20–30 years and if the government does not support, they face business interruption.

The risks associated with renewable energy companies can be classified as construction, operation and maintenance risk, market, policy, and regulatory risk. To mitigate risk from the investors' perspective they transfer this risk to insurance companies that are still limited due to huge challenges. The sustainability of renewable energy companies depends on the policy and regulatory stability and it's important to find alternative insurance solutions in order to provide stable returns and to facilitate decision making by investors in this industry. In this way, we investigate the determinants of profitability for the 26 largest companies in the renewable energy industry that are geographically spread between developed and developing countries by using the Fixed Effects model spanning between 2005–2018. The empirical results show that capital is important in explaining the profitability of renewable energy companies. Additionally, the size of the firm and capital productivity are positively and strongly related to profit. Only, leverage seems to have a negative impact on profit, but it is in low value. The macroeconomic factors such as inflation have a positive impact but no statistically significant. Also, the impact of gross domestic product is not significant. From the findings, the main suggestions that will create opportunities for the sustainable development of these companies and environment protection are as follow:

- To increase the level of clean energy consumption in all countries by setting up clean policy and putting targets in order to increase the share of renewable energy that creates benefits for actual consumers and future generations. The increased level of clean energy creates conditions to mitigate global warming.
- The support schemes for these companies to be clearer related to the face that there are concerns if governments will support during their all life cycle.
- To improve technologies that are using to produce clean energy in order to reduce construction and operation risk.

We suggest further research for renewable energy companies engaged in business like solar, wind, geothermal, biomass, ocean to examine if firm specific factors affect the profitability of solar companies in the same way as it affects wind, geothermal, biomass, or ocean companies.

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# Sentiment Analysis: Relationship Between Customer Sentiment and Online Customer Ratings for Price Comparison Engines. An Empirical Study



Iasonas Papafotikas and Dimitrios Folinias

**Abstract** Sentiment analysis, in other words, opinion mining, is aiming at analyzing people's sentiments, opinions, emotions, attitudes, etc. Customer sentiment refers to the emotions expressed by customers through their text reviews. These sentiments can be positive, negative or neutral. This study will explore customer sentiments and express them in terms of customer sentiment polarity. In the current days, Greece is facing one of the worst economic crisis in its history, so price comparison engine usage is more than needed, especially for the most competitive and pricy goods, such as athletic footwear and technology ones. In such circumstances, companies have to find more efficient ways to get the absolutely necessary information from their targeted audience by overcoming the problems that a researcher can face with the usage of an ordinary questionnaire, because the customer has written his own point of view; using his own words without being guided by a questionnaire or an interview. This study tries to identify this crucial information and help the contemporary e-shop to improve its ecommerce services and gain more income with less advertising, cpc campaigns, etc. Hence, in this case we gathered from «Skroutz» one of the most renowned PCE in Greece and extracted the sentiment from these core industries target groups, based on the user's/buyer's comments and their rating. We used WEKA for classifying the text and extracting knowledge.

**Keywords** Sentiment analysis · e-commerce · Online customers · Classification · Opinion · Price comparison engine (PCE) · Rating · Machine learning · Customer polarity · Skroutz · Data mining

**JEL Classification** M21 · M31 · C55

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# 1 Introduction

This research is an empirical analysis of data mining; in other words, sentiment analysis, which is a global trend in the marketing era and not only to it. Sentiment analysis is the scientific era that tries to identify the customer's, reader's, fan's, voter's social media user's, etc. sentiment. To be honest in my opinion the idea of revealing people's sentiment by using their own point of view, opinion, state, through their own writing without the implementation of interviews, questionnaires, etc. is just beyond imagination.

Greece in our days is facing one of the worst economic phases of its history; with its citizens' habits and needs still thriving. They need finding new ways to fulfill these needs and one of these ways is the Comparison Price Engines (CPE). As the CNBC so poetically stated, "After a Decade of Economic Crisis, has stopped Dreaming." [cnbc.com](http://cnbc.com) (2017), is a big indicator of the state that the citizens of Greece are experiencing right now. Needs never stop, so domestic CPE such as Skroutz ([skroutz.gr](http://skroutz.gr)), best price ([bestprice.gr](http://bestprice.gr)), etc. thrive and help customers and retailers to achieve their goals.

Comparison Price Engine CPE is a site that compares products and prices from various sellers, categories, etc. and show them depending on the user's search.

Even in Greece, which is way behind on the usage of this kind of purchasing goods and services, we observe a rise of consumers choosing it because it is very easy and convenient to have all the data that you need, with pictures, characteristics, reviews from former buyers and all these with one click. So it is not so unexpected that e-commerce through CPE has thrived the last decade. Another reason for CPEs that are so widespread is that it is a cheap way to "find and keep" a customer to your e-shop.

Then why in Greece there has been a late evolution? It is because the users are not so educated and there is a well-spread fear of fraud in the "internet realms". Research though that was conducted in 2017 about e-commerce in Greece showed encouraging outcomes and metrics ([Greekecommerce.gr](http://Greekecommerce.gr) 2017; [Export.gov](http://Export.gov) 2017).

That is why sentiment analysis is so valuable, because it provides that kind of information, to sellers, to strategists, to marketers, to managers, to whole industries in general. With this kind of knowledge, purchasing would be easier, the products that would be provided for the customers would be more targeted and the loss of money, time and the loss of wealth factor would be shrunk.

Hence, this kind of analysis has no borders and limitation; it is a new and unmapped area were researchers could find and unleash all this needed information about people/customers/voters! For this research, there have been obtained the reviews of two of the most successful categories of Skroutz; ([skroutz.gr](http://skroutz.gr)) athletic footwear and Technology products. We thought that it would be enlightening to dive in that two-target group sentiment and find out as much as we could by only observing and classifying their data. Furthermore, it sounded challenging to train an algorithm to do all these for us. The data were collected anonymously for these two categories

with the prices from technology goods being from 3.99 euros to 1332.99 euros. For the Athletic ones, the price range was from 19.99 euro to 199.95 euro.

This study tries to explore customer sentiments and express them in terms of customer sentiment polarity. There were five hundred and fifty-one reviews randomly collected from the two. After the first cleaning and cutting all the unnecessary, I ended up with 320 reviews and for the sports, there were 470. Three different algorithms have been used on an open-source software WEKA. The three algorithms are Naive Bayes, Random Forest, and SVM, with Naive Bayes being the algorithm that worked the best. The outcomes were enlightening as expected for these two target groups and showed how much educated they are on the era that they are reviewing and how much attention they are paying to the reviews etc. As I have already said there are so many aspects and areas that sentiment analysis could be broadened and serve strategists and marketing managers on their quest, what their customer wants. I believe that this research could contribute to this quest and could help sellers, managers, strategists, and industries to further develop their business, advertising, etc., to comparison price engines.

## 2 Literature Review

### 2.1 *Current Domestic e-Commerce Market Trends*

Today the Greek e-commerce landscape shows that the sector is growing with six and a half thousand e-shops and three million online consumers ready to buy. The total amount of internet users in Greece is seven million, and they spend an average amount of one thousand three hundred euros per year. Thirty percent of these already mentioned e-shoppers spent half of their budget on Internet purchases (Greekecommerce.gr 2017; Export.gov 2017; Greekecommerce.gr 11/2017).

Eight out of ten get access to the internet through their laptops, seven out of ten through their tablets and six out of ten through their desktops. The daily e-banking transactions through a mobile device were the twenty-five percent of the total banking ones. For bidding were twenty percent and for access to suppliers and retailer mobile applications were twenty percent (Greekecommerce.gr 2017; Export.gov 2017).

Despite the financial disgrace of Greece's economy, e-commerce continues to grow. The sensitivity of the Greek consumer in prices and capital controls—2015 to 2019—made the Domestic e-shops more appealing than the abroad ones. Online retailing has gained growth in the past two years, with e-commerce having the advantage of product and price comparison through less time and clicks. Hence, six to ten consumers are going to increase online purchasing and only one to ten are going to decrease spending. (Greekecommerce.gr 2017; Export.gov 2017).

Some interesting numbers about the Greek reality of e-commerce, is that online product categories have increased by 5%, with three out of ten Greek consumers being mature buyers and ten percent of online customers just now starting their

journey on online shopping. Almost thirty percent of consumers in our days have made fifty percent of their purchases online; six out of ten consumers made eighty percent of their online purchases from local e-shops, with thirty percent of on-line purchasing taking place from e-shops that are abroad (Greekecommerce.gr 2017; Export.gov 2017).

The top five online categories of purchasing are travel services, hotel reservation, electronic equipment, tickets for entertainment, apparel and footwear. Still, though the lack of trust has an impact, with three out of ten consumers not returning for new purchases to an e-shop.

## ***2.2 Product and Price Comparison Engines***

The Comparison-shopping engine, is basically a web site that gathers information about products or services, information about their price, special features, shipping options, description etc. it displays their combined information about the products or services from multiple retailers. Hence the potential consumer can compare products through specific criteria and make his purchase easier with the best outcome for the merchants, find new potential customers, raise their sales and have the information that they need for winning the competition (api2cart.com 2017; web.archive.org 2016). The CSE is also known as price comparison websites. The best-known ones in Greece are Skrutz and Best price.

Now, from the retailers' perspective, the CSE is a method of advertising online. These engines allow retailers to upload this above-mentioned information about their products (data) as a product feed, by setting bids for those products or whole categories. Those engines show your products alongside with other retailers that the search criteria are aligned with and when the potential customer clicks on your products, immediately the engine transfers the potential customer directly to your site (Resources.datafeedwatch.com 2018; cpcstrategy.com 2018).

## ***2.3 Sentiment Analysis***

Sentiment analysis, in other words, opinion mining tries to quantify, identify, measure, study and last but not least extract subjective information. It refers to the extended use of natural language, through text or speech, biometrics statistics, etc. and it has been widely used for catching the customers' sentiment, by using reviews, survey questionnaire's responses, etc. It aims to measure consumer sentiment of a specific topic or a contextual polarity, or emotional reaction to a specific topic, event, incident, product, document, performance, etc. In simple words, it is the actual measurement of positive and negative language. It is a way for the evaluation of language—from speech or written—with the volume of its positive, negative

or neutral aspect (Towardsdatascience.com 2018; blog.algorithmia.com 2018; Pang and Lee 2008).

An important aspect of our everyday life is to know what other people think about something. It has been easier than ever now, with all the opinion-rich resources such as online reviews websites and blog posts or even video logs. All that has made things interesting to researchers and began mining all that information (cs.cornell.edu 2008; Pang and Lee 2008). Sentiment Analysis, which is a subcategory of Machine Learning, is the procedure that helps understand the intent or emotion on a given text (ethz.ch 2017). In general Sentiment Analysis aims to detect the emotion of the writer, with respect to some topic or the overall contextual polarity. The first step of performing a Sentiment Analysis on the given text is to classify the polarity of each sentence in the text (Devika et al. 2016).

The next step is the text classification (or categorization) which predicts in what predefined set of groups certain data belong to. For the classifiers to predict correctly the given data, you have to create a word vector, also known as bag-of-words. This model is one of the simplest models used in natural language processing. It divides the text by keeping track of the number of occurrences for each word, which is useful for the text classifiers (ataspinar.com 2016).

In text classification, the data are textual or at least partly textual (e.x. Web pages) (mklab.iti.gr 2015). Depending on the dataset, text classification might be binary (positive, negative) or multi-class. To visualize the results the common practice is to use graphs, histograms and confusion matrices. Nowadays the most popular way for visualization is the word-cloud (Tag cloud) which gives a contextual view of the dataset. It can be done by calculating the word frequency or use an important number to each word that can be extracted from the sentiment and the frequency of the word in the document (kdnuggets.com 2018).

The best thing about sentiment analysis is that there is no implementation between the observer-researcher and the data; there is a clear depiction of a person thoughts, points, review, etc. There is no way to guide, mislead the data through a questionnaire or an interview because there is always the possibility of guiding the interviewer, customer, etc.

## 3 Methodology

### 3.1 Data Collection and Cleaning

For this research, the gathered information is from a marketplace that helps users compare prices of lots of products. The information was gathered between 15/01/2018 and 15/03/2018. Using the comments of the users and the rating for every product, it makes it possible to train a model and extract the sentiment of the given information. There are two product categories involved, technology and sports products where users make the most explanatory comments. For each category, a

CSV (Comma Separated Values) file was created, with all the information about the comments and the rating of it. Thereafter, based on the comments and the rating, the sentiment information was extracted.

First of all, there was a data collection (reviews) for the two industries technology and sports footwear from Skroutz during. There were five hundred and fifty-one reviews randomly collected from the two. After the first cleaning and cutting all the unnecessary, there were 320 reviews for technology and sports, there were 470. The price range for the sports industry was from 19.99 to 199.95 euro and for the Technology industry, the price range was from 3.99 to 1332.99 euro. The data were collected manually and anonymously from skroutz.gr.

The first difficulty was that Skroutz (skroutz.gr) does not accept further applications to permit access to its api. A “scraper” was tried to be used through the Skroutz platform to gather all the necessary data but the platform would not allow it to happen, hence the data were collected manually anonymously and randomly (Boeing and Waddell 2016; Vargiu and Urru 2013). Another difficulty was that there are no libraries for machine learning that could support Greek; hence the data cleaning happened manually as described downwards. For the machine learning algorithms to perform better, the data passed to them should be cleaned and well-formed.

The first step of data cleaning is to remove unwanted observations. That includes duplicates or Intel not connected to the topic. Afterward, structural errors were fixed. These could be typos, incorrect intonation or inconsistent capitalization. The next step is to handle any missing data that will most probably break the algorithms’ performance. To avoid this, you should either drop any missing observations or import the missing values based on your observation. Finally, all the punctuation, stop words and words with no sentiment information should be removed from the dataset. That way we will be sure that the algorithm will learn from the data and not mimic them (elitedatascience.com 2018).

### ***3.2 Model Training***

After the data cleaning the next step is to train the data and extract information. For this research, an open-source software “Weka” was used (Laurent and Andrew 2008; gnu.org 2017). Weka has a graphical user interface (GUI) that helps users perform data mining task easily without the need of knowing any programming language. It consists of a collection of machine learning algorithms. Unlike any other machine learning research, it includes interactive tools for result visualization, data validation, cross-validation, etc. (Holmes et al. 1994). Weka was developed using Java; a programming language first created by Sun Microsystems and currently owned by Oracle. Java is used in many open-source projects like the well-known mobile operating system “Android” (cs.waikato.ac.nz 2018).

### 3.3 Algorithms Used

For the classification of the data, the most commonly used algorithms are Naive Bayes, Support Vector Machine (SVM), Random Forest (RF). Each of these algorithms makes text categorization and clustering.

#### 3.3.1 Naive Bayes

Naive Bayes assumes that any value of a feature is completely independent of any other value of a feature. It is used to get the base accuracy of the dataset. Despite the naive design, this classifier has worked well for complex situations such as real-time predictions—because it is a fast learning classifier-, spam filter, text classification/sentiment analysis, and last but not least as a recommendation filter—because it filters unseen information and predict whether a user would like a given resource or not. Its advantages are that it is a fast and easy classifier, it performs better compared to other models with the need of less training data and it performs well in case of categorical input variables compared to numerical variables (Russel and Norvig 2003; Murphy 2006; towardsdatascience.com 2018).

#### 3.3.2 SVM—Support Vector Machine

It is a supervised learning algorithm that analyses datasets used for classification and regression analysis. SVM tries to separate the given data into an infinite-dimensional space using a hyper-plane. One problem is that sometimes the sets to differentiate are not separable into that space (Cortes and Vapnik 1995). SVM is helpful in text classification because they do not depend on the numbers of features as their overfitting protection. One way to avoid these multi-dimensional spaces is to assume that all the features are irrelevant to each other. The adversity is that in text classification feature cleaning is hard because there are not a lot of irrelevant features (Ben-Hur et al. 2001). The SVM—Support Vector Machine is a widely used algorithm for several applications. Those applications are face recognition, Text and hypertext categorization, bioinformatics with protein and genomic classification and handwriting recognition (<https://data-flair.training> 2018).

#### 3.3.3 Random Forest (RF)

As known, Decision Trees Learning is very popular in text classification tasks. The main benefit of the Random Forest algorithm is that trees that tend to grow deep are able to learn the most complex patterns (Ho 1995). It takes an average of decision trees based on random results from the dataset. It breaks down the dataset into simple and smaller subjects while creating trees with decision nodes and leaves. A leaf node

is a feature. The algorithm itself cancels any irrelevant created trees and leave the meaningful trees to produce the results (Ho 1998). The Random Forest algorithm has several applications in banking for finding for example loyal or fraud customers, it also has application in medicine by analyzing patient’s records, that way it can identify diseases or the correct combination of components in medicine. The RF algorithm has also applications in the stock market for determining loss or profit and e-commerce predicting whether the customer will like the recommend products based on other similar customer behavior (medium.com 2018).

## 4 Research Findings

### 4.1 Results and Algorithm Performances

From Tables 1 and 2 we can observe that both datasets were classified correctly with only 20–30% of incorrectly classified instances, which means that people, in general are careful of what they write on reviews and what score they give to that review. The algorithm that performed better was Naive Bayes and that is because of the way this algorithm works. The Naive Bayes classifier assumes that any value of a feature is completely independent of any other value of a feature. For the Random Forest algorithm, a larger dataset was probably needed to create more trees and SVM is a more complex algorithm. We also got good values for the precision and the recall.

From the two datasets on technology products and sports ones, we can see from the Confusion Matrix that in the sports section people pay a bit more attention to what they write on reviews.

**Table 1** Results and algorithm performances for sports

Sports	Naive Bayes	Support Vector Machine (SVM)	Random Forest (RF)
Classification correctly (%)	69	74	73
Classification incorrectly (%)	31	26	27
Precision	0.680	0.623	0.731
Recall	0.686	0.739	0.731
Confusion Matrix Three-dimensional array	a b c 10 10 11 (a negative) 5 20 46 (b neutral) 4 43 230 (c positive)	a b c 4 1 26 (a negative) 0 0 71 (b neutral) 0 1 276 (c positive)	a b c 0 0 31 (a negative) 0 0 71 (b neutral) 0 0 277 (c positive)

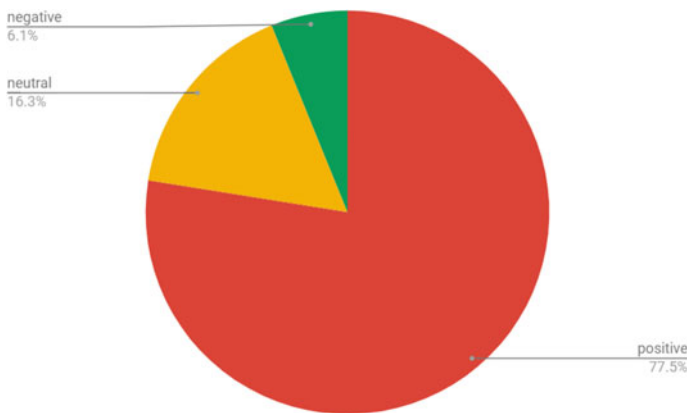
**Table 2** Results and algorithm performances for technology

Technology	Naive Bayes	Support Vector Machine (SVM)	Random Forest (RF)
Classification correctly (%)	62	69	69
Classification incorrectly (%)	38	31	31
Precision	0.598	0.692	0.691
Recall	0.619	0.691	0.691
Confusion Matrix Three-dimensional array	a b c 0 8 13 (a negative) 0 47 78 (b neutral) 4 77 245 (c positive)	a b c 0 0 21 (a negative) 0 2 123 (b neutral) 0 2 324 (c positive)	a b c 0 0 21 (a negative) 0 0 125 (b neutral) 0 0 326 (c positive)

This unbridled result may have one explanation and that is that people who write reviews on the sports section are normally well educated in that sector and are much more careful when writing reviews. On the other hand, for technology products, people often might not even understand how the product works and thus they will give a bad review and not explanatory enough.

In Figs. 1 and 2 we can easily observe that in general Sports have more positive sentiment (77.5%) than Technology (69.5%). The neutral sentiment for Technology was 26.5% and for Sports was 16.3%. The negative sentiment for Sports was 6.1% and for Technology was 4.0% (Fig. 3).

Figures 2 and 4 are Word-cloud showing the most important words—in the Greek language—on the tech and sports dataset based on the frequency. The most important



**Fig. 1** Count of sentiment for sports





Fig. 2 Word-cloud-sports (Word-cloud showing the most important words on the sports dataset based on the frequency)

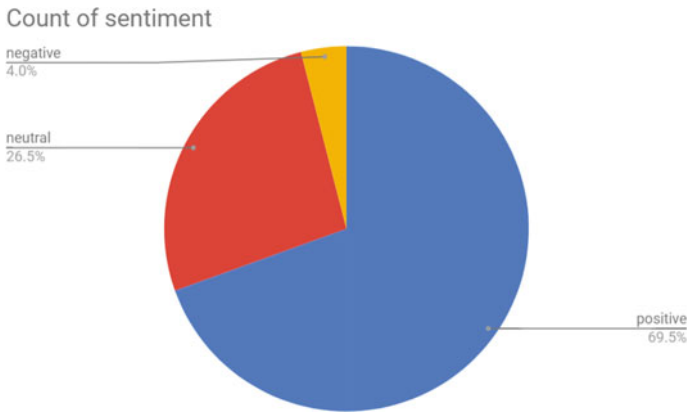


Fig. 3 Count of sentiment for technology

words on the tech dataset—Fig. 4—based on the frequency were good, price, euro, fast, general, I believe, time, perfect etc. The most important words on the sports dataset—Fig. 2—based on the frequency were, very/much/too, shoes, shoe, good, walking, price, relationship, quality, comfortable, better etc.



might be words that appear on all the polarity categories and this might confuse the algorithm. The other important values are precision and recall. Precision is the true positives, meaning that from the prediction the values that the algorithm predicted as true are actually true. Moreover, recall is the false positives; these values show the rest of the prediction that are not relevant. Finally, it is the Confusion Matrix, which shows where the data are classified based on the polarity of the dataset. In this case, we have three different categories for the polarity therefore, it produced a three-dimensional array.

### ***4.3 Results and Algorithm Performances for Technology Goods***

As we can observe from Table 2, Naive Bayes algorithm on the tech dataset was classified correctly 62% of the dataset and only 38% is incorrectly classified. The incorrectly classified instances might be words that appear on all the polarity categories and this might confuse the algorithm. The other important values are precision and recall. Precision is the true positives, meaning that from the prediction the values that the algorithm predicted as true are actually true. In addition, recall is the false positives, these values show the rest of the prediction that are not relevant. Finally, it is the Confusion Matrix, which shows where the data are classified based on the polarity of the dataset. In this case, we have 3 different categories for the polarity; therefore, it produced a three-dimensional array.

The Random Forest algorithm on the tech dataset was classified correctly 69% of the dataset and only 31% is incorrectly classified. The incorrectly classified instances might be words that appear on all the polarity categories and this might confuse the algorithm. The other important values are precision and recall. Precision is the true positives, meaning that from the prediction the values that the algorithm predicted as true are actually true. And recall is the false positives, these values show the rest of the prediction that is not relevant. Finally, is the Confusion Matrix, which shows where the data are classified, based on the polarity of the dataset. In this case, we have three different categories for the polarity; therefore, it produced a three-dimensional array.

The SVM algorithm on the tech dataset. Seeing this we understand that this algorithm classified correctly 69% of the dataset and only 31% is incorrectly classified. The incorrectly classified instances might be words that appear on all the polarity categories and this might confuse the algorithm. The other important values are precision and recall. Precision is the true positives, meaning that of the prediction the values the algorithm predicted as true are actually true. And recall is the false positives, these values show the rest from the prediction that are not relevant. Finally, it is the Confusion Matrix, which shows where the data are classified based on the polarity of the dataset. In this case, we have three different categories for the polarity; therefore, it produced a three-dimensional array.

## 5 Conclusions

This research is analyzing the sentiment between two target groups: the sports footwear and technology goods, which are two of the most fruitful categories at a Comparison Price Engine; in this specific case, the CPE that was used is Skrutz. The main difference between this study and other sentiment analysis researches is that the target groups are two. In addition, the comparison between them. These two target groups are from the two most successful industries of Comparison Price Engines, the sports footwear and technology products. It would be enlightening to compare those two target groups and take some insights that at first sight are not easily observed.

The scores of the three algorithms that were used during this research for the two main target groups were Naive Bayes, SVM and Random Forest. Their produce was that the customers/people are careful of what they write in reviews and what score they give to a specific product in that review. The algorithm that performed better was Naive Bayes and that is because of the way this algorithm works. As was already stated above, Naive Bayes is the classifier that assumes that any value of a feature is completely independent of any other value of a feature. For the Random Forest algorithm, a larger dataset was probably needed in order to create more trees and SVM is a more complex algorithm.

In Fig. 4 we can easily observe that in general Sports have a From the two datasets on technology goods and sports, we can see, based on the Confusion Matrix—Tables 1 and 2—that the sports target group pays a bit more attention to what they write in reviews. The most profound answer to this outcome is that the reviewers are normally well educated in that sector and are much more careful when writing reviews. On the other hand, for technology products, people/customers often might not even understand how the product works and thus they will give a bad review and not explanatory enough.

As was already stated above, as the price gets higher the comments from both industries (sport and technology) become more positive—Fig. 6. Hence, in the case of sports, as the price gets lower the sentiment becomes more negative—Fig. 5—but, in the case of technology, as the price gets lower they do not care about commenting negatively on such products so they do not pay so much attention to them.

By taking into consideration the price factor in Fig. 5, we can easily observe that technology has much more positive sentiment than the sport one. This outcome could lead us to the conclusion that the reviewer based on the products price has a more positive sentiment. We can also understand that the reviewer on the technology industry is giving a negative review to a high-priced product only to products that deserve a negative review. People/customers that are purchasing a cheap technology product do not really pay so much attention to it. On the other hand, customers that are purchasing sports products pay attention to them despite the product's price (high or low). We can easily observe that the neutral sentiment is doubled for technology products compared to what they do for the sport ones. Which is way more as the price is getting higher.

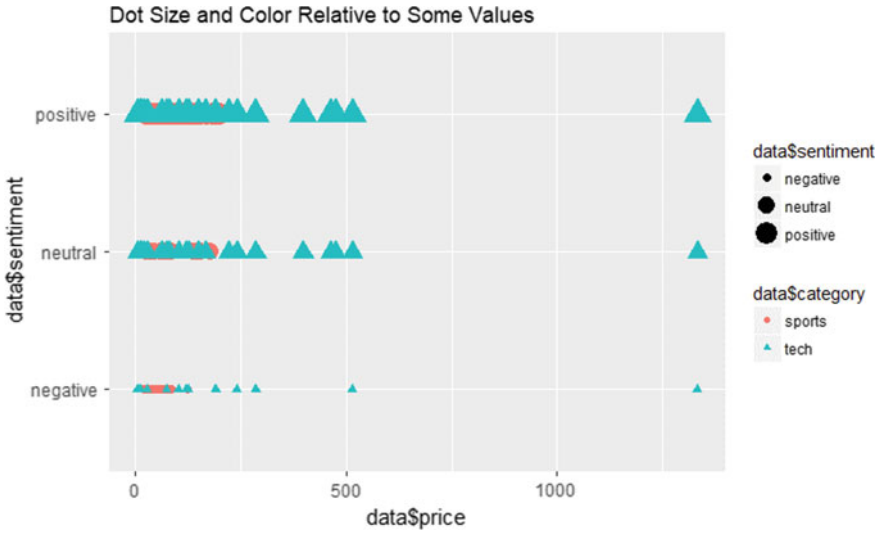


Fig. 5 Chart-sentiment (chart based on the sentiment and the category of the data)

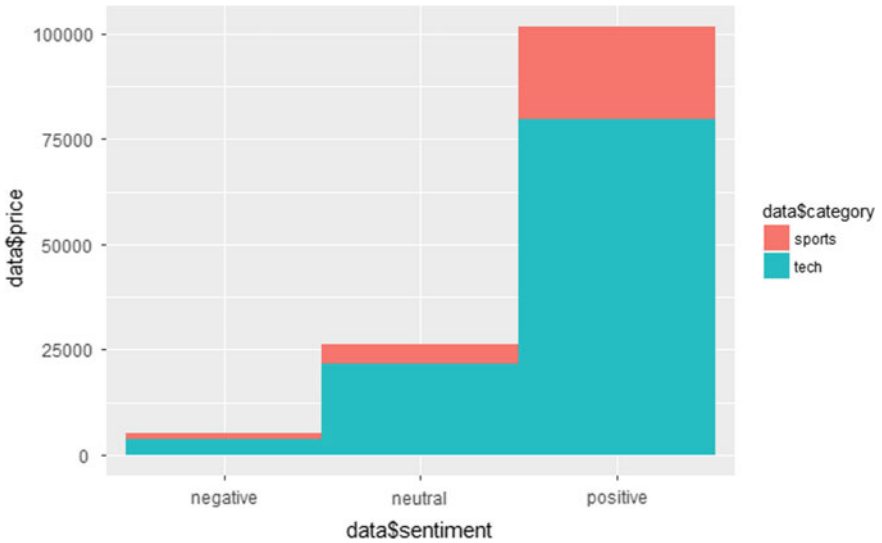


Fig. 6 Count of sentiment for both categories

### 5.1 Limitations

There were limitations through the conduction of this dissertation. We did not have the opportunity to use a scrapper for gaining all the data that I needed for this research. If

we had that opportunity, we would have way more reviews and the algorithms would work much better. As it was mentioned above, the data were obtained manually and anonymously. Another big limitation is that there are not libraries in Greek for machine learning and again the cleaning process had to be done manually.

## 5.2 Food for Thought—Recommended

This research reveals many paths for future research based on the online-opinion mining concept. The first recommendation for future research is a study in which the researcher will gather more information and from many platforms (like Amazon, Gearbest, ebay, etc.). This will produce more results and from different data sources and it will provide us with better results. The second recommendation is to create a Neural Network using more data (It can be achieved with WEKA). Neural Networks are inspired by the biological neural networks that constitute the human brain. Such software tends to find patterns in specific tasks and learn from this observation. Those systems do not need to be highly programmed because of their learning ability. Imagine a kid that wants to learn how to add in math, instead of just giving the kid a calculator. This way we can collect data from comments of users from different data sources and insert them to the Neural Network. After a while, it will make observations and produce interesting results. It might make observations about the sentiment and the color of the product. Maybe a red shoe will produce more positive results than a black shoe or a colorful USB stick might be more attractive than a simple monotonous white one.

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# Determinants of Subjective Well-Being: Case of Albania



Arjona Çela and Chrysanthi Balomenou

**Abstract** There is a growing interest recently towards research in the economics of happiness. Research in this area highlights the importance of subjective well-being as an indicator of welfare. The purpose of this study is to identify the main factors influencing subjective well-being in Albania and discuss the main issues regarding the self-reported data and subjective nature of this topic. Subjective well-being is a term used to identify the subjective evaluation of life satisfaction in general by individuals through survey questions. This term is considered very broad and includes many aspects of individual well-being, valuations that people make regarding their life which include their mental, physical and financial state. Traditionally well-being has been identified by objective measures such as GDP or life expectancy. However, these measures cannot capture all aspect of human well-being. Therefore, there has been a growing literature measuring it using subjective measures by asking people how satisfied are they with their lives in general. Literature in this aspect has identified several factors which affecting subjective well-being such as socio-demographic factors, health status, income, social capital, and environmental quality. Although there is a growing literature using subjective measures, they have several limitations and the question raised is if these indicators are reliable for policymakers. This paper delivers an overview of the growing literature in this filed and discuss the main factors that have an impact on the subjective well-being of individuals in Albania.

**Keywords** Subjective well-being · Life satisfaction · Social capital · Absolute income · Relative income

**JEL Classification** I30 · I31

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## 1 Introduction

Economic of happiness has during the last years has become a booming field of economics trying to give explanations to factors affecting happiness (subjective well-being). A large number of studies investigating subjective well-being have emerged recently and there is a growing literature in this aspect (Anand 2016; Lane 2017; Dominko and Verbič 2018; Fabian 2018; Yuan et al. 2018; Fanning and O'Neill 2019; Graafland and Lous 2018; Brzozowski and Visano 2019). This concept, which describes the subjective assessment of well-being, has been studied related to different fields and from different perspectives describing its definition as relatively broad. However, there is a common consensus among researchers that in studying subjective well-being a distinction can be made between life evaluations in general, affect and eudemonic well-being. Life evaluation or cognitive aspect can be defined as one's evaluation of satisfaction from life in general, while affective dimension, divided into positive and negative affect represent the way people feel about life in a particular point in time. Eudemonic well-being is the study of well-being from the psychological perspective.

This article reviews research focusing on the hedonic aspect of well-being, subjective well-being. It identifies several determinants of subjective well-being based on the literature revised such as socio-demographic characteristics, health status, education, income, environmental quality, and social capital. Different factors identified have a different impact on subjective well-being. Increase in reported health status, education appears to increase subjective well-being. The effect of income is somehow predictable to be positive. However, the positive effects of absolute income decrease as soon as it is controlled for relative income variables such as their actual situation compared to the past and compared to the others. Social capital appears to be one of the most important elements of contributing to life satisfaction, seen also as an element, which influences economic growth and stability. While to accurately determine externalities of social capital is necessary to take into consideration types of it because not all kinds of it have a positive impact on societies. The literature distinguishes two types of social capital, bonding and bridging social capital. Bonding social capital refers to that type of capital that is among individual of an association, which are similar in characteristics while bridging social capital refers to heterogeneous groups with individuals of different communities or societies. While it is important to distinguish between different types of it in order to determine its impact it is also important to recognize different elements consisting it such as social connection, volunteering work or volunteering membership in various organizations and trust in individuals and institutions. The aim of this article is to identify factors affecting subjective well-being for channeling future empirical research and policy-makers focus in this area. The importance of this study lies in two aspects: firstly, due to the lack of previous studies in this field in Albania, this paper tends to serve as an indicator for further works. Second, having income in focus both in absolute and relative terms, this paper also includes a new element such as social capital with a view to achieving a better analysis by capturing all the factors affecting the happiness

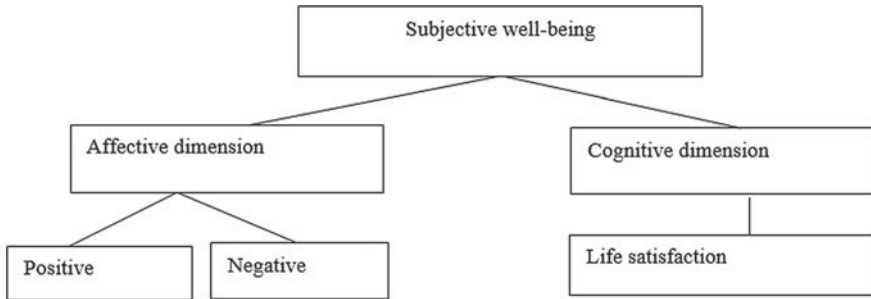
of Albanians and built a better econometric model. There are not many studies that research this topic in transition countries. However, transition countries with their different environment characteristics such as uncertainty, volatility and complexity challenge theories and findings in developed countries. Therefore, this paper studies the factor that affect subjective well-being in transition environment and enriches literature by adding empirical research in a transition country such as Albania.

## 2 Subjective Well-Being

It is widely accepted that improving well-being is the goal of humanity. The macro-economic indicators of economic growth such as GDP do not represent any significant measure as long as individual's well-being has not become better. There is a part of literature criticizing the usage of GDP as a measure of well-being and progress since GDP is a measure of productivity and reflect the monetary value of product and services produced in an economy (Costanza et al. 2009; Ivković 2016). Therefore, the European Commission and OECD have given special attention to the development of non-GDP indicators (Cassiers 2009; OECD 2013). This is because well-being is not just related to economic well-being but includes other elements such as civil liberty, satisfaction of enjoying a clean and good environment, good physical and mental health. One of the pioneer works, which is considered, as the earliest introduction of SWB in economics, is that of Easterlin's paper (1974) titled "*Does Economic growth improve the human a lot? Some empirical evidence*". In this study, Easterlin analyzed cross-country data for 19 countries and USA data since 1946. His findings show that income growth was not systematically accompanied by growth in happiness data and this is due to humankind adaptability. As the level of income increases individual adapt and their inspirations increase (Easterlin 2001).

Nevertheless, how can happiness be measured? Easterlin (1974) argues that happiness is subjective in its nature because individual judge based on their personal experience. Subjective well-being is a widely used way of measuring happiness and well-being and is considered to be the hedonic aspect of wellbeing. It is mostly concerned with happiness and pleasant life. In psychology, subjective well-being and psychological well-being are sometimes seen as two different approaches of the same thing. Although the literature regarding these issues is separated into two views. One group argues that subjective well-being and psychological well-being represent different aspects of well-being, while the other group believes that these two concepts do not represent different aspects of well-being but are rather two traditions of research (Chen et al. 2012).

Subjective well-being refers to all of the various types of evaluations, both positive and negative, that people make of their lives as a whole. It includes reflective cognitive evaluations, such as life satisfaction, and affective reactions to life events, such as joy and sadness as it is illustrated in figure one (OECD 2013; Lyubomirsky et al. 2005) Affective dimension of subjective well-being reflect positive and negative feelings



**Fig. 1** Dimensions of subjective well-being

and emotions of individual in particular time while life satisfaction represent life evaluation as a whole (Fig. 1).

As much as there is literature praising the usage of this indicator there, are also studies indicating its drawbacks? Smith (2007) reviews a large part of literature in the field of subjective well-being. He particularly criticizes were most of the studies are recently concentrated and especially draw attention in the method used to evaluate it, taking into consideration the subjective nature of the topic. According to his observation, subjective well-being survey's question widely used nowadays might not lead research in this area to any meaningful findings. He suggests the use of contingent evaluation (CV) techniques to connect questions about emotions to choices and redirect research in this area. Other authors, such as Hamermesh (2004) question whether subjective measures in economics would lead to meaningful results. According to his findings, it is important that economist use their "comparative advantage" which is reliance on economic theory to reach economically meaningful results.

SWB according to MacKerron (2011) is not just a "monolithic concept" but a term that collects under it different ways of identifying it. Therefore, one of the problematic issues noticed in the literature is the use of terminology, especially in survey questions. Empirical studies asking different questions to measure the same concept might be problematic because of the possibility of measuring not exactly the same thing and the difficulty in comparing results due to differences that might arise from different questions. Another difficulty in measuring well-being by subjective well-being consists of the fact that individuals have different views on what happiness mean for them and each of them has a subjective opinion regarding satisfaction with life. Therefore, it is difficult to measure happiness. Besides changing across individuals, happiness can also change across time and periods. Individuals when asked to compare their current life quality to past they compare their current situation to past weeks or months but not to their long-term past. According to Coyne and Boettke (2006) "*This makes comparison across time difficult, therefore perhaps what Easterlin called it happiness paradox might not be at all a paradox*". Another problematic issue in using subjective well-being database stand in interpretation and responses. Surveys conducted in different countries, although there might

exist universal concepts might not reflect the same thing. The answer responded give depends on their understanding and their understanding depends on multiple factors such as culture, language, educational background, etc. Although subjective well-being has been studied by different fields and from different perspectives, in economics researchers generally look at factors such as socio-demographic characteristics, health status, education, job satisfaction, income, social capital, social capital, and natural environment.

### *Socio-demographic factors and health*

Socio-demographic factor studied in relation to subjective well-being includes age, gender, marital status, education, work, and religion. Each of these factors has been studied in literature and included in almost every empirical model. Indeed the goal of the individual is to have a happy and healthy life. Literature studying subjective well-being and health highlights the importance of individual perception regarding health condition (Cross et al. 2018). Johnston et al. (2009) define subjective health as individual perception about their health at a point in time. Subjective measurement of health is in general used by studies in social sciences. This method has its advantages due to it captures how individual feel about their health compared to certain standards. Nevertheless, on contrast data collected in this way are also subject to reporting errors.

## **2.1 Income**

Income appears to be one of the most important elements of subjective well-being, as well as the one of the most studied in the literature (Blanchflower and Oswald 2004; Clark et al. 2008). These studies have shown that with income increase subjective well-being has also increased. Later evidence shows that this relationship is weaker and less significant. Explanation of this relationship indicates relative income as the reason. Income can be relative when individual evaluate themselves compared to others and compared to their past. They compare themselves to their reference group and an increase in the average income of their reference group causes a decrease in subjective well-being (Clark et al. 2008). Therefore, absolute income might be less important compared to relative income. Knight et al. (2009) in their study search for the determinants of subjective well-being in rural China concludes that the main determinants of happiness are the relative income and aspiration. The positive effects of absolute income decrease as soon as it is controlled for relative income variables such as their actual situation compared to the past and compared to the other household in the village. And the reason why rural households are happy despite low income is that they limited information and the narrow reference group.

## 2.2 Social Capital

Social capital is seen as one of the most important elements of contributing to life satisfaction (Helliwell and Putnam 2004). Social capital is seen as an element, which influences economic growth and stability. The OECD defines the notion as “*the set networks together with shared norms, values, and understandings that facilitate co-operation within or among groups*” (Healy and Côté 2001). Empirical evidence of Bjørnskov (2003) suggests that countries performing high in social capital also have high life satisfaction values. Countries such as the Scandinavian, Netherlands, Switzerland, and Iceland demonstrate a high correlation between social capital and life satisfaction. The impact of social capital variables in high-income countries appears to be significant while in low-income countries not significant. Hence, this implies that advanced societies see the effect of an increase in social capital in life satisfaction more important than income while the reverse implies for less developed societies (Puntscher et al. 2014). The authors Stevenson and Wolfers (2008) define the USA as “puzzling outlier” because in their work they conclude that Japan and Europe have increasing subjective well-being as they become richer different from what Easterlin concludes in his work for the USA. The findings of Bartolini et al. (2008) on contrast states that the USA is not a “puzzling outlier” but what makes it different from Europe is it decreasing social capital because social capital is an important element explaining differences in subjective well-being.

According to Coffé and Geys (2006), social capital is mostly seen as an element with only positive externalities and this is due to the abundance in studies providing positive outcomes. While to accurately determine the externalities of social capital, is necessary to take into consideration types of it because not all kinds of it have a positive impact on societies. Putman (1993) distinguishes two types of social capital bonding and bridging social capital. Bonding social capital refers to that type of capital that is among individuals of an association that are similar in characteristics while bridging social capital refers to heterogeneous groups with individuals of different groups or societies. Bartolini et al. (2008) differently distinguish between what they call “relational social capital or non-market relations” and “non-relational social capital or beliefs in institutions”. Relational social capital can be intrinsically and extrinsically motivated which means that there are internal and external elements motivating individuals. International differences in subjective well-being according to their findings can be explained through differences in social capital.

Although in general high levels of social capital in a society reflect high levels of subjective well-being, different components of it might have different effects. Trust is one of the most important components of social capital and is an essential component of individual interaction. Trust is considered to have two dimensions: interpersonal and institutional. Interpersonal trust is related to social relations. Social relations are seen as an important component with a powerful impact on subjective well-being. This connects to the fact that social relations are essential needs of a human being (Magnani and Zhu 2018). Mikucka et al. (2017) study take into account 46 developed, developing and transition countries to test whether there is a positive

relationship between economic growth and subjective well-being and whether this relationship is conditional on social trust or income inequality. Authors finding show that when economic growth is accompanied by an increase in social trust, it has a positive effect on life satisfaction while the economic growth accompanied by income inequality depends on the wealth of countries. Based on these findings authors recommend what they call “*promote, protect and reduce policy which means promote economic growth, protect and promote social trust and reduce income inequality.*”

### 3 Methodology

Based on the literature review the main hypotheses identified in this study are:

*H1: The impact of socio-demographic variables on life satisfaction are statistically significant*

*H2: The impact of income on life satisfaction is positive and statistically significant*

*H3: The impact of social comparison variables on life satisfaction are statistically significant*

*H4: The impact of social capital variables on life satisfaction are statistically significant.*

#### 3.1 Data and Variables

This study uses data from Living Standard Measurement Survey (LSMS) of 2012 in Albania conducted by Albanian Institute of Statistics (INSTAT). LSMS is a survey which includes 6671 households. The sample is randomly selected in two rounds of selection. In the first round randomly are selected 834 administrative units representing all of Albania's territory. For each administrative unit, eight households selected randomly were interviewed in the second round. To solve the problem in case of not answering or not having contact, four other families were selected as a substitute, which provided the completion of 6691 questionnaires. From 2002 to 2012, the LSMS was undertaken 4 times. The first LSMS was undertaken in 2002 followed by three other questionnaires, respectively 3 years apart from each other, 2005, 2008, 2012 (INSTAT 2014).

For LSMS 2012 49% of individuals live in rural areas and 51% in urban areas, while gender distribution is 50% male and 50% female. The average age of individuals is 36 years old, where the minimum is 0 and the maximum is 108. The number of individuals who belong to 6671 households is 25,355. Once all individuals under the age of 18 have been removed from the sample, the size of the final sample is 18,904 individuals. In this study, the dependent variable that identifies happiness is life satisfaction. This variable was measured by the responses reported by individuals to whom the question asked was: in general how satisfied are you with your

current life? Respondents are given 7 alternative choices that are: (1) Very satisfied (2) Satisfied (3) Not very satisfied (4) Not satisfied (5) I do not know (6) I refuse to answer. The variable has been re-coded in Stata in five categories so that the largest number matches the category that indicates that individuals are “Very satisfied” and the smallest number with “not satisfied”. Therefore (5) Very Satisfied (4) Satisfied (3) I do not know, I refuse to answer (2) Not very satisfied (1) Not at all pleased. In literature as depended variables are used life satisfaction as well as happiness. Individuals are therefore asked to answer questions about how happy or satisfied they are with their lives in general. In this study variable of “life satisfaction” is used as a depended variable as this variable has a more economic context that the term “happiness”.

### *Independent variables*

Socio-demographic variables are those that can found in each equation of measurement of life satisfaction. Such variables are age, gender, marital status, ethnicity, religion, education, and place of residence (urban or rural area). In our sample age is a continuous variable and only individuals over 18 are considered, observations for individuals under the age of 18 are deleted. Gender is a “dummy” variable that takes 1 for females and 0 for males. This variable is named *female*. *Married* gets the value 1 if individuals are married or live with a partner and zero otherwise. Also *single* gets values one if individuals are single *widower* gets the value one if individuals are widowed. In terms of ethnicity, respondents were asked which ethnic group they belong to and answers are: (1) Albanian, (2) Greek, (3) Romas, (4) Macedonians, (5) Montenegrins, (6) Vlach. The *ethnic* variable is turned into a dummy which takes values 1 if individuals belong to an ethnic group and zero if they are Albanians.

In this study, three dummy variables were designed to measure social comparison. The question addressed to the respondents from INSTAT was: “*Imagine a ten-step scale, in the first step stand the poorest people and in the tenth step the richest ones. What step are you today?*” This variable is turned into three dummy variables, from where *below average* is a dummy variable that takes values 1 if the persons consider themselves in the first, second and third step, the *average* gets the values one if the respondent considers himself in the fourth, fifth, sixth and seventh step. While the *above average* is a dummy variable that takes values 1 if the person considers himself in the eight, nine, and ten steps. The dummy variable kept out of regression is the *average*.

There are three dummy variables used to compare the current situation with the past. Individuals are asked if their financial situation in the last three years has: (1) improved much (2) improved somehow (3) stayed the same (4) somehow deteriorated (5) worsened much (6) did not know and (7) refused to answer. *Financial improved* is a dummy variable that takes value 1 if individuals think that their financial status in the last three years has improved a lot and somehow, and zero in the opposite. *Financial same* as well is a dummy that takes values 1 if people think their financial status in the last three years has remained the same.

Apart from the comparison that individuals make with the past, their opinions about the future have been taken into account. The opinions they have about the

future affect their current happiness. The question addressed to the respondents was whether in the next 12 months their financial situation would be: (1) greatly improved (2) improved somewhat (3) staying the same (4) getting deteriorated somehow (5) getting worse (6) not knowing (7) refuse to answer. *Future improved* takes values 1 when people think that their financial situation will improve a lot and somehow. *Future same* gets values 1 when they think their financial status in the future will not change and 0 in otherwise. *Future worsen* takes values 1 when respondents have a pessimistic view of their financial status in the future. Nevertheless, unlike the comparison made with the past, in this case, a significant part of 12.71% responded do not know. For this reason, a fourth variable dummy *Future unknown* is constructed, which takes values 1 when individuals cannot make a prediction for their future financial status and 0 in the opposite.

Though social capital is very broad in itself, this work is focused only on the belief in central and local government as well as social ties. For this reason, six dummy variables were built to measure individuals confidence in local and central government. Three dummy variables measuring trust in local government are: *trust local government*, *not trust the local government* and *neutral local government*. The same logic is used with the *trust central government*, *neutral central government* and *not trust central government* variables. To measure social links, the question is “How often do individuals meet with relatives and friends?” Response alternatives have been (1) every day (2) every week (but not every day) (3) several times a month (not every week) (4) once a month (5) at least once a year (6) never. Here are built two dummy variables from where *meet relatives* is dummy that takes value 1 if people meet once a week with their relatives and zero otherwise. While *meet friends* gets the values 1 if individuals meet once a week with their friends.

In this study, two models were used such as OLS and ordered probit to give a clearer picture and to see if there are differences between the coefficients of the two models. Since the depended variable is an ordered variable the order probit model is expected to be a more suitable model for our data. Table 1 shows the coefficients of the variables of the two models. Before the models were estimated, the correlation between the variables was seen to avoid the problem of perfect multicollinearity. It is noticed that there is no perfect multicollinearity between the variable. In addition, the VIF average is 1.7, which is not a problem. From the social capital variables, only two dummy variables of trust and not trust in central government appear to be statistically significant both in the OLS model and ordered probit. While other social capital variables, such as meeting with friends and relative once a week, trust in local government are statistically insignificant. Therefore, LR (likelihood ratio test) is used to test if the ordered probit model is better without the statistically insignificant social capital variables. According to this test the model without these variables appears to be a better model, therefore these variables are removed from the equations.



**Table 1** OLS and ordered probit model's results

	Number of obs = 2740 F (26, 2713) = 198.19 Prob > F = 0.0000 R-squared = 0.5506 Root MSE = 0.85572	Number of obs = 2740 Wald chi <sup>2</sup> (26) = 1374.46 Prob > chi <sup>2</sup> = 0.0000 Pseudo R <sup>2</sup> = 0.2963
Variables	OLS model	Order probit model
Female	-0.0259499*	-0.0564614*
Age	0.0002563*	-0.000038*
Age square	-0.0000534	0.0000169
Divorced	-0.0198503	-0.0660871
Widower	-0.1932688	-0.2170441
Married	0.1199911*	0.1846367*
High school	0.1241807***	0.1738687***
Professional high school	0.0712742	0.1131719
University	0.3137785***	0.3931143***
Postgraduate	0.0668464	0.1742781
Good health	0.0823482*	0.1308607*
Poor health	-0.1164209*	-0.3653304*
Ethnic	-0.2024331*	-0.2537728*
Religion	0.0169182	0.0230709
Urban	-0.0283573	-0.052747
Ln income	0.334634***	0.4641297***
Work Hours	0.0007557*	0.0029567*
Financial improved	0.7189411***	0.7676355***
Financial worsen	-0.413558***	-0.6698764***
Future improved	0.3004562***	0.3379412***
Future worsen	-0.2288933***	-0.4064882***
Future unknown	-0.0475747	-0.0660824***
Below average	-0.4661337***	-0.7218465***
Above average	0.6418679***	0.8984636***
Trust central government	0.0679302	0.0981451*
Not trust central government	-0.1982277***	-0.291092***

\* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

## 4 Results

Based on the second hypothesis we can say that from the model results this hypothesis is confirmed. Absolute income appears to have a statistically significant impact on the happiness of Albanians and this impact appears to be positive in both models.

With the increase in the monthly income of individuals, increases and the probability that they will be happier. The third hypothesis, which is built on the relative concepts of income, is also verified. All income variables appear to be statistically significant at the level of 1%. In line with the literature findings, the effect of relative income of individuals appears to be statistically significant. Social comparison, therefore, the position of individuals in society compared to other individuals is very important. Those who consider their financial situation above the average have an increase in the points of subjective well-being. Consequently, being over the average increases the probability of being happier and below the average reduces this probability. It is also concluded that individuals make comparisons and their financial situation in the past and in the future. Happiness increases if current earnings are increased compared to three years ago and if they are expected to increase in the next twelve months. If we have a decrease in income compared to three years ago and if they are expected to decrease in the next twelve months we have a decrease in probability to be happy. The sensitivity of happiness to future changes in incomes happens because individuals cannot predict how their aspirations will fit in with future changes. While the sensitivity of happiness to the financial situation in the past suggests that individuals are analyzing the income of the first three years given with the actual aspirations. Considering the importance of education in wellbeing, several educational variables have been included with the aim of achieving the best of its effect on happiness. Only variables that control whether individuals have completed high school education and university are statistically significant. Their effect is positive as predicted. Surely in Albania, individuals who have completed the university have higher employment opportunities compared to those who have a secondary education, those who have finished elementary or have no education. Therefore, in this case, the effect of education has a direct impact on happiness. Education gives individuals a different perception, better self-esteem and consequently makes them happier (Cagriota 2006). In addition, also an indirect effect is through employment. It is also worth mentioning that those belonging to an ethnic group in Albania have the probability of being unhappy. Ethnic groups such as the Roma community have a high level of poverty, incomes below the minimum and consequently a lower level of well-being. Only two of the social capital variables appear to be statistically relevant to our model. These are trust and mistrust in central government. Outcomes show that trust in the central government has a positive impact on wellbeing and mistrust a negative impact. Different from Jovanović (2016) the impact of institutional trust in Albania has a significant impact. This conclusion is understandable as the countries with the highest prosperity have a high level of trust in the governing bodies and their dependent institutions. However, as mentioned in the chapter of the literature review, social capital is a broad concept and presents difficulties in measurement, hence other elements of it may have an impact on happiness.

## 5 Conclusions

Subjective well-being is a concept that describes the self-evaluation of well-being. The economics of subjective well-being even though has seen a growing interest is considered relatively young. Research in this area leans mostly on survey data collected by asking the individual how happy they are with their lives. Subjective measurement is widely used in social sciences and has shown to have some degree of validity because they capture aspects unable to be captured by using objective measurements. Nevertheless, there are also limitations associated with these kinds of measurements. Subjective measurements associated with reporting errors. Answers of respondents to questions are vulnerable and depend on many factors related to their nature such as methodology of survey question construction, interpretation of by respondents, educational background, culture, their current mood, etc. Therefore, some authors are skeptical about suggesting policy advice based on the results of this type of research.

Of course, is there is no single determinant of subjective well-being and determining all of them is very difficult. Nevertheless, literature studies the main factors of subjective well-being. These factors include socio-demographic factors, health status, income, social capital, and environmental quality. Positive health status, good financial condition, good social relations are all components that have a significant positive influence on our well-being. Despite this large body of literature studied until recently, the field of subjective well-being is quite complex and further research needs to be conducted to improve current methodology and to able to accurately define factors having an impact on it. In Albania, there is a lack of literature conducted in this field. Therefore, this study aims to fulfill that gap by conducting empirical analysis. From this analysis, it is concluded that factors such as absolute income, relative income or the position of individuals compared to other individuals in a society and their position compared to the past and future, education, a positive subjective evaluation of health, trust in central government have a positive impact in subjective well-being. However, limitations are associated with this study. The data used are cross-section data and analysis with this type of data might not give a full picture of the topic. For further research is recommended that this analysis to be conducted by using panel data.

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# Emotional Branding—Identifying the Difference Between Nike and Adidas



Alexandra Kammerer, Thomas Dilger, and Christian Ploder

**Abstract** Enterprises place their faith in emotional branding to differentiate themselves from competitors and anchor the brand in their customer's minds. By linking a particular character to the brand, people can feel an emotional attachment. Especially in the sports clothing industry, it is essential to place a strong relationship with customers to add value. For many years, Adidas and Nike have found themselves fighting for their market position in the sports clothing industry. This chapter shows how these two brands represent different personalities based on an empirical study. The authors researched within the German speaking countries, and it is based on 150 questionnaires. Following a short introduction (Sect. 1), a literature review is given in Sect. 2. The empirical study is described in Sect. 4 based on the research question (Sect. 3). All the findings are described in Sect. 5 and are recapitulated in Sect. 6.

**Keywords** Emotional Branding · Brand Personality · Empirical Study · Sports Clothing Industry

## 1 Introduction

According to Temporal (2005), emotions are the core element of power branding and the key to successful brand management. Brand managers have learned that it is crucial to influence brand perception by associating their products with attributes such as reliability, quality, and luxury. The trigger for this was as products became more and more similar and became necessary to stand out from the competition

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(Russell-Walling 2011). Since the emergence of brand management, there has been tremendous development. The main goal of branding is to chisel the brand onto the memory of the customer (Andreani and Devina 2017). According to Su and Tong (2015), it is vital to understand the concept behind Brand Personality to build a productive consumer-brand relationship. Brand Personality enables the consumer to identify with the brand and to embody its own brand. Through a unique brand personality, the brand gains attention and stands out from the competition (Su and Tong 2015). Due to the increasing importance of emotional branding, especially in the sporting goods industry and the associated brand personality, it is essential to understand precisely the role of Emotional Branding in modern marketing and the corresponding characteristics of Brand Personality. Sportswear manufacturer Nike Inc. is the current leader in the sporting goods industry, and Adidas ranks second among the top-selling companies. The sporting goods industry is one of the most brand protected areas in the apparel industry worldwide. Especially in this industry, it is vital to communicate strong brand values so that the customer can identify with the brand and express their personality (Tong and Hawley 2009).

## 2 Literature Review

Jim Stengel, Global Marketing Officer of Procter and Gamble, commented on emotional branding as follows: “If something gets to be a billion-dollar brand, there’s more going on than just a rational attachment. My feeling is that all the billion-dollar brands occupy an extraordinary place in the heart among some consumers. That would make them Lovemarks” (Roberts 2005). Where in the past, many companies focused on production and sales, nowadays the wishes and needs of the customer and the relationship to each individual are an essential component for successful business management (Andreani and Devina 2017). When positive emotions and feelings can be associated with a brand and an emotional attachment to a brand is built up, the purchase volume of this brand will increase. One well-known example is the multinational company, Kodak, which uses nostalgia as an active emotion trigger (Rossiter and Bellman 2012).

According to Achar et al. (2016), emotions are a reflection of the different relationships between consumers and their social and physical environment and the interpretation of these relationships Achar et al. (2016). Rossiter and Bellman (2012) define emotional branding as the consumers’ attachment to a brand, along with specific, relevant, and strong feelings (Rossiter and Bellman 2012). Thomson et al. (2005) attribute such attachments to any object to the fact that humans can also build an emotional relationship with animals, places, and celebrities without any interaction. Similarly, an emotional bond to gifts, cities, and brands can be formed. This humanization of objects or contexts is called anthropomorphism. This phenomenon is often used in marketing to humanize various products or a brand. For example, to make a product more memorable by human characteristics, highlight certain quality features, and make it more endearing (Aggarwal and McGill 2012).

To build up a strong brand affinity with consumers, brand identification of the consumer plays a particularly important role (Kuenzel and Halliday 2010). According to Malär et al. (2011), emotional connectivity between people and brands is mainly influenced by Brand Personality. Consumers use products to present, show, and illustrate themselves to others. A brand with a defined and specific brand personality helps the consumer to find himself and gives them the feeling of getting closer and closer to their ideals. Besides, a brand that complements the self-image strengthens the self-esteem of the consumer (Malär et al. 2011). Also, Delgado-Ballester et al. (2017) believe that a brand can be integrated into a person's identity to better define and express the self in the social environment. The characteristics of brand personality are associated with the self and defined outwardly and used as a presentation of one's identity to the outside world. The humanization of the brand is a tool to express personal aspects and influence social relationships (Delgado-Ballester et al. 2017). However, a brand should not only offer the opportunity to represent the real identity and ideal of this identity but also to connect and relate to a particular value, lifestyle, and meaningfulness of life (Batra et al. 2012).

Brand Personality is the key to differentiate your brand in a particular industry from the competition. Brand Personality is the central point to influence the preference of the consumer (Aaker 1997). Brand Personality guides the customer in his positive attitude and choice for a brand (Su and Tong 2015). When a consumer perceives human characteristics, habits, or motivations, the human sense is aroused, prompting him to perceive a brand as a plausible partner for an emotional relationship (Delgado-Ballester et al. 2017). Brand personality strengthens identification with the brand and increases the potential for companies to control customer behavior (Kuenzel and Halliday 2010).

To gain attention and reach the consumers emotionally, images and experiences are used as triggers in advertising. In order to increase brand value, a unique brand personality is essential, as the consumers want to link symbolically and figuratively with the brand. The choice of a product or a brand no longer depends only on the quality of the product, but much more on the subjective perception (Su and Tong 2015). Brand Personality is the brand character and strengthens the salience of the brand. It creates a positive brand perception in the mind of the consumer (Andreani and Devina 2017). Clients seek out a brand they can best identify with, the brand personality that matches their self-image (Arora and Stoner 2009). The more the personal character matches the brand personality, the higher the preference for the chosen brand develops (Kuenzel and Halliday 2010). According to Kuenzel and Halliday (2010), managers are encouraged to evaluate the personality of their brand and to evaluate the ideal self of their consumers and their target market. For example, cosmetic brands have been telling their customers for years that they will achieve their perfect image with their products, thus making them feel more attractive and beautiful (Malär et al. 2011). Understanding brand personality can build a meaningful consumer-brand relationship (Jana and Das 2017; Su and Tong 2015).

Aaker (1997) has established a general brand personality model that divides the Brand Personality into five dimensions (Fig. 1). Three of the five dimensions of Brand Personality relate to the "Big Five human personalities". Based on 309 personality



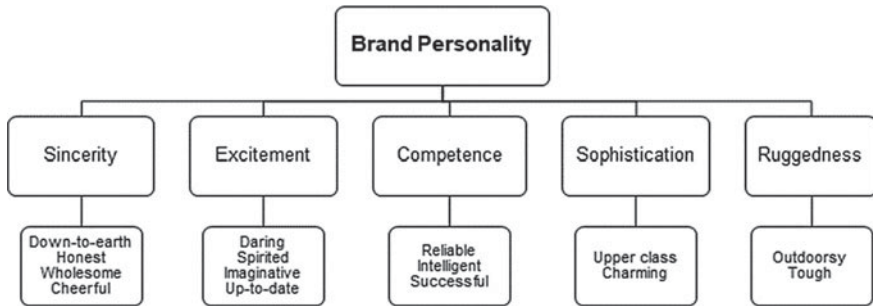


Fig. 1 Brand personality model. Reproduced from Aaker (1997, p. 352)

traits, she concluded in her study on five dimensions of the Brand Personality. The five dimensions of BP are sincerity, excitement, competence, sophistication, ruggedness (Aaker 1997).

Tong and Su (2014) have studied the dimensions of Brand Personality too. They found out that the dimensions of the Brand Personality of Aaker (1997) differ from the dimensions of Brand Personality for sporting goods manufacturers. Fifty-three different characteristics were found, divided into seven different dimensions (Tong and Su 2014). The model Tong and Su (2014) contains two further dimensions compared to the model of Aaker (1997), which emerged from the specific analysis of the ten most successful sporting goods manufacturers. The seven dimensions of the brand personality of the sporting goods industry (Fig. 2) are competence, attractiveness, sincerity, innovation, activity, excitement, ruggedness. Brand Personality may vary by product and industry, but also by nation and culture (Aaker 1997; Jana and Das 2017; Su and Tong 2015).

Brand personality can be measured using the Brand Personality Scale from Aaker (1997). The Brand Personality Scale is used to explain how consumers perceive brands, both in terms of products and services (Su and Tong 2015). Based on an adjusted set of 42 personality traits, a 5-piece Likert scale is used to assess which

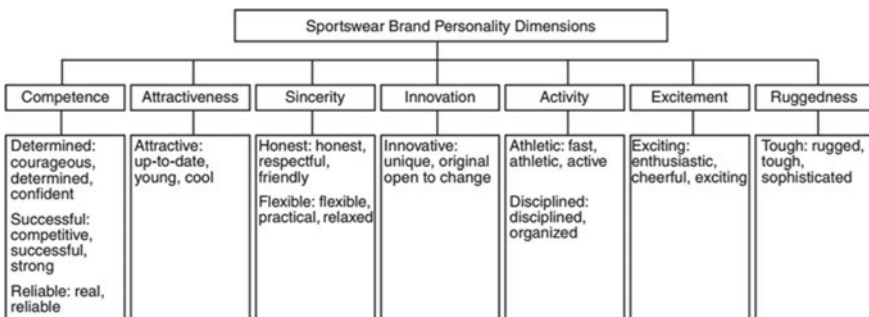


Fig. 2 Sportswear brand personality dimensions. Reproduced from Tong and Su (2014, p. 168)

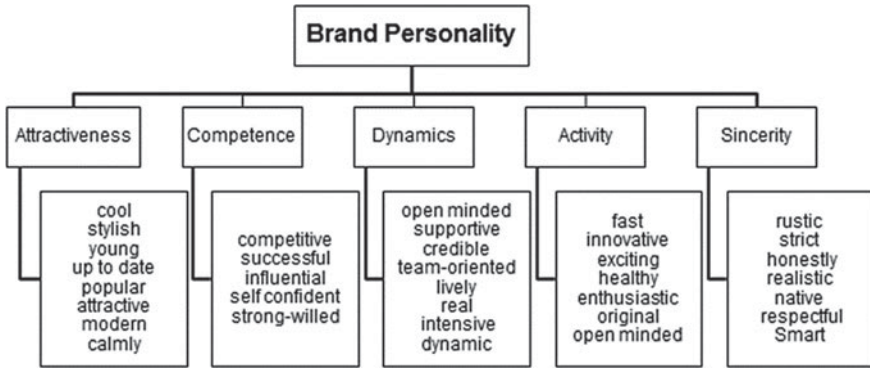


Fig. 3 Brand personality dimensions model (own illustration)

characteristics are more or less applicable to a brand. Aaker's Brand Personality Scale measures how consumers identify their personality with the brand (Su and Tong 2015). Aaker's Brand Personality Scale can also be used to compare Brand Personality from different brands in the same product segment (Aaker 1997).

### 3 Research Topic

Referring to the statement by Rossiter and Bellman (2012) that emotional branding has a powerful impact on purchasing volume and based on research by Su and Tong (2015) and Jana and Das (2017)—these pieces of evidence show that Brand Personality is an immense influencing factor in the customer-brand relationship, the question arises as to whether two companies in the same industry differ with similar products in their Brand Personality. The study by Tong and Su (2014) has shown that ten different sporting goods manufacturers differ in their Brand Personality Aaker (1997) and Jana and Das (2017) have found that Brand Personality can vary not only in the industry but also in the nation and culture. The sportswear industry is one of the largest competitive markets and one of the strongest brand-based apparel markets. Nike and Adidas are quite similar in terms of sporting goods manufacturing and have been running head-to-head for years for the top-selling sporting goods company in the world. Based on previous research on brand personality and the fact that a direct comparison between Nike and Adidas concerning the respective Brand Personality based on a German sample has not yet been investigated, this is an interesting approach for a quantitative investigation. Also, the two companies Nike and Adidas, are not only strong sales but also world-famous and therefore well suited to do a survey, without having to give the respondents a prior knowledge.

This finding raises the following research question: In which brand dimensions do Nike and Adidas differ? In Sect. 4, the methodology and the used model will be elaborated in detail.

## 4 Methodology and Model

Concerning the research methodology of Aaker (1997) and Tong and Su (2014), a quantitative survey using online questionnaires will explore the extent to which brand personality dimensions differ between Nike and Adidas, and which dimension is pivotal, that is, a dominant character of the respective brand.

Building on the brand personality scale of Aaker (1997), which uses a selected number of personality traits to measure consumer and brand perception, the following empirical study is being developed. Based on the research by Tong and Su (2014), in which a set of 53 personality traits and a model with seven brand personality dimensions was explicitly created for the sportswear industry, based on the Aaker's (1997) mode, an online survey will be conducted that examines Nikes and Adidas' brand personality. Respondents will initially select a brand and then rate the personality traits based on a 5-piece Likert scale with the chosen brand. Following the survey, an exploratory factor analysis investigates personality traits and sets up a brand personality model specific to this empirical survey (Aaker 1997; Mustamil et al. 2014; Tong and Su 2014). After defining the brand personality dimensions, the averages of the brand personality dimensions of the two brands Adidas and Nike, are analyzed using an ANOVA analysis, thereby closing the most dominant dimension of their brand personality (Mustamil et al. 2014; Su et al. 2016).

The survey targets 18–35 year-olds, with Nike targeting between 15 and 40 and Adidas between 20 and 29. Since the survey is formulated in German, the entire sample will come from the German-speaking population group (Austria, Germany, Switzerland). An online questionnaire asks 150 people how they perceive Adidas or Nike.

The survey is structured in three parts. In the first part, respondents are asked about their preferences. If the respondents agree with Nike, the questions that follow are related to Nike, and if the respondents prefer Adidas, the questions are associated with Adidas. The main component of the questionnaire is the evaluation of the 53 personality traits based on a 5-piece Likert scale. Respondents will be familiarized with the situation with this text:

“If I asked you to give me your impression of a particular person, you might answer with a set of personality attributes”. Now, let's think about brands in the same way. In this study, we are interested in finding out your perception of human personalities associated with your most familiar sportswear brand. While evaluating the subsequent set of attributes, please ask yourself, “If this sportswear brand was a person, how would you describe him/her?”.

The 5-part Likert scale runs from 1 to 5, where 1 means “very true” and 5 “does not apply at all”. After the respondents rated the personality traits, they are asked some behavioral and demographic questions. These questions relate, on the one hand, to the buying behavior and intended use, regarding the previously selected brand, the preference of other brands, for example, smartphone or car brands, and demographic characteristics such as age, gender, and educational attainment.

## 5 Findings

The data obtained will be transferred into SPSS to evaluate and illustrate the results. All in all, 150 people ( $n = 150$ ) participated in the study, of which 37% for Adidas and 63% for Nike. All 150 datasets could be used for analytical evaluation. The sample consists of 150 persons with an average age of 24 years ( $M = 23.51$ ). All 150 respondents are within the age range of 18–35 years. 59% of respondents are female and 41% male. 59% of respondents have a high school diploma, 21% have an academic degree, 16.7% have a vocational qualification, and hardly anyone has only a lower secondary school diploma (1.3%), intermediate maturity (1.3%), or no educational qualification (0.7%). Asked whether the active sport is actively practiced, 86 respondents (57%) responded with “yes”. Of these 86 people, 62 (72%) say they do sports between two to four times a week. Fourteen people (16%) regularly practice sports five to seven times a week and ten people (12%) at most once a week.

Concerning Nike and Adidas, the average age of the sample hardly differs. For Adidas users, the average age is 24 years, and for Nike users, 23 years. When using the products, Adidas has found a balance between active sports and leisure/everyday life. 51% of Adidas customers use Adidas products for sports and 49% in their daily lives. By comparison, Nike products are more used for sports than everyday wear. 61% of Nike users use their products for sports and 39% for their daily lives. When asked how many times a product of each brand is purchased each year, 139 respondents (93%) of the total sample responded. Adidas users buy a product on average 2.5 times a year, and Nike users 2.4 times a year. This result indicates that there is no difference in the purchasing power of consumers and consumers of the two brands.

For the definition of the brand personality dimensions to be reliable and valid, the data collected will be determined according to the approach of Aaker (1997), Tong and Su (2014), and Mustamil et al. (2014) with exploratory factor analysis.

A correlation analysis, a significance study, and the inverse correlation matrix have shown that the collected data are suitable for factor analysis (significance  $p < 0.1$ , the correlation between 0 (no effect) and 1 (maximum effect)). Besides, the Kaiser-Mayer-Olkin criterion (KMO) was considered, with a value of 0.92 in the range 0.9–1, which suggests that the data is very well suited for the analysis.

To check the validity of the nine factors, consider the scree plot and the rotated component matrix. The scree plot maps the number of factors and their eigenvalues. The evaluation of the scree plot shows that only five factors are relevant. Since the scree plot is based on subjective judgment, the rotated component matrix is considered as a further test. The rotated component matrix maps all nine factors with an eigenvalue  $>1$  and their associated variables. Factor charges of  $\pm 0.30$  to  $\pm 0.40$  are not acceptable, according to Guadagnoli and Velicer (1988), especially for small samples and a small number of variables. A factor is valid and can be interpreted if at least four variables have a factor loading of  $\pm 0.60$  or more, or if at least ten variables have a factor loading of  $\pm 0.40$  or more. If the sample size is smaller than 300 ( $n < 300$ ), factors with only low charges should not be interpreted (Guadagnoli

and Velicer 1988). The rotated component matrix shows that four factors only load four variables at a time and do not always load them onto a factor with a factor charge  $>\pm 0.60$ . This means that only five factors can be interpreted. Based on the scree plot and the rotated component matrix, the exploratory factor analysis is continued with five factors. Now, considering the newly calculated rotated component matrix with five factors, all five factors are valid and interpretable.

After interpreting the factor loadings of variables, those variables were removed from the analysis that could not be clearly distinguished from a given factor. The cleansing of the dataset leaves 34 variables loaded on five factors. Initially, 53 variables loaded on nine factors. A reliability analysis, according to Cronbach Alpha measures the internal consistency of the individual factors. Since all  $\alpha$  values are between 0.846 and 0.937, all five factors show high homogeneity and a high correlation. The five factors are named based on the studies of Aaker (1997) and Tong and Su (2014). The result is a model of five different dimensions, with a total of 34 variables.

An ANOVA study analyzes differences in dimensions relative to the Adidas and Nike brands (Mustamil et al. 2014; Su et al. 2016). The descriptive statistics of the ANOVA study show that “competence” is the most dominant dimension in terms of Nike (mean = 1.57), and “attractiveness” is the most dominant dimension related to Adidas (mean = 1.85). The one-factorial ANOVA study shows that there is a significant difference in the first three dimensions. The significance value is close to zero for the first three dimensions: “competence”, “attractiveness,” and “activity”. A significance value close to zero means very significant. The biggest difference in the dimensions between Nike and Adidas can be seen in “activity”. The significance value is 0.019, and the mean of Nike is 1.99, and the mean of Adidas is 2.28. In the dimensions “sincerity” and “dynamics” no significant difference can be seen.

The analysis of the two Adidas and Nike brands in terms of brand personality dimensions has shown that Nike users see their brand as very competent. This perception can also be a trigger for using Nike products in active sports activities. The dimension “competence” reflects a competitive, successful, influential, self-confident, and strong-willed character, which can be strongly associated with the personality of a sports idol. Thus, Nike products are used to present and strive for a confident and successful sports character. For example, Nike promotes famous and successful basketball player Michael Jordan, whose role ties in well with Nike’s BP (Tong and Su 2014).

Adidas products are considered very attractive. Perception may be related to using as a fashion brand and as a sportswear brand. The dimension “attractiveness” represents a cool, fashionable, young, popular, attractive, modern, and relaxed character. Adidas users want to show their outside world both in their leisure time and in their everyday lives as well as during their active sports activities as a fresh and fashionable personality, which goes along with fashion and time. This appearance can also be deduced from the perception of the names of the two brands. Nike’s word is shorter, more aggressive, and more convincing, while the name Adidas sounds longer, calmer, and more relaxed.

Based on the available results, it can be concluded that Nike users put more emphasis on the performance of their sporting activity, while Adidas users focus on visual appearance. This is also reflected in the substantial difference in the perception of the dimension “activity”. Nike is perceived as a more active, that is healthier, faster, more innovative, and exciting brand than Adidas.

Comparing this study with the research results of Arora and Stoner (2009), there are apparent differences in the perception of the brands Adidas and Nike. Arora and Stoner (2009) used a mixed-method study to interview people from the Midwestern United States of America about Nike and Adidas. Compared to Adidas, Nike has been described as more trendy and contemporary. Adidas has been perceived as customer-oriented, friendly, and practical, while Nike has become a dominant and authoritarian character. The comparison corroborates the research findings of Aaker (1997) and Jana and Das (2017), who found that perceptions of brand personality may vary by nation and culture.

## 6 Summary and Conclusion

As explained in the theoretical part, emotional branding is a useful and much-used marketing tool to differentiate a brand from the competitors (Aggarwal and McGill 2012; Andreani and Devina 2017; Rossiter and Bellman 2012). To control a consumer’s preference for a particular brand, a specific brand to the target group is created. Brand personality enables the consumer to build a stronger emotional bond with the brand and find their personality in the brand and present it to the outside world through the brand’s products (Aaker 1997; Jana and Das 2017; Su and Tong 2015). Because at first glance, the sportswear industry is quite similar in its products, emotional branding, and the associated concept of brand personality are also very common in this industry. As noted in the empirical study, Adidas and Nike differ not only in their use but also in their brand personality. The results have shown that the marketing of the two companies influences and control the perception of their consumers by a specific form of brand personality. In this context, Nike relies on a competitive, successful, influential, confident, and strong-willed character, while Adidas radiates a cool, fashionable, young, popular, attractive, modern, and laid-back personality.

The empirical study has also shown that the model of brand personality dimensions can vary by industry.

Thus, the brand personality model of Nike and Adidas, based on the sample of a German-speaking population group, built with five dimensions and 34 personality traits. Thus, this empirical study substantiates the findings of previous research reports that the perception of brand personality may differ according to nation, industry, or product (Aaker 1997; Jana and Das 2017). Furthermore, the study has shown that two companies within the same sector with hardly distinguishable products can be perceived differently by their brand personality. The present study

complements the existing literature, as there was no direct comparison of the brand personality of Nike and Adidas to date.

## 7 Limitations and Further Research

This empirical study has some limitations, which then lead to further research questions.

A larger sample can produce a more detailed result and differentiate the differences in brand personality dimensions more clearly. In this empirical study, there was a 37/63 ratio between Adidas and Nike consumers. With a more significant number of participants in the survey, this relationship can be balanced.

The present study focused on an age group of 18–35 years, and further research could target a broader audience and explore how the perception of Nike and Adidas brand personality changes across age groups. In this context, it can also be found out whether there are differences in opinion regarding the sex of the respondents.

Another limitation of the questionnaire survey may have been a misunderstanding of personal traits. For example, the property “dynamic” can be perceived and understood by two respondents in a very different way. As the focus of the present study was to find out how the two companies generally differ in their brand personality, further research into how Brand Personality of Nike or Adidas within the company changes in the various product segments can be undertaken. In this context, the effect of these characteristics on the sales strength of the two companies and the influence on the purchasing power of consumers can also be found out.

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# Determinants of University Efficiency Focusing on Entrepreneurship and Innovation Activities



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**Abstract** One of the main and most important locomotives of knowledge transfer is higher education institutions. The productivity, efficiency, and effectiveness issues in higher education institutions are of high importance for policymakers and higher education professionals in the construction of innovative strategies. In this context, the topic of the research is about the measurement of efficiency and determining the factors that affect the performance of the university efficiency in the focus of entrepreneurship and innovation activities, which is considered as the third role of the universities. Based on the data for the years 2011–2016, firstly it is aimed to calculate the efficiency scores of the top 50 universities in the “Entrepreneurial and Innovative University Index” between 2012–2017 by data envelopment analysis, secondly, it is aimed to examine the environmental factors affecting the efficiency scores with the panel data analysis and to analyze in detail the elements necessary for higher ranking of successes. According to the results obtained, it was observed that 35 universities in Turkey, which are included in the scope of the study, do not use resources effectively and provide a systematic improvement periodically. According to the panel Tobit model results, presence of technopark, GDP per capita by region, the score of the graduates of the doctorate level, the establishment of the university after 1992 and the foundation year have a positive effect on the efficiency scores in the focus of entrepreneurship and innovation activities. Additionally, concerning the results, the efficiency of the universities in the Central Anatolia and Marmara Region is higher than the universities in the Blacksea, Eastern, and Southeastern Regions. Moreover, being a public university, the presence of a medical faculty, the number

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of undergraduate students per academician, and the existence of a vocational high school adversely affect efficiency.

**Keywords** Efficiency · Efficiency in higher education · Data envelopment analysis · Panel data analysis

## 1 Introduction

The Bayh–Dole Act came into force in response to the lack of sufficient patent numbers received by US research institutes before 1980 and the lack of a technology transfer mechanism to efficiently commercialize the patented inventions. A new era has started in the cooperation between the research universities, the state and the industry with the related law, the transfer of research results from the universities to the industrialization has gained great momentum (Sukan et al. 2002, p. 3).

The development of universities in the historical process takes place as the first, second, and third generations. As third-generation universities are emerging worldwide, a major transition phase of universities is currently in progress (Wissema 2009, p. 3). In most regions around the globe, higher education has undergone a considerable transformation due to the globalization and increasing expectations from the knowledge-based economy. With this transition, universities have experienced important changes from traditional teaching and research tasks, including the entrepreneurial role as the third mission that fully fulfills their potential to contribute to traditional socio-economic development (Sam and Sijde 2014, p. 3). In this context, it is inevitable for universities to focus on new functions for information transfer in the face of these changes in the ecosystem. Universities play an important role in the formation of human capital and at the same time provide new knowledge which will have a positive effect on the innovation systems of the regions. In this sense, with the increasing emphasis on knowledge and innovation, universities must respond immediately to industry needs (Berbegal-Mirabent et al. 2013, p. 2). There is empirical proof that in numerous academic systems the development and commercialization of intellectual property have become institutional goals (Etzkowitz et al. 2000, p. 1).

Despite different views on the third mission of the universities, the common one addresses the university's entrepreneurial function in socio-economic growth, underpinning the notion of an entrepreneurial university in which cooperation between university and external stakeholders is emphasized (Sam and Sijde 2014, p. 1). It is hard and ambiguous to obtain a single definition of the Entrepreneurial University across the European Higher Education Area (OECD, s. 2). There are many ways to define the University of Entrepreneurship in the literature. With the simplest definition, an entrepreneurial university is a university that can take on several roles in society and the innovation (eco) system (Sam and Sijde 2014, p. 11). Röpke (1998) states that entrepreneurial university may imply three things: as an institution,

the university becomes entrepreneurial, University members-faculty, students, staff-somehow become entrepreneurs, University-environmental interaction, the “structural coupling” between university and region, follows entrepreneurial patterns. To become an entrepreneurial university, to boost regional development, a university should improve entrepreneurial abilities and become a competent bloc for regional development (Röpke 1998, p. 2).

The higher education system in Turkey is officially supervised and controlled by the Council of Higher Education (CoHE) which was established with the Law No. 2547 dated 6 November 1981. Today, there are 206 universities including 129 public universities, 72 private universities, 5 private vocational schools. In the context of Turkey’s objectives in the field of economy and science for the year 2023, at the forefront strategies focusing on higher education are the creation and development of the information transfer ecosystem and human resources system (Council of Higher Education (CoHE)).

Today, one of the main and most important locomotives of knowledge transfer is Higher Education Institutions. The productivity, efficiency, and effectiveness issues in Higher Education Institutions are of high importance for policymakers and higher education professionals in the construction of innovative strategies. In this context, the topic of the research is about the measurement of the universities efficiencies in the focus of entrepreneurship and innovation activities, which is considered as one of the third mission and determining the factors that affect the efficiency of universities. At the first stage efficiency of 35 higher education institutions for the academic years 2011–2016 in Turkey computed, and in the second stage of the application, the efficiency scores, which were obtained with DEA, were taken as dependent variables and the factors determining the efficiency scores of the universities analyzed.

The rest of this paper is structured as follows: In Sect. 2, an overview of the literature on measuring the efficiency of higher education institutions was given. Section 3 and Sect. 4 data, methodology, data envelopment analysis (DEA), changes in total factor productivity levels of the universities, panel Tobit model results, and conclusions presented, respectively.

## 2 Literature

There is comprehensive literature on measuring the efficiency of educational institutions, including various higher education institutions. Despite variations in techniques used for this purpose and details of model specification, all current studies share similar approaches to higher education activity account as using main inputs to generate significant outputs such as education, research, and knowledge transfer (Agasisti 2017, p. 2). Information about some of the studies in this rich literature is given below.

Torre et al. (2017) investigated the impact of knowledge transfer indicators on the efficiency analysis of the higher education sector in their study of 47 state universities in Spain. In the study by applying various DEA models with different specifications,

results showed that the estimates for technical efficiency in the Spanish Higher Education system change when knowledge transfer indicators are included. Rossi (2014) analyzed the relative efficiencies of university institutions that use their financial and human resources to produce a broad range of knowledge transfer outputs (intellectual property disclosures, research and consultancy contracts, public events, etc.) by using data from the United Kingdom. According to the results universities operating either at a very small or at a very large scale are more likely to be efficient. Moreover, it was stated that the intensity of research and teaching had no significant influence on the transfer of knowledge. Berbegal-Mirabent et al. (2013) focused on the impact of academic initiatives (spin-off) on university performance as a direct knowledge transfer mechanism. The findings have shown that regional factors related to technological development and entrepreneurial culture have a strong influence on universities' efficiency and their involvement in knowledge transfer activities. Agasisti et al. (2019) examined the relationship between the performance of universities and the regions which they are located, considering the indicators of teaching, research, and third mission as outputs. According to their research, the existence of efficient universities facilitates local economic development.

Lee (2011), first analyzed the research performance of 37 Australian universities by DEA then investigated the determinants of efficiency by regressing efficiency scores on potential environmental variables. The findings have shown that the location of the university, the proportion of Associate Professors, and Professors to total academic staff and institutional grants scheme have a positive, actual student load has a negative effect on efficiency. Mousa and Ghulam (2018) studied the efficiency of 61 higher education institutions for the academic years 2008–2014 in Saudi Arabia first and at the second stage employed regression analysis to identify determinants of efficiency scores. According to the results obtained, it is observed that the ownership of the institution has no significant effect on the efficiency scores. Besides, being a university and having more than 20 years of experience have a positive effect on efficiency scores. Also, an increase in female staff in tertiary education reduces the efficiency level of HEIs. Srairi (2014) investigated the relative efficiency of eleven public universities in Tunisia and examined determinants of efficiency by the panel Tobit model. Research results have shown that being in the developed region, the proportion of professors and associate professors, the share of female academics, and a higher quality of student in secondary education increases the efficiency. On the other hand, the size of the university and load per teacher has a negative effect on efficiency. Selim and Bursalioglu (2013) conducted a two-stage DEA for 51 public universities in Turkey between 2006 and 2010. The results of the panel Tobit model showed that the number of female students has a positive, the number of male students, and the number of faculty has a negative effect on the relative efficiency of universities. Kempkes and Pohl (2010) calculated efficiency scores in the first step, then they regressed the efficiency scores on regional GDP per capita, the existence of the medical school and engineering faculty regarding a panel set of 72 German universities in 1998–2003. They found that GDP as a proxy for the location of university characteristics has a positive; the existence of medical or engineering faculties

has a negative and significant effect on the efficiency of universities. Wolszczak-Derlacz and Parteka (2011) aimed to analyze efficiency and its determinants based on a sample of 259 public higher education institutions from 7 European countries for the period of 2001–2005. They applied a two-stage DEA analysis by first calculating DEA scores then regressing on potential variables by use of bootstrapped truncated regression. At the second stage of the analysis of higher education characteristics as the size of the institution, universities with medical/pharmacy faculty, gender structure of academic staff have a positive effect on efficiency. Additionally, young universities (proxied by the foundation year of university) have a negative effect on the efficiency of universities.

In studies on the efficiency analysis of universities in Turkey, as far as known, there has been no study using current data given the “entrepreneurial and innovative” aspects of the universities. The study has an original value in measuring the efficiency of universities in the context of “entrepreneurship and innovation” activities based on the data for the years 2011–2016 and examining the environmental factors affecting the efficiency scores with the panel data analysis.

### 3 Data, Methodology, and Results

#### 3.1 Data and Variables

The data used in this study obtained from the Council of Higher Education (CoHE) and The Scientific and Technological Research Council of Turkey (TUBITAK). The data is based on the data for the years 2011–2016 of 35 universities, which managed to stay in the top 50 for five years in the Entrepreneurial Innovative University Index 2012–2017. Description of variables used in the DEA and panel Tobit model are given in Tables 1 and 2.

The output of the DEA score is based on the Entrepreneurial and Innovative University Index prepared by the Scientific and Technological Research Council of

**Table 1** Description of variables used in DEA

Variables	Description
<i>Inputs</i>	
Number of professors and associate professors	Sum of professors and associate professors
Number of other academic staff	Sum of assistant professors, instructor, and other academic staff
Number of Ph.D. students	Number of Ph.D. students
<i>Output</i>	
Entrepreneurial and Innovative University Index Score	

**Table 2** Description of variables used in panel Tobit model

Variables	Description
<b>Dependent variable:</b> DEA scores	–
<b>Independent variables:</b> University type	1: public university, 0: foundation university
Presence of medical school	1: if the university has a medical school, 0: otherwise
Presence of technopark	1: if the university has a technopark, 0: otherwise
Regional GDP per capita	Per capita gross domestic product by provinces (NUTS-3) (2009 based)
Geographical Region	7 Geographical Regions: Eastern Anatolian, Central Anatolia, Blacksea, Mediterranean, Aegean, Marmara, Southeastern Anatolia
Central Anatolia Region	1: the university is located in the Central Anatolia Region, 0: otherwise
Marmara Region	1: the university is located in the Marmara Region, 0: otherwise
Aegean Region	1: the university is located in Aegean Region, 0: otherwise
Mediterranean Region	1: the university is located in the Mediterranean Region, 0: otherwise
Blacksea, Eastern and Southeastern Regions	1: the university is located in Blacksea or Eastern or Southeastern Regions, 0: otherwise
Presence of vocational school	1: if the university has a vocational school, 0: otherwise
Number of undergraduate students per academic	The ratio of the number of undergraduate students to the number of total academic staff
Doctoral Graduate Score	URAP doctoral graduate student score
Founded before 1992	1: if university established before 1992, 0: otherwise
Year of establishment	Establishment year of the university

Turkey (TUBITAK) since 2012. The Index consists of 5 pillars which consist of scientific and technological research competence, intellectual property pool, cooperation and interaction, entrepreneurship and innovation culture, and economic contribution and commercialization. Detailed information about the 5 pillars from 23 indicators can be found in Appendix.

Table 3 summarizes the dataset for inputs and output variables that were used in DEA, Malmquist Total Factor Productivity (TFP) Index, and panel Tobit model Analysis.

**Table 3** Descriptive statistics of inputs, output, and environmental variables

Variable	Mean	Std. Dev.	Min.	Max.	Obs.
<i>Input</i>					
Number of professors and associate professors	503.966	461.609	10	2084	210
Number of other academic staff	1281.062	846.414	49	3677	210
Number of Ph.D. students	1416.39	1535.559	10	7844	210
<i>Output</i>					
Entrepreneurial and Innovative University Index Score	52.146	16.414	28.84	95.03	210
<i>Environmental variables</i>					
University type	0.714	0.452	0	1	210
Presence of medical school	0.628	0.484	0	1	210
Presence of technopark	0.761	0.426	0	1	210
Regional GDP per capita	31,329.2	11,447.8	8264	54,933	210
Central Anatolia Region	0.314	0.465	0	1	210
Marmara Region	0.342	0.475	0	1	210
Aegean Region	0.142	0.350	0	1	210
Mediterranean Region	0.114	0.318	0	1	210
Blacksea, Eastern and Southeastern Regions	0.085	0.280	0	1	210
Presence of vocational school	0.771	0.420	0	1	210
Number of undergraduate students per academic	0.052	0.024	0.0007	0.170	210
Doctoral Graduate Score	121.982	40.509	14.12	199	210
Founded before 1992	0.4	0.491	0	1	210
Year of establishment	1980.229	18.487	1924	2007	210

### 3.2 Data Envelopment Analysis (DEA) Results

Various methods were used in studies on the efficiency of higher education (De Witte and Lopez Torres 2017). Within these various methods, DEA has found widespread use due to the advantages of usage. The DEA, which has been frequently used for over 30 years to evaluate educational activities of countries, universities, schools, and libraries, is a useful method for identifying the sources of educational inefficiency and providing suggestions for possible improvements in respective educational performance metrics (Emrouznejad and Cabanda 2014). The first implementation of DEA in the field of education was carried out by Charnes et al. (1978) to assess the efficiency of educational programs in public schools. DEA is an approach to measure the relative efficiency of peer decision-making units (DMUs) with multiple inputs and outputs (Chen et al. 2009). The main feature that distinguishes DEA from other methods of similar purpose is that it makes it possible to evaluate when there is a large number of inputs and outputs.

In this study based on the data for the years 2011–2016, efficiency scores of the top 50 universities in the “Entrepreneurial and Innovative University Index” between 2012 and 2017 calculated by DEA and changes in total factor productivity levels of these universities measured by Malmquist Total Factor Productivity (TFP) Index. While determining the input and output variables to be used in the study, both the past studies and the official published statistics were taken into consideration. As a result of the model experiments made, inputs such as human resources (number of academicians, number of Ph.D. students) and due to data limitation “Entrepreneurial and Innovative University Index Score” was taken as output. The Win4DEAP package program was used to calculate the efficiencies of the universities via the DEA method and to obtain the results of the Malmquist Total Factor Productivity (TFP) Index. Tables 4 and 5 presents the DEA and Malmquist Total Factor Productivity (TFP) Index results respectively.

As a result of the analyses made, it is concluded that 2 out of 35 universities included in the study are efficient in all periods. Also, the most significant number of universities with 6 universities are efficient in the year 2016. According to the results of the Malmquist Total Factor Productivity (TFV) index, which is used to determine the change in the efficiency of the universities over time, total factor productivity increased by 0.1% and 0.6% in the period of 2011–2012 and 2013–2014, respectively.

### **3.3 Panel Tobit Model Results**

The topic of the research is about the measurement of the university efficiency in the focus of entrepreneurship and innovation activities, which is considered as one of the third role (mission) and determining the factors that affect the efficiency of universities. At the first stage efficiency of 35 higher education institutions for the academic years, 2011–2016 in Turkey computed, and in the second stage of the application, the efficiency scores which were obtained with DEA were taken as dependent variables and the factors determining the efficiency scores of the universities analyzed.

When the relationship between external factors and efficiency scores is evaluated in the second stage of DEA, the use of Tobit regression is frequently encountered (Hoff 2007). If the dependent variable has a censored structure, consistent parameter estimators cannot be obtained by LS regression estimation. For this reason, it is recommended to use the Maximum Likelihood Method in estimating the Tobit model (Gürüş et al. 2015). While the random-effects model allows estimating the coefficients for the variables that are time-varying and time-invariant, it is only possible to estimate the coefficients of the time-varying explanatory variables that change only over time by the fixed-effects model. As the explanatory variables examined in the panel Tobit model analysis have a time-invariant structure, random effects panel Tobit model analysis was performed in the study. As estimated DEA efficiency scores are limited between 0 and 1, due to the censored nature of the data panel Tobit model analysis conducted. Tobit model estimates were obtained by using STATA 15 software. The results for the two different models are shown in Table 6.



**Table 4** Efficiency scores of the 35 universities

	University	2011	2012	2013	2014	2015	2016
1	Akdeniz University	0.464	0.489	0.439	0.455	0.443	0.406
2	Anadolu University	0.357	0.558	0.663	0.601	0.530	0.560
3	Ankara University	0.440	0.486	0.468	0.434	0.491	0.463
4	Atilim University	0.481	0.631	0.647	0.569	0.640	0.722
5	Bahcesehir University	0.548	0.510	0.483	0.404	0.408	0.380
6	Bogazici University	0.774	0.889	0.931	0.901	0.843	0.903
7	Cankaya University	1.000	0.677	1.000	1.000	1.000	1.000
8	Cukurova University	0.488	0.546	0.527	0.488	0.451	0.448
9	Dokuz Eylul University	0.417	0.446	0.459	0.487	0.458	0.455
10	Ege University	0.560	0.617	0.602	0.614	0.581	0.593
11	Erciyes University	0.548	0.518	0.520	0.638	0.556	0.565
12	Firat University	0.345	0.388	0.362	0.363	0.403	0.346
13	Gazi University	0.524	0.638	0.579	0.560	0.530	0.508
14	Gaziantep University	0.393	0.486	0.499	0.485	0.543	0.579
15	Gebze Institute of Technology	0.679	0.637	0.697	0.684	0.819	1.000
16	Hacettepe University	0.583	0.659	0.647	0.615	0.543	0.577
17	Bilkent University	0.833	0.964	0.919	0.883	0.870	0.897
18	İstanbul Teknik University	0.798	0.844	0.876	0.848	0.846	0.906
19	İstanbul University	0.357	0.377	0.458	0.445	0.448	0.446
20	İzmir University of Economics	0.443	0.478	1.000	1.000	1.000	1.000
21	İzmir Institute of Technology	0.690	0.794	0.833	0.830	0.741	0.856
22	Karadeniz Teknik University	0.381	0.462	0.396	0.405	0.400	0.401
23	Kocaeli University	0.714	0.746	0.903	0.865	0.827	0.476
24	Koc University	0.440	0.513	0.512	0.467	0.440	0.866
25	Mersin University	0.409	0.501	0.476	0.373	0.442	0.442
26	Middle East Technical University	0.988	1.000	1.000	0.972	0.903	0.960
27	Ozyegin University	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>
28	Pamukkale University	0.345	0.347	0.353	0.375	0.431	0.463
29	Sabancı University	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>
30	Selcuk University	0.512	0.643	0.723	0.669	0.618	0.575
31	Suleyman Demirel University	0.536	0.518	0.523	0.459	0.413	0.369
32	TOBB University of Economics and Technology	0.773	0.827	0.931	1.000	1.000	1.000
33	Uludag University	0.440	0.465	0.527	0.530	0.476	0.521
34	Yeditepe University	0.476	0.535	0.483	0.482	0.456	0.483
35	Yıldız Teknik University	0.488	0.578	0.697	0.723	0.712	0.756

**Table 5** Malmquist total factor productivity index results

Period	effch (efficiency change)	techch (technology change)	pech (pure efficiency change)	sech (scale efficiency change)	tfpch (total factor productivity change)
2011–2012	2.390	0.419	1.091	2.191	1.001
2012–2013	1.211	0.719	1.052	1.151	0.871
2013–2014	1.205	0.834	0.974	1.238	1.006
2014–2015	1.012	0.975	0.987	1.026	0.987
2015–2016	1.044	0.925	1.020	1.023	0.966
Geometric average	1.298	0.743	1.024	1.268	0.965

According to the analysis results, the Wald test statistic ( $\text{Prob} > \chi^2 = 0.0000$ ) was significant for both models and concerning LR test results which compares the pooled estimator with the panel estimator, the panel-level effect is important. Since Rho is different from “0” in both models (0.834 and 0.716), panel-level data analysis is found to be important.

First, the results of Model 1 and Model 2 in Table 6 will be evaluated together. Being a public university and the presence of a medical faculty in the university reduce the effectiveness. The conclusion regarding the negative impact of the presence of a medical faculty in the university on the efficiency is consistent with the results of Kempkes and Pohl (2010); contradicts with the research of Wolszczak-Derlacz and Parteka (2011), which indicates that the universities with a medical faculty or engineering faculty have higher efficiency. The fact that the university has technopark and GDP per capita by region increases the efficiency. The finding of the positive effect of GDP per capita by region on efficiency is coherent with the evidence presented by Kempkes and Pohl (2010). Likely, university-industry cooperation opportunities that can be realized in the region where universities are located, the higher possibility of technology transfer, and the higher qualification of R&D infrastructures in the regions with high GDP might have a positive impact on university efficiency in the focus of entrepreneurship and innovation activities. In Model 1, the increase in the number of undergraduate students per academican decreases productivity and accordingly the efficiency. The negative impact of the number of undergraduate students per academican on efficiency is similar to that obtained by Srairi (2014) and Lee (2011).

According to the results of Model 2, the existence of a Vocational High School at the university has a negative effect on the efficiency scores. The establishment of the university after 1992 and the foundation year have a positive impact on the efficiency. Based on this result, it can be thought that the younger universities are more comfortable adapting to new trends within the scope of entrepreneurship and innovation activities. Contrary to this result Mousa and Ghulam (2018) found that

**Table 6** Random effect panel Tobit model results

Independent variables	Model 1				Model 2			
	Coef.	Std. Err.	Marginal effect	Coef.	Std. Err.	Marginal effect	Marginal effect	
Presence of medical school	-0.2210544***	0.0742654	-0.2210544	-0.1594791***	0.0571243	-0.1594791	-0.1594791	
Presence of technopark	0.1474821***	0.0422062	0.1474821	0.1527101***	0.0421349	0.1527101	0.1527101	
University type (1: public, 0: foundation)	-0.2732128***	0.0898609	-0.2732128	-0.2015239***	0.0841466	-0.2015239	-0.2015239	
Number of undergraduate students per academic	-1.624711*	0.82663	-1.624711	-	-	-	-	
Doctoral Graduate Score	0.0012533**	0.0005836	0.0012533	-	-	-	-	
Regional GDP per capita (2009 based)	0.0445247*	0.031089	0.0445247	0.0679076***	0.0285352	0.0679076	0.0679076	
Presence of vocational school	-	-	-	-0.1570662**	0.0704973	-0.1570662	-0.1570662	
Founded before 1992	-	-	-	0.2367065***	0.0903844	0.2367065	0.2367065	
Year of establishment	-	-	-	0.0048733*	0.0025895	0.0048733	0.0048733	
Central Anatolia	-	-	-	0.1780317*	0.1024637	0.1780317	0.1780317	
Marmara Region	-	-	-	0.1784511*	0.0996654	0.1784511	0.1784511	
Aegean Region	-	-	-	0.1220353	0.1104926	0.1220353	0.1220353	
Mediterranean Region	-	-	-	0.1742675	0.1115714	0.1742675	0.1742675	
Constant	0.3460183	0.3591928	-	-	5.224331	-	-	
Log-likelihood	117.99963	-	-	-	118.30156	-	-	
Left-censored observations	0	-	-	-	2	-	-	
Uncensored Observations	183	-	-	-	181	-	-	
Right-censored observations	27	-	-	-	27	-	-	
Rho	0.834	-	-	-	0.716	-	-	
LR test of sigma_u	217.68	-	-	-	154.69	-	-	

(continued)

**Table 6** (continued)

Independent variables	Model 1		Model 2	
	Coef.	Std. Err.	Marginal effect	Coef.
Wald	44.27		–	67.43
				Marginal effect
				–

Base category: Blacksea, Eastern and Southeastern Regions  
 \*, \*\* and \*\*\* indicate statistical significance at 1%, 5% and 10%

being a university and having more than 20 years of experience have a positive effect on efficiency scores.

Another question investigated in the study is whether the region where the universities are located has an impact on efficiency. In that regard, formed by combining five of the seven geographical regions of Turkey and one region was chosen as a base class. Regarding the results, the efficiency of the universities in the Central Anatolia and Marmara Region is higher than the universities in the Blacksea, Eastern, and Southeastern Regions. The DEA confirms this result, the fact that universities with the highest efficiency score (Çankaya University, METU, Özyeğin University, Sabancı University) are located in Ankara and Istanbul. Unfortunately, compared to the base class (Blacksea, Eastern and Southeastern Regions) the effects of being in the Aegean and Mediterranean regions were not found significant.

## 4 Conclusion

In this study first efficiency of 35 higher education institutions in Turkey for the academic years 2011–2016 computed and in the second stage, the efficiency scores which were obtained with DEA were taken as dependent variables and the factors determining the efficiency scores in the focus of entrepreneurship and innovation activities analyzed. The study provides significant findings for future work and policymakers since the efficiencies of the universities are measured by focusing on entrepreneurship and innovation activities, although the study has some limitations due to the inadequacy of the published data.

As a result of the analysis made, it is concluded that 2 out of 35 universities included in the study are efficient in all periods. Besides, the most significant number of universities with 6 universities are efficient in the year 2016. However, according to the results of the Malmquist Total Factor Productivity (TFV) index, which is used to determine the change in the efficiency of the universities over time, total factor productivity decreased by 0.1% and 0.6% between 2011 and 2012 and 2013–2014, respectively. According to the results obtained, it was observed that 35 universities in Turkey, which are included in the scope of the study, do not use resources effectively and provide a systematic improvement periodically.

With regard to Turkish universities, panel Tobit model analysis revealed that drivers of the university efficiency in the focus of entrepreneurship and innovation activities are the presence of technopark, GDP per capita by region, the score of the graduates of the doctorate level, the establishment of the university after 1992 and the foundation year which contributed positively to the efficiency. Also, the efficiency of the universities in the Central Anatolia and Marmara Region is higher than the universities in the Blacksea, Eastern, and Southeastern Regions. Besides, being a public university, the presence of a medical faculty, the number of undergraduate students per academican, and the existence of a Vocational High School adversely affect efficiency.

In light of this evidence, to achieve third generation university model, higher education institutions are obliged to change their old patterns by enhancing university-industry collaboration, knowledge transfer and applying strategies to increase the interest of students in graduate programs to meet the need of qualified personnel of the industry. In this context, it is critical to take measures to reduce the course load to ensure that academicians spend more time in R&D studies and to reduce the number of students per academician.

As a result, it can be said that within the framework of Turkey's goals in the economy and science for the year 2023, there are many factors that universities need to develop in terms of "entrepreneurship and innovation". The higher education system needs to implement innovative strategies for producing high value-added products and for technology-based entrepreneurship.

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## Appendix

Information on 5 dimensions and 23 parameters that form the Entrepreneurial and Innovative University Index.

The output of the DEA score is based on the Entrepreneurial and Innovative University Index prepared by the Scientific and Technological Research Council of Turkey (TÜBİTAK) since 2012. The Index consists of 5 pillars and 23 indicators which are given below.<sup>1</sup>

1. Scientific and Technological Research Competence (20%)—6 indicators
  - Number of scientific articles and citations
  - Number of projects and the monetary amount of project funds
  - Number of scientific prizes
  - Number of graduates having Ph.D. degree
2. Intellectual Property Pool (15%)—4 indicators
  - Number of national and international patent applications
  - Number of national patent grants
  - Number of utility model/industrial design grants
3. Cooperation and Interaction (25%)—5 indicators

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<sup>1</sup>Information about Entrepreneurial and Innovative University Index is gathered from the presentation of Yasemin Aslan, Head of STI Policies Department, accessed 20 April 2020, [https://www.oecd.org/sti/Session5\\_Yasemin%20Aslan.pdf](https://www.oecd.org/sti/Session5_Yasemin%20Aslan.pdf).

- Number of university-industry collaboration project and the amount of university-industry collaboration project funds
  - Number of international collaboration project and the amount of international collaboration project funds
  - Number of academicians/students who are in circulation
4. Entrepreneurship and Innovation Culture (15%)—4 indicators
    - Number of undergraduate and graduate-level courses
    - Number of training/certification programs
    - The activities of the Technology Transfer Office
    - Number of full-time working people for the management
  5. Economic Contribution and Commercialization (25%)—4 indicators
    - Number of firms that are founded or co-founded by academicians/students—last five years graduates and their employment
    - Number of employees of firms that are founded or co-founded by academicians
    - Number of licensed patent/utility model/industrial design.

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# Stochastic Socio-economic Ex-ante Evaluation of Road Transport Infrastructure Projects



Dimitrios D. Kantianis

**Abstract** The successful delivery of major infrastructure projects to meet social needs is at the core of European Union (EU) 2020 strategy aiming at the enhancement of territorial cohesion and economic development. Selecting the “most valued” public infrastructure investments is obviously crucial, especially during economic recession periods. Cost-benefit analysis (CBA) has long been accepted as the leading analytical technique to assist decision-making in the appraisal of public mega projects by assessing their “discounted” whole-life cycle socio-economic benefits and costs. Nonetheless, the uncertain nature of the critical variables involved in the analysis is endemic in any ex-ante project evaluation process and, therefore, an appropriate quantitative (stochastic) risk assessment (QRA) is indispensable. According to relevant EU regulations, the inclusion of QRA in CBA is a prerequisite for the approval of major projects. The herein presented paper aims at investigating the level of significance of adopting a stochastic approach to the socio-economic evaluation of public road transport infrastructure projects through the application of QRA within the traditional CBA framework. Both CBA and QRA methodologies are presented and an illustrative numerical example for a road transport infrastructure project is demonstrated: a practical probabilistic CBA implementation concerning the decision whether to proceed with the construction of a new peripheral motorway for improving the existing local road traffic conditions in the connection of two urban areas. From the results of the analysis, the advantages of stochastic appraisal and selection of major capital investment projects are vindicated.

**Keywords** Transport infrastructure · Public decision-making · Cost-benefit analysis · Monte Carlo simulation

**JEL Classification Codes** R58 · D81 · L91

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## 1 Introduction

The successful delivery of major infrastructure projects to meet social needs is at the core of European Union (EU) 2020 strategy aiming at the enhancement of territorial cohesion and economic development. Selecting the “most valued” infrastructure investments is obviously crucial, especially during deep economic recession periods. Cost-benefit analysis (CBA) has long been used as an analytical tool to assist public works’ decision-makers in the appraisal of major investment projects by assessing their “discounted” whole-life cycle socio-economic benefits and costs.

Nevertheless, the uncertain nature of both internal and external critical factors involved in the analysis is inherent in any ex-ante project evaluation process and an appropriate quantitative (probabilistic) risk assessment (QRA) is indispensable. According to EU relevant regulations, the inclusion of QRA in CBA is a prerequisite for the approval of major projects. There is a strong need, therefore, to adopt a new stochastic cost-benefit analysis (Stochastic-CBA) methodology to support decision-making in the selection of *mega* projects.

The main purpose of the herein presented research is to assist public works’ decision-making towards more effective socio-economic appraisal and selection of major transport infrastructure projects. The objectives of the study are: (a) to analyse both traditional CBA and QRA methods; (b) to incorporate QRA within the traditional CBA methodology framework; and (c) to explore the effect of uncertainty to the socio-economic evaluation of public infrastructure projects. The research methodology entails: (a) the development of a spreadsheet CBA model for deterministic (base-case) calculation; (b). the practical implementation of the developed model to a typical major transport infrastructure project—a new peripheral road construction; (c) the use of probabilistic simulation to investigate the significance of critical variables in project’s economic performance indicator; and (d) to draw important conclusions towards more effective decision-making.

## 2 CBA and EU Cohesion Policy 2014–2020

The EU cohesion policy aims to deliver growth and jobs together with the targets and objectives contained within the Europe 2020 strategy. Choosing the best quality projects which offer best value for money and which impact significantly on employment and economic development is a key ingredient of the overall strategy. In this framework, CBA is explicitly required, among other elements, as a basis for decision making on the co-financing of major projects included in Operational Programmes (OPs) of the European Regional Development Fund (ERDF) and the Cohesion Fund. CBA is an analytical tool to be used to appraise an investment decision in order to assess the welfare change attributable to it and, in so doing, the contribution to EU cohesion policy objectives. The purpose of CBA is to facilitate a more efficient

allocation of resources, demonstrating the convenience for society of a particular intervention rather than possible alternatives.

## ***2.1 Definition and Scope of Major Infrastructure Projects***

According to Article 100 (Major projects) of Regulation (EU) No. 1303/2013, a “major project” is an investment operation comprising “a series of works, activities or services intended to accomplish an indivisible task of a precise economic and technical nature which has clearly identified goals and for which the total eligible cost exceeds EUR 50 million”. In order to get the co-funding approval for major projects, the managing authority (MA) of the programme(s) submitting the projects is asked to include the information referred to in Article 101 (Information necessary for the approval of a major project) of Regulation (EU) No. 1303/2013.

## ***2.2 General Principles in CBA***

Information required includes a CBA economic analysis and a risk assessment. CBA is an analytical tool for judging the economic advantages or disadvantages of an investment decision by assessing its costs and benefits in order to assess the welfare change attributable to it. The analytical framework of CBA refers to the following underlying concepts.

**Opportunity cost:** the opportunity cost of a good or service is defined as the potential gain from the best alternative forgone, when a choice needs to be made between several mutually exclusive alternatives.

**Long-term perspective:** a long-term outlook is adopted, ranging from a min of 10 to a max of 30 years or more, depending on the sector of intervention. Hence, one needs to set a proper time horizon; to forecast future costs and benefits (look forward); to adopt appropriate discount rates to calculate the present value of future costs and benefits; and to account for uncertainty by assessing the project’s risks. The calculation of economic performance indicators is expressed in monetary terms. CBA is based on a set of predetermined project objectives, giving a monetary value to all positive (benefits) and negative (costs) welfare effects of the intervention. These values are discounted and then totalled in order to calculate a net total benefit.

**Microeconomic approach:** CBA is typically a microeconomic approach enabling the assessment of the project’s impact on society as a whole via the calculation of economic performance indicators, thereby providing an assessment of expected welfare changes. The discount rate in the economic analysis of investment projects, the Social Discount Rate (SDR), reflects the social view on how future benefits and costs should be valued against present ones. For the programming period 2014–2020 the European Commission (EC) recommends that for the SDR 5% is used for major projects in Cohesion countries and 3% for the other Member States (EC Guide

2015). The use of the appropriate SDR is the first step in calculating the economic performance of any proposed major project. Once all project costs and benefits have been quantified and valued in money terms, it is possible to measure the economic performance of the project by calculating the following indicator.

**Benefit/Cost Ratio (BCR):** the ratio between *discounted* economic benefits and costs. BCR is the present value of project benefits divided by the present value of project costs. If  $BCR > 1$ , the project is suitable because the benefits, as measured by the present value of the total inflows, are greater than the costs, as measured by the present value of the total outflows.

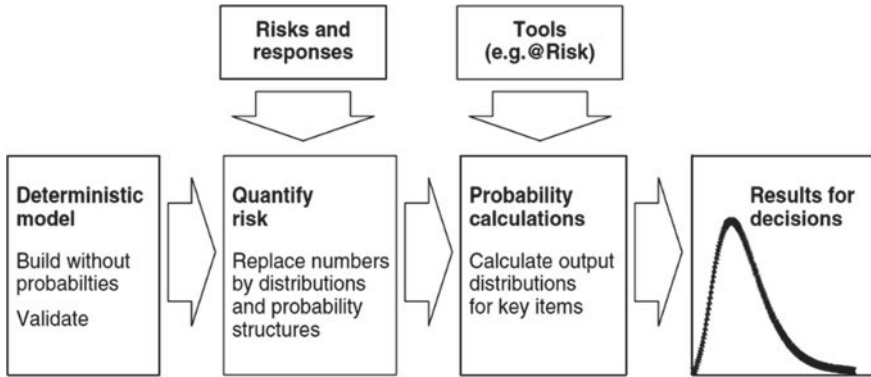
### 2.3 *Quantitative Risk Analysis (QRA) and CBA (Stochastic-CBA)*

As set out in Article 101 (Information necessary for the approval of a major project) of EU Regulation No. 1303/2013, a risk assessment must be included in the CBA. This is required to deal with the uncertainty that is endemic in infrastructure projects.

The main recommended tool for assessing the project risks is Monte Carlo Simulation (MCS) or *stochastic* simulation (Hertz 1964). This type of analysis generates estimates by *randomly* calculating a feasible value for each critical variable from a statistical probability distribution function which represents the range and pattern of possible outcomes. To ensure that the chosen values are representative of the pattern of possible outcomes, a large number of repetitive *deterministic* calculations (known as *iterations*) are made (Bennett and Ormerod 1984). The probability distribution for each variable may be derived from different sources, such as collected experience from similar past projects or consultation with experts. Obviously, if the process of generating the distributions is unreliable, the risk assessment is unreliable as well. However, in its simplest design (e.g. triangular distribution) this step is always feasible and represents an important improvement in the understanding of the project's strengths and weaknesses as compared with the base case. Having established the probability distributions for the critical variables, it is possible to calculate the probability distribution of the BCR of the project (EC Guide 2015).

The values obtained enable analysts to infer significant judgments about the level of risk of an infrastructure project. The graphical display of output results, as expressed in terms of the probability density or the cumulative probability of the BCR in the resulting interval of values, provide comprehensive information about the risk profile of the project and allows sensitivity analyses to be performed. The accumulated probability curve assesses the project risk, for example verifying whether the cumulative probability for a given BCR value is higher or lower than a reference value that is considered to be critical.

In general, QRA process in large projects (see Fig. 1) encompasses four steps (Cooper et al. 2005):



Source: Cooper et al. (2005)

**Fig. 1** Outline of the quantitative risk analysis (QRA) process

- developing and validating a “single best-guess” base-case model by defining the problem examined in standard spreadsheet format;
- quantifying risk by assigning probability distributions to critical variables (inputs) to be analysed;
- performing MCS to determine the range and probabilities of all possible outcomes for the analysis results (outputs); and
- making a decision based on the results provided and personal preferences or other constraints.

The tool used in this research for performing QRA calculations is spreadsheet add-in *@RISK*® by Palisade Corporation® (*@RISK*). Other widely used MCS tools are *Crystal Ball*® by Oracle® and *ModelRisk* by Vose Software.

### 3 Numerical Example: Construction of a New Motorway

The major infrastructure project used in the numerical example consists of the construction of a new non-tolled peripheral road with a length of 50 km and an estimated average daily traffic of 5000 vehicles. The new road project mainly aims at providing faster and safer travels with an average vehicle speed of 90 km/h by replacing a 75 km existing old road, connecting two cities within a prefecture, with an average vehicle speed of 50 km/h and a reached capacity limit. Thus, the estimated travel time reduction is 56 min (0.94 h). The analysis is performed using a 30-year reference period which is common for road transport projects (EC Guide 2015). No residual values are considered at the end of this reference period. The unit rates applied in this example (see Table 1), whilst being representative of current economic and traffic conditions, should be seen as illustrative and not to be taken as wider benchmarks.

**Table 1** Deterministic-CBA basic assumptions

Basic assumptions	
(1): Road length (km)— <i>new road</i>	50
(2): Road construction unit cost ( $10^3$ EUR/km)	6800
(3): Annual road maintenance unit cost ( $10^3$ EUR/km/yr)— <i>new road</i>	35
(4): Average vehicle speed (km/h)— <i>new road</i>	90
(5): Vehicle operating unit cost (EUR/km)— <i>new road</i>	0.25
(6): Accident rate (no. of accidents/ $10^6$ vehicle-km)— <i>new road</i>	0.50
(7): Average accident cost ( $10^3$ EUR/accident)— <i>new road</i>	12
(8): Average daily traffic (vehicles/day)	5000
(9): Average vehicle occupancy (passengers/vehicle)	1.5
(10): Unit value of time (EUR/h)	8.6
(11): Road length (km)— <i>old road</i>	75
(12): Annual road maintenance unit cost ( $10^3$ EUR/km/yr)— <i>old road</i>	40
(13): Average vehicle speed (km/h)— <i>old road</i>	50
(14): Vehicle operating unit cost (EUR/km)— <i>old road</i>	0.20
(15): Accident rate (no. of accidents/ $10^6$ vehicle-km)— <i>old road</i>	1.20
(16): Average accident cost ( $10^3$ EUR/accident)— <i>old road</i>	8
(17): Analysis period $T$ (yrs)	30
(18): Social discount rate $SDR$ (%)	5

Source Author's own work

### 3.1 Deterministic-CBA Calculations

The estimated project costs used in the deterministic (base-case) CBA include: (a) the total investment cost which is calculated with an average construction unit cost of EUR 6.8 million/km based on historical comparable projects; and (b) the annual maintenance cost which is estimated to be EUR 35,000/km based on previous conducted surveys and is assumed to remain constant throughout the evaluation period. The SDR used in the socio-economic assessment is 5%, in line with EU instruction set out by the EC Guide (2015).

The estimated project benefits are consistent with the purpose of faster travel on safer traffic conditions of the new road project: (a) traffic time savings, which are calculated with an average vehicle occupancy (for both cars and goods vehicles) of 1.5 passengers/vehicle and an average unit value of time (for both work and non-work trips) of EUR 8.6/h; (b) vehicle operating cost (VOC) savings, which are estimated with an average unit cost of 0.25 EUR/km and 0.20 EUR/km for the new road and the existing road respectively; (c) accident cost savings, which are derived from an estimated reduced accident rate from 1.20 accidents per  $10^6$  vehicle-km (old road) to 0.50 accidents per  $10^6$  vehicle-km (new road) and an average cost of EUR 8000 per

**Table 2** Deterministic-CBA basic calculations

Calculation of analysis variables	
(19) = (1) × (2): Total road construction cost (10 <sup>3</sup> EUR)	340,000
(20) = (1) × (3): Annual road maintenance cost (10 <sup>3</sup> EUR/yr)— <i>new road</i>	1750
(21) = (8) × (9): Average daily no. of passengers (passengers/day)	7500
(22) = (1)/(4): Average traffic time (h)— <i>new road</i>	0.56
(23) = (21) × (22) × (10) × 365/1000: Traffic time cost (10 <sup>3</sup> EUR/yr)— <i>new road</i>	13,079
(24) = (8) × (1) × (5) × 365/1000: Vehicle operating cost (10 <sup>3</sup> EUR/yr)— <i>new road</i>	22,813
(25) = (6)/1,000,000 × (8) × (1) × 365: No. of accidents (accidents/yr)— <i>new road</i>	46
(26) = (25) × (7): Accident cost (10 <sup>3</sup> EUR/yr)— <i>new road</i>	548
(27) = (11) × (12): Annual road maintenance cost (10 <sup>3</sup> EUR/yr)— <i>old road</i>	3000
(28) = (11)/(13): Average traffic time (h)— <i>old road</i>	1.50
(29) = (21) × (28) × (10) × 365/1000: Traffic time cost (10 <sup>3</sup> EUR/yr)— <i>old road</i>	35,314
(30) = (8) × (11) × (14) × 365/1000: Vehicle operating cost (10 <sup>3</sup> EUR/yr)— <i>old road</i>	27,375
(31) = (15)/1,000,000 × (8) × (11) × 365: No. of accidents (accidents/yr)— <i>old road</i>	164
(32) = (31) × (16): Accident cost (10 <sup>3</sup> EUR/yr)— <i>old road</i>	1314
(33) = (20) + (23) + (24) + (26): Total cost per year (10 <sup>3</sup> EUR/yr)— <i>new road</i>	38,189
(34) = (19) + PV[(33); (17); (18)]: Present value (10 <sup>3</sup> EUR)— <i>new road</i>	927,061
(35) = (27) + (29) + (30) + (32): Total cost per year (10 <sup>3</sup> EUR/yr)— <i>old road</i>	67,003
(36) = PV[(35); (17); (18)]: Present value (10 <sup>3</sup> EUR)— <i>old road</i>	1,029,996

Source Author's own work

accident (old road) and EUR 12,000 per accident (new road); and (d) cost savings from avoiding periodic maintenance works for the abandoned motorway.

After setting the aforementioned basic assumptions in a spreadsheet, it is possible to calculate the variables that are included in the analysis. Table 2 summarizes required calculations (PV is the spreadsheet argument for present value calculations).

Table 3 presents the total benefits (B) and costs (C) and the resulting BCR with a net benefit (B-C) figure in 10<sup>3</sup> EUR (PMT is the spreadsheet argument for annual cost calculations).

Since  $BCR = 1.28 > 1$ , the new road generates a positive welfare change and is deemed acceptable. The net benefit is calculated as a present value of EUR 102.9 million or an annual amount of EUR 6.7 million.

### 3.2 Stochastic-CBA Calculations

In order to receive EU funding assistance for delivering the new public infrastructure, a probabilistic analysis is an additional prerequisite to support the aforementioned

**Table 3** Results from deterministic-CBA (base-case forecast)

Calculation of benefits and costs	Per year	Present value (t = 0)
(37) = (29) – (23): Savings in cost of traffic time (10 <sup>3</sup> EUR)	22,235	
(38) = (30) – (24): Savings in vehicle operating cost (10 <sup>3</sup> EUR)	4563	
(39) = (32) – (26): Savings in accident cost (10 <sup>3</sup> EUR)	767	
(40) = (27): Savings from old road maintenance cost (10 <sup>3</sup> EUR)	3000	
(41) = (37) + (38) + (39) + (40): B = Total benefit (10 <sup>3</sup> EUR)	30,564	469,837
(42) = PMT[(19); (17); (18)]: Construction cost (10 <sup>3</sup> EUR)	22,117	340,000
(43) = (20): Maintenance cost (10 <sup>3</sup> EUR)	1750	26,902
(44) = (42) + (43): C = Total cost (10 <sup>3</sup> EUR)	23,867	366,902
<b>Calculation of benefit/cost (B/C) ratio (BCR)</b>	<b>1.28</b>	<b>1.28</b>
<b>Calculation of net benefit (10<sup>3</sup>EUR) (B-C)</b>	<b>6696</b>	<b>102,935</b>

Source Author's own work

deterministic results. MCS is applied to assess the probability distribution of the project's main socio-economic performance indicator (BCR).

The two most critical variables indicated by the base-case analysis are: (a) the road construction (investment) unit cost; and (b) the average daily traffic which directly affects the benefits from savings in travel time cost (and also from vehicle operating cost and accident savings).

An asymmetrical *triangular* distribution was assigned to these two variables with the following assumed possible ranges (min, max): (–5%, +20%) for investment cost and (–30%, +15%) for daily traffic load of the new road (see following Figs. 2 and 3). The above ranges have been suggested by the EC Guide (2015) and they are based on ex-post evaluation of historical motorway projects.

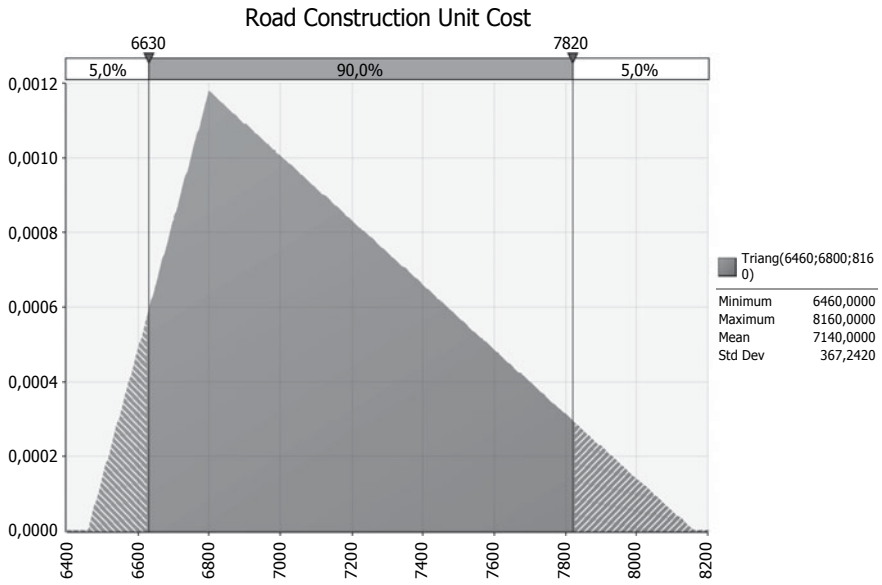
The use of @RISK spreadsheet add-in for conducting MCS with 5000 iterations, results in a 90% confidence interval that the BCR will range between 0.97 and 1.36, with a mean value of 1.17 (see BCR probability distribution frequency chart in Fig. 4). Minimum and maximum values of the BCR are 0.82 and 1.47, respectively.

Furthermore, Fig. 5 presents the BCR ascending cumulative probability distribution. It can be seen that, whilst there is a rather low probability of 8.6% that the BCR value will be less than 1.00, the probability that the BCR will range between 1.00 and 1.28 (baseline deterministic value) is 72%.

Therefore, there is a significant probability of approx. 81% the BCR value to be lower than 1.28. Nonetheless, the probability of a BCR >1 is approx. 91% justifying in general terms the viability of constructing the new road project.

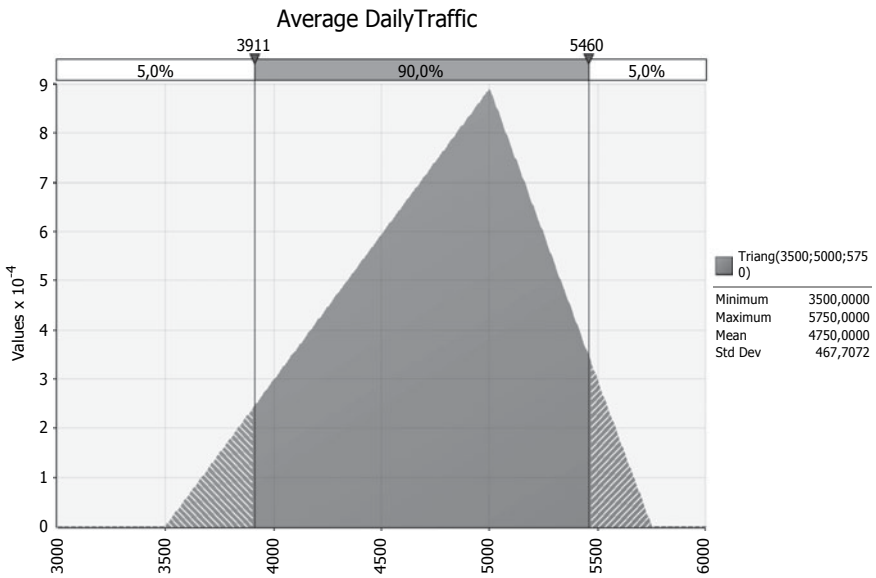
Figure 6 shows a Tornado chart with correlation coefficients between the two critical (assumption) variables (average daily traffic and road construction unit cost) and the output (forecast) variable (BCR). A correlation (regression) coefficient between two variables measures the strength of the relationship between these variables. Thus, each regression coefficient indicates how strongly the critical variables are





Source: author's own work

**Fig. 2** Triangular distribution for road construction unit cost (in  $10^3$  EUR/km)



Source: author's own work

**Fig. 3** Triangular distribution for average daily traffic (in vehicles/day)

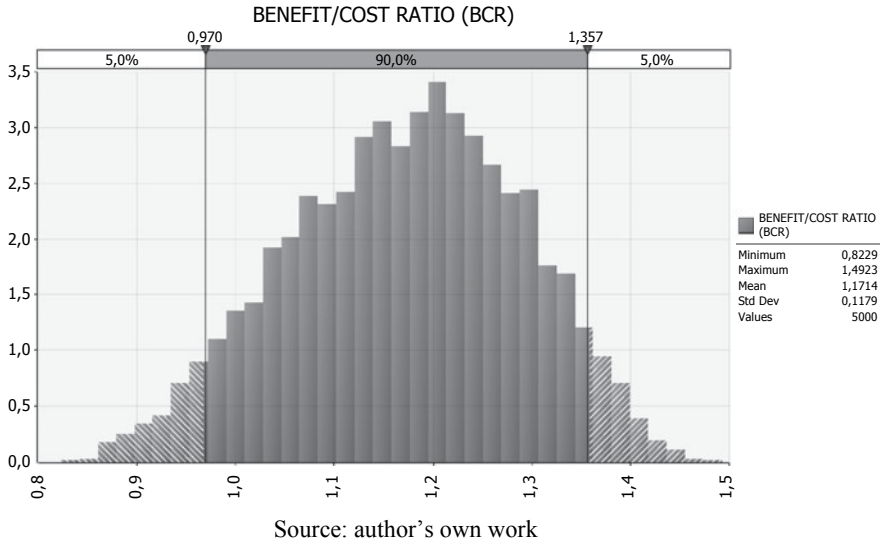


Fig. 4 Frequency probability chart for benefit/cost ratio (BCR)

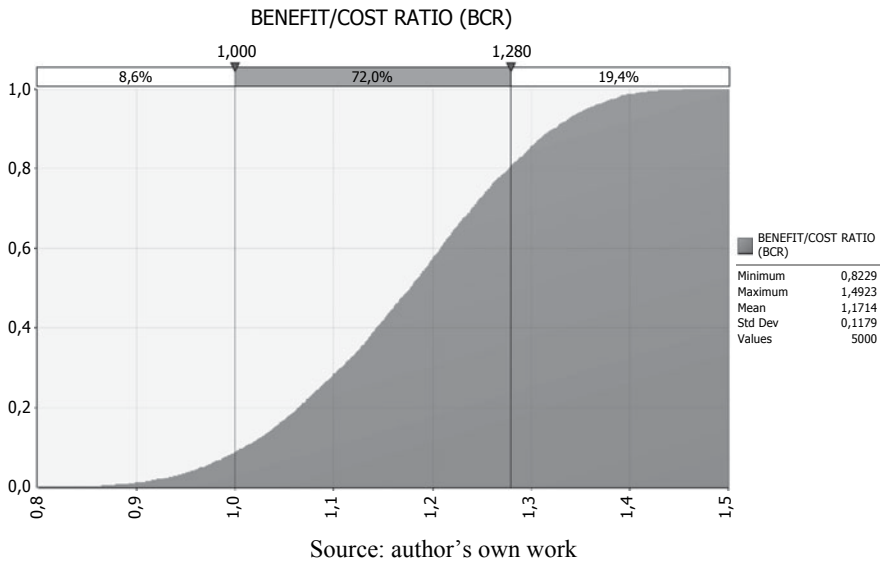
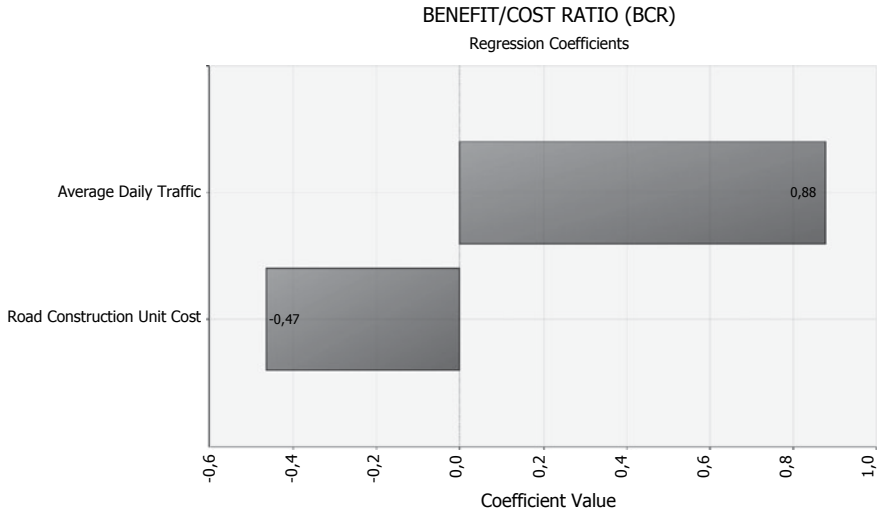


Fig. 5 Cumulative probability distribution for benefit/cost ratio (BCR)



Source: author's own work

**Fig. 6** Tornado chart with regression coefficients for BCR critical variables

influencing the project's BCR; the higher the regression coefficient, the stronger is this influence. Based on the assumptions made thus far, the correlation chart reveals that average daily traffic has a much higher (positive) correlation coefficient of 0.88 than investment unit cost which has a negative regression coefficient of 0.47.

## 4 Conclusion

The uncertainty which is inherent in the construction of major infrastructure projects should not be ignored and the associated risks must be assessed as accurately as possible. Nowadays, the inclusion of QRA in the traditional CBA is a prerequisite for securing development funds from EU sources. The advantage of the herein presented probabilistic CBA approach stems from its capability: (a) to assess the probabilities that selected performance indicators (e.g. BCR) are within a specific range and/or higher or lower than certain values; and (b) to easily provide sensitivity analysis, whereas the decision-maker, after establishing the default (base-case) forecast, can alter the assumptions on inputs of the proposed capital investment project to identify potential risks.

The results from the deterministic-CBA analysis showed that total road construction cost and cost savings from travel time reduction are the most significant critical variables, respectively, in the appraisal and selection of major road transport projects.

From the MCS analysis, it is evident that average daily traffic is more strongly influential to BCR (positively correlated) than road construction unit cost (negatively correlated).

Further research should concentrate on establishing reference probability distributions for all variables involved in the analysis in order to arrive at more realistic and reliable conclusions.

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# Types of Markets Within the Healthcare Systems; Examples from Balkan and East European Countries



Dan Sava

**Abstract** The purpose of the paper is to provide a general framework from micro-economic perspective, for describing various markets within the health care system and to understanding the characteristics of main actors, especially those playing simultaneously the role of supply and of demand. The paper is based on a review of markets within the healthcare systems of Balkan and East European countries using for examples from the WHO monographs (HiT—Health Systems in Transition) on their respective health systems. The markets within the health systems can be grouped in two tiers. Those where the patient is the demand and the provider of health services is the supply, named here *front-stage markets*. and those where the provider of health services is the demand, and the producers of medical inputs are the supply, named *back-stage markets*. These markets are analyzed from microeconomic perspective. All of them are imperfect competition markets, where actors' behavior is specific to the type of market, and suppliers benefit of asymmetric information. Health provider institutions and independent medical practitioners play a double role within the health system. On the *back-stage markets* they are the demand, and simultaneously on the *front-stage markets* they are the supply. This double role position has important implications on the capacity of these to perform well virtually opposed roles. The paper also discusses how health insurance and government intervention affects those markets. The paper is important for policymakers, because it describes the economic incentives driving the actors in the health care system and their market power. It is useful in designing interventions regarding education of health care managers and efficiency of care delivery.

**Keywords** Health care system · Imperfect markets · Asymmetric information

**JEL Classification Codes** D40 · D43 · D49

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## 1 Introduction

All Balkan and East European countries have a “market” type health system where the demand and supply are clearly identifiable. From the point of view of inputs and outputs, the system consists of two tiers: a more visible system of markets where health services outputs (consultations, prescriptions, treatments) are delivered by the health care providers (supply) to the patients (demand), and a less visible system of markets where health systems inputs (pharmaceuticals, medical equipment and medical supplies) are delivered by manufacturers of those items (supply) to the providers of health services (demand). The output markets are clearly visible and thereafter will be referred to as *front-stage* markets, whereas the inputs markets are less visible and will be referred thereafter as *back-stage* markets. This system of markets has only three categories of actors: manufacturers of inputs, healthcare services providers and patients. The front-stage markets overlap on the back-stage markets, due to the fact that health care services providers act as supply on the front-stage markets and as demand on the backstage markets. Further, each type of market will be described and analyzed, based on examples from Balkan and East European countries and their respective health systems. For each type of market, the description and analysis is based on general microeconomic theory, while taking also into consideration the behavior of the respective actors. The most obvious set of markets are the primary medical outputs markets or *front-stage* markets. Typically, in these types of markets the demand is the patient, and the supply of services is a medical and economic entity where labor consists of medical professionals, always doctors and/or nurses. However, as we will see further there are exemptions, when the demand is not the patient but an “agent”, a doctor working for a health services provider, who induces demand for another health service provider. The purpose of this paper is to provide a synthetic picture of the key markets within the health care system, the relationship between these markets and main actors active within these markets. Examples are chosen from health systems of Balkan and East European countries.

## 2 Types of Markets

The following types of markets will be analyzed based on the following characteristics: a description of good or service traded with its characteristics, prices, payment methods, the supply, the demand, market characteristics and the type of market.

## **2.1 Primary/Front-Stage Output Markets**

All the following markets have as demand the patient and as supplier a provider of health services or medical goods. Health services and medical goods vary a lot and were grouped based on the characteristic of the service/good and its specific provider.

### **2.1.1 Primary Care Services**

GPs or family doctors have their own practice where they deliver health services—consultations—to patients. From the economic point of view, GP consultations are necessity goods, non-tangible and homogenous goods. The price of the service is regulated, GPs practicing within a public framework either by being state employees paid by salary or by contract with a health insurer, paid by capitation. In this case there is a typical oligopolistic non-price competition. GP practices operating in rural areas, as the only supplier on a certain area, enjoy the privilege of a monopoly, whereas GP practices in urban areas can be either monopolies, if population in certain area is assigned to that practice (Ukraine 2015) or oligopolies in case the population can choose between the GP practices. In this case, the patient list functions like a loyalty scheme. Other features of primary care market which are characteristic to monopolies or oligopolies are barriers to entry (doctors' licenses and approval of health authorities to open a practice) as well as the informational asymmetry between supply (doctors) and demand (patients). Primary care is the most labor intensive medical activity.

### **2.1.2 Specialist Outpatient Clinic/Ambulatory Services**

During the late two centuries, medical science has developed, new diseases were been described, new diagnostic techniques were developed and new treatments invented. The result was an equal development of medical specialties, and an increase in the number of doctors (Bosnia Herzegovina 2002). Specialist doctors work in outpatient clinics or ambulatories and hospitals. Outpatient clinics are medical offices which provide specialized medical care for patients through specialist consultations. These consist of a medical examination  $\pm$  lab or image tests, diagnostic, followed by a prescription or treatment. Usually, because there are many specialties and many patients are referred for lab and imaging tests, outpatient clinics consist of several specialty medical offices and a lab and imaging facilities. Within the same specialty the consultation is a necessity, non-tangible, homogeneous good. For certain diseases (duodenal ulcer), consultations in outpatient ambulatory can be substitution goods in case of different specialties (internal medicine vs. surgery). The same is valid for treatments. Specialist outpatient services are also labor intensive but not as much as primary care. Prices are set by the government in public health systems and by the provider within the private system. The payment method is fee for service, but it might have a cap, like in Romania. The supply for outpatient specialist services is

the outpatient clinic. The demand for care in outpatient clinics is either the patient directly (Albania 2002; Armenia 2013), or in systems where primary care (GPs) play the role of gatekeeper, the patient is referred by the primary care practitioner who acts as an agent and creates the demand for services on behalf of the patient. Similarly, specialist doctors in outpatient clinics, may refer patients among themselves (different specialties), or to the hospital. Some of the outpatient clinics are standalone; some are integrated in a bigger hospital structure. In this case there is the danger of referring more patients than necessary according to their medical condition, to the hospital. This practice is especially present in systems where payment for ambulatory and for hospital is done through different methods, and when hospitals have a lower occupancy rate than necessary to operate normally. It creates inefficiency by “milking” unnecessarily the public payer. Because of the large scope of specialties, it is obvious the specialized outpatient clinics are few. Most of them are in cities, especially in large ones, where large population means enough patients to keep the business afloat. Entering the market requires authorization. There is asymmetric information between supply and demand. Because consultations within a specialty are very much the same (homogenous product), the market for outpatient clinics is monopolistic in areas where there is a single provider and oligopolistic in bigger cities.

### **2.1.3 Dental Services**

Dental services are multivariate (filling, descaling, dental prostheses), obviously non-homogeneous and labor intensive. They are necessity goods and tangible goods. Prices are usually set by providers, except those subsidized by public system, while the payment method is fee for service. The supply consists of dental offices, dentists and dental technicians, while the demand is patients with dental problems or children for check-ups or orthodontic therapies. The market is defined by asymmetric information between supply and demand. Entry requires prior authorization. The market is monopolistic in small towns and oligopolistic in big cities.

### **2.1.4 Hospital Services**

The most complex provider of health services is the hospital. The rationale to its existence is to provide services to inpatients, sick persons. The severity of the disease or the low health status of the patient requires permanent surveillance and monitoring, activities performed by medical personnel. Usually the hospital provides specialty services, but in less developed health systems there are small hospitals which provide general care for inpatients (Moldova 2012). Hospitals are of various sizes, the bigger the hospital, the more specialties it has. Because it is covering an extensive scope of diseases, and because not only any disease has its own treatment but also different patients with the same disease may receive different treatments, the hospital services are not homogenous.



The price of hospital services is very difficult to set due to difficulties in costing hospital services. In certain cases (Romania 2016), public hospitals are paid by a cost/case method, DRG. Private hospitals set their own prices and are paid by fee-for-service. The demand for hospital services is of three types. There are the so called emergencies, when obviously very ill patients are brought in by ambulances or by relatives. When patients are not in such a bad condition, they may come referred by another health services provider, usually a GP practice, an outpatient clinic or another hospital. In this case the demand for hospital services is created by an agent—the health services provider—in the name of the patient. The third case is when the patient is demanding directly hospitals services (Georgia 2017). The difference between the second and the third type of demand is that when the patient is referred by a doctor, it is supposed the doctors' decision is an informed one, and there is no informational asymmetry between demand and supply of services (Poland 2011). In the third case, the informational asymmetry between demand and supply is obvious. In cases when the medical condition did not require admission to the hospital, and services were paid directly by the patient this asymmetry was clearly in the advantage of the provider, the hospital acting as monopolist (deciding upon which services to provide and setting prices) being able to acquire the consumer surplus, creating a financial loss for the customer. Unfortunately, in a system where the patient is insured but still free to decide upon the demand like in Turkey, because there is no gatekeeper, the financial loss is transferred to the insurance fund.

Characteristic features of hospital market are limited and strongly regulated entry and exit, an asymmetric information between supply and demand, obviously in favor of the supplier. In many cases in big cities, we find not only one hospital providing the same services. If we look on a single specialty service, we may say the few hospitals in that city are operating on oligopolistic market (services within a specialty being more homogenous than within all specialties), but there are also many situations when there is only one hospital in an area, so that is a natural monopoly. Having many specialties, a hospital may be a monopoly for certain specialties or an oligopoly for others if there is competition in the area from another hospital.

### 2.1.5 Pharmacy Services

Another primary—front stage—market is the pharmaceutical retail market. The products sold on this market are pharmaceuticals, a huge variety. In order to be sold, certain pharmaceuticals require a prescription issued by a doctor. The rest can be sold over-the-counter (OTCs). Pharmacists are responsible for dispensing drugs to patients and to inform them about how to use them. The price of prescription drugs is regulated and as we will see further in many cases subsidized, whereas the price for OTCs is not, a case when the manufacturer sets its own price. In certain countries advertising for OTCs is allowed (Romania 2016). Commercial margins of pharmacies are set by government, usually below 10%. The payment method is price/item and it is subsidized by including the drug on a reimbursement list. This reimbursement list is made for the use of a health insurance fund which pays sometimes up

to 100% of the price. This method is designed for elimination of price and income elasticity of demand. The consumer (patient) faces no, or low price barrier when demanding a pharmaceutical. The supplier of pharmaceutical services is the pharmacy. Some pharmacies do not only sell drugs but sometimes prepare drugs based on a medical prescription. In certain countries like Romania, in urban areas, the law allows for chains of pharmacies, not only individual pharmacies (Turkey 2011). The demand for pharmaceutical services is the patient but not directly. For pharmaceuticals which require prescription, the demand is induced or created by a doctor who issues an adequate prescription according to for the patient's disease. The prescribing doctor acts as an agent in the benefit of the patient. However, for OTCs, the patient demands the product, directly. Pharmacies require an authorization prior to entering the market. Because most products sold are patented and branded and because patient have imperfect information about the drugs, and pharmacists have imperfect information about the diseases of the patient (utility), the market displays the characteristics of monopolistic competition. However, in the cases when in rural areas there is only one pharmacy, that pharmacy is a natural monopoly in the area. When pharmacy chains exist, they behave like oligopolies, enacting loyalty schemes and advertising.

### **2.1.6 Ambulance Services**

The service provided by ambulance is a medical emergency service. It is a highly specialized service, which requires a costly infrastructure. The medical emergency service is obviously a necessity good, intangible good, and non-homogenous, as patients display various diseases. The public ambulance service is free, whereas the private one is paid by fee-for-service. Ambulance services are paid usually by budget lines or by fee-for-service a case when emergencies have different rates than medical transport. The supply of ambulance services are the ambulance companies. Ambulances are usually public providers of emergency care on site (Cyprus 2012). They are natural monopolies in the area of operation. In certain countries there are ambulances belonging to separate or private health networks, rendering not only emergency services but all kinds of specialized services. In these cases private ambulances are a competition to public ones. The demand for ambulance services are patients with medical emergencies. Entry on the market is strictly regulated. There is asymmetric information between supply and demand. Because public ambulance companies have a certain area to cover, and private ambulance companies serve only a pool of subscribers, the market is monopolistic.

### **2.1.7 Hemodialysis**

Hemodialysis is a very specialized service addressed to patients with kidney failure. It is necessity good, final good, non-durable good, non-tangible good, homogenous good. The prices of hemodialysis are regulated within the public system and set by provider in a private environment. Payment is usually fee-for-service with the

exemption of Romania where it is a flat fee based on investment. The supply consists of specialized clinics and hospitals. The demand consists of patients with kidney failure on behalf of which specialized doctor create the demand by issuing referrals. In order to enter the market providers require prior authorization. There is asymmetric information between supply and demand. The market is monopolistic in small towns and oligopolistic in big cities.

### **2.1.8 Rehab Services**

Rehab services are specialized medical services aimed rehabilitation of patients, being a continuation of treatment for certain illnesses (neurological, post-trauma). Rehab services are necessity goods, final goods, non-durable goods, non-homogenous goods (Azerbaijan 2010). Prices of rehab services are controlled within the public system, and set by providers in private environments. Usually the payment method is fee-for service. Rehab services may be covered under a public health insurance scheme which pays all the expenses or possibly charge a co-payment from the patient. There are also private rehab facilities where patients may pay directly out-of-pocket the full service. The suppliers of rehab services are specialized providers, sanatoria. Most of the rehab facilities are publicly owned and they are part of national health system or are contracted by a national health insurance fund. The demand consists of referred patients. The market is characterized by asymmetric information between supply and demand, and prior authorization for entering the market. The market is usually oligopolistic by type of service, but there are also regional monopolies.

### **2.1.9 Inpatient Nursing Services**

Inpatient nursing services are medical services for old patients, in stable condition, who cannot care for themselves anymore. They are necessity goods, final goods, non-durable goods, non-homogenous goods. Prices are regulated in public settings, market price (set by provider) in private settings. The payment method is budget line or fee/day of care. Suppliers of inpatient nursing services are public and private nursing homes, while the demand consists of patients in need. On the inpatient nursing services market, entry is regulated by a prior authorization. The market is usually oligopolistic in big cities and monopolistic in small towns.

### **2.1.10 Home Care Services**

Home care services are health services delivered at the home of the patient. They are necessity goods, final goods, non-durable goods, non-homogenous goods. Usually these services are rendered on long term. Prices are regulated in case of public funding or market price set by the provider in private environment. The payment

method is fee—per—visit adjusted with severity of disease (Hungary 2011). The supply consists of specialized providers and trained nurses. The demand consists of patients in need, most of them being referred by other health care providers. Home care providers require authorization prior to entering the market. The market is monopolistic locally or oligopolistic in big cities.

### **2.1.11 Prostheses**

Prostheses are artificial objects replacing a missing or non-functional body part. They are designed for restoring normal functions of a patient's body. They are necessity goods, final goods, tangible goods, durable goods, consumer goods. Because they are customized, they are obviously non-homogenous. Most of them are limb prostheses, eye glasses, and ENT devices. Prices for prostheses are market prices, while the payment method in public systems is the regulated price, usually rated at the cheapest prosthesis and a co-payment to cover the full price (Romania 2016). Payment method is price/item or reimbursement state price + co-payment, except for eye glasses which are not reimbursed. The supply consists of various manufacturers of prostheses and opticians, usually focused on a certain medical specialty (orthopedics, optics, ENT). The demand consists of patients who have a permanent impairment and for therapeutic purposes prosthesis might be necessary. It can be direct demand, but in many cases it is based on an agent, the prescribing doctor. Entry on the market requires prior authorization. There is asymmetric information between supply and demand. The market for orthopedic prostheses, and eye glasses, which are individually customized and products are non-homogenous, has features of monopolistic competition, whereas for ENT where products are more homogenous, it seems more like an oligopolistic market. However because there are not so many suppliers, there can be local monopolies, and oligopolies ENT in big cities.

## ***2.2 Secondary/Back-Stage Input Markets***

Aside from the primary health services, front-stage markets, where patients, who are the demand receive health services (outputs of the health systems), there are secondary, back-stage markets, where the goods traded are inputs in the health system, and the demand are the providers of health services who acquire resources in order to fulfill their activities. The items sold on the back-stage markets are of two kinds: capital goods like equipment and consumer goods like consumables and utilities.

### 2.2.1 Diagnostic Equipment

One of the compulsory steps of a medical consultation is establishing an accurate diagnostic. Direct clinical examination is not sufficient anymore. For reasons of accuracy and objective proof for medical judgment, health services providers use lab equipment for exploring various functions of the patient through biochemical tests. They also use as a diagnostic tool imaging equipment (X-ray, ultrasound, CT, MRI), and technical diagnostic equipment (ECG, EEG, respiratory function investigation equipment, audiometers, optical diagnostic equipment and other specific equipment for various specialties). Although designed and manufactured for the same purpose, the diagnostic equipment comes in various formats and sizes, each one using its own branded consumables (Czech Republic 2015). Therefore there is a tendency for differentiation of these kinds of products. Therefore they are non-homogenous goods. They are by definition capital goods. Among other diagnostic equipment imaging equipment may be considered credence good. Prices are set by manufacturer. Purchasing this equipment requires competitive bids and procurement methods. There are many manufacturers of diagnostic equipment, and there are even more customers who demand diagnostic equipment, mainly hospitals and outpatient clinics (Slovakia 2016). The same health services providers are on the supply side on the primary, output front-stage markets. In all countries, the diagnostic equipment requires an official approval and registration with a public agency, before entering the market. Because the equipment is registered trademark of the manufacturer, this market displays the characteristics of monopolistic competition.

### 2.2.2 Therapy Equipment

As lab and other equipment is used for diagnostic purposes, for the ultimate purpose—treatment of patients—health services providers use not only pharmaceuticals but also equipment for direct therapy. This is especially the case of oncology and surgery like probes and robotics. This equipment (radiation therapy equipment, probes, robots, surgical equipment) comes in various formats and sizes, being a non-homogenous good. This equipment is also final and capital good. Prices are set by manufacturer. Purchasing this equipment requires competitive bids and specific procurement methods. There are few suppliers of therapy equipment because it requires strong technological and R&D capabilities. The demand consists of various health care services providers (Russia 2011). The product requires approval and registration prior to entering the market. Products are differentiated, registered trademarks and the market is that of monopolistic competition.

### 2.2.3 General Medical Equipment

This category of goods comprises sterilization equipment, anesthesia equipment, operating theatres equipment, monitors, pumps, medical furniture and others alike.

These come in various formats and sizes being: non-homogenous goods, capital goods. Prices are set by manufacturer. Purchasing this equipment requires competitive bids, and specific procurement methods. The supply consists of specialized manufacturers while the demand consists of various health care services providers (Estonia 2018). The product requires approval and registration prior to entering the market. Products are differentiated, registered trademarks and the market is that of monopolistic competition.

#### **2.2.4 Information and Communication Equipment**

For every health services provider, part of the medical activity is collecting medical data. Today carrying out this task requires information equipment (computers, peripherals, software). But health care providers also need to communicate as well as to send and receive data in an electronic form. For this they need communication equipment (telephones, faxes, computers and communication packages, telephone and internet). All these information and communication hardware is non-homogenous. Sometimes there is branded hardware, but software is always patented. These goods are homogenous in their own class. They are capital goods. Prices are set by manufacturers. Purchasing this equipment requires competitive bids, specific procurement methods. There are only few manufacturers of information and communication equipment and software producers and providers of communication packages are even fewer. The demand consists of all healthcare providers. The market is oligopolistic for information equipment, communication equipment and communication packages. For software which by definition involves patent and property rights, the market is purely monopolistic, being it a market for general software or software specially designed for hospital use (Lithuania 2013).

#### **2.2.5 Pharmaceuticals**

As shown previously, the purpose of the medical consultation is establish a diagnostic and consequently prescribe a treatment to curing the illness of the patient or at least to improve his/her health status and control chronic diseases. Today, pharmaceuticals are standardized chemical molecules with biological effect, mass produced by specialized manufacturers. All pharmaceuticals are labeled products, registered trademarks, and are of two kinds: patented and generics (Greece 2017). Usually, the patent lasts 7–10 years. Pharmaceuticals are substitution goods in case their effect is similar (antibiotics, beta-blockers, diuretics), being grouped in classes with similar effect, but they can also be complementary, when one drug is prescribed to tackle the side effects of the other or when a disease is treated by action upon different functions or structures of the body. They are obviously necessity goods, final goods, non-durable goods, tangible goods, and non-homogenous goods taken as a whole but identical if we talk of pills or veils of a specific drug as they are manufactured in standardized forms and content. Usually new pharmaceuticals and

to some extent antibiotics display the characteristics of credence goods. Prices are strictly regulated, correlated with other European markets with fixed margins for wholesalers and pharmacies. Pharmaceuticals are expensive products (especially patented ones) and therefore many of them are not affordable. For this reason, in many countries of Balkan and East Europe the price of drugs is subsidized at the moment of consumption by a mechanism of reimbursement discussed previously. The suppliers are the pharmaceutical manufacturers. Major pharmaceutical manufacturers constantly synthesize and patent new molecules. The demand for pharmaceuticals consists of hospitals, other inpatient institutions, and pharmacies. Because patented and generic drugs require prescription, the demand for pharmaceutical is created by doctors who prescribe the drugs for their patients. The manufacturers sell their products through distributors (Croatia 2014), the formal demand being made by health services providers mainly hospitals and outpatient clinics where doctors work. Therefore pharmaceutical manufacturers pay a lot of attention in informing doctors about their products, this kind of “advertising” being allowed. Pharmaceutical manufacturers organize conferences on medical topics and the “informative” message is conveyed, main targets being opinion leaders—professors and high ranking officials. Thus they build up upon the asymmetric information between the producer, pharmaceutical manufacturer and the customer—medical services provider or the payer. The pharmaceutical market is tightly regulated, especially in terms quality of the product and market entry. It requires product approval and registration. When a pharmaceutical company has patented a drug, it enjoys the position of a monopoly (there is no substitute for the product protected by patent), and consequently acts as a price setter, being able to incur considerable profits until the patent expires. After the expiration of the patent, the drug becomes a “generic” and can be copied by other manufacturers. In this case because the product is the same, the providers act as oligopolies as any molecule is produced by several manufactures. In order to differentiate products, many molecules are branded differently by manufacturers, so the market is transformed from oligopolistic towards monopolistic competition.

### 2.2.6 Medical Devices

Medical devices are objects designed for improving an impaired physiological function of the human body; they are therapeutic aids (Slovenia 2016). The most commonly known are stents, artificial lenses, artificial joints and surgical nets. Within their class they are homogenous goods. They are sold in batches of various sizes. Prices are set by manufacturer. Purchasing them requires specific procurement methods. The supply consists of few medical devices manufacturers while the demand consists of many health care services providers, mainly hospitals and outpatient clinics. Medical devices are obviously patented products, products requiring an authorization before entering the market, which is oligopolistic.

### **2.2.7 Medical Materials**

Health services providers need for their activity a lot of medical materials ranging from surgical instruments, binding materials, plaster, bandages, to disinfectants and so forth. They are homogenous goods within their own class, although of various types, because they have unique functionality. They are sold in batches of various sizes. Prices are set by manufacturer. Purchasing them requires specific procurement methods. The supply consists of medical materials manufacturers, while the demand consists of various health care providers. There are only few suppliers, each one of them having considerable part of the market. It is therefore an oligopolistic market within classes of products.

### **2.2.8 Human Resources**

The most important input or resource used by health services providers is labor, the workforce; indeed health services are one of the most labor intensive activities, although this character is slowly diminishing today with the advent of new sophisticated technologies. In the realm of healthcare human resources, medical personnel is highly trained, highly specialized. Prices in the human resources market are salaries, wages and payments; they are regulated in the public sector, negotiable in the private sector. The payment method is salary, capitation, fee—for service. The supply of workforce is the educational system, especially universities and medical schools (Latvia 2012), while the demand consists of health care providers. Entry on the market is limited by various diplomas and licenses. There is the notion of right to practice, which requires registering with a professional organization and keeping a continuous education record.

Health sectors human resource markets are usually national markets, protected by barriers to entry like recognition of diplomas, employment permits, language knowledge. In cases of contiguous markets, when these barriers fall, big differences in salaries lead to a migration of workforce from the markets with low salaries to markets with high salaries. Because health care services are labor intensive, this leads to decreased supply of health services. Countries of Eastern Europe encountered this situation after becoming member of EU, the bigger the salary gap, the greater the drainage of workforce.

## **2.3 State Intervention**

In all health systems of Balkan and East European countries, there is a clear state involvement. It is considered that a deregulated system would lead to a market failure, health services becoming unaffordable for many, and thus impeding access to care for large categories of people. The state intervention is done either directly by setting prices of services within the benefit package (Bulgaria 2018), or by controlling the



salaries and wages within the public sector. Regulation pertains mainly to market entry, for reasons of competence, safety and quality and to payment and procurement issues for reason of preventing corruption. In other situations the state also intervenes as a provider of services, either by employing doctors and nurses or by ownership of health providers (Belarus 2013) or by fostering a public health insurance fund which acts as a buyer of health services on behalf of the patients (FYR of Macedonia 2017). In this case the national health insurance fund is a monopoly on the health insurance market and a monopsony being the only purchaser of health services from various providers.

Sometimes, state intervention may lead to government failure, in cases like keeping doctors' and nurses' salaries low in order to reduce expenditures, or fixing prices of pharmaceuticals low, to make them more affordable. Problems appear when the country enjoys free movement of persons, goods and services. Too low salaries lead to migration of workforce to markets with better salaries and too low pharmaceutical prices lead to "parallel exports" towards markets with higher prices. Romania was in these situations in the last decade.

## ***2.4 Market Mergers***

There is an example from Romania of vertical expansion of providers of medical supplies who bypass traditional healthcare providers and became service providers, thus merging back-stage and front-stage markets for increasing profits. In 2002, IFC initiated a public-private partnership, by which four suppliers of hemodialysis consumables incorporated previously public outpatient nephrology clinics and contracted hemodialysis services with the National Health Insurance House. Thus the "strenuous" process of annual bidding for the price of hemodialysis was eliminated, providers being paid a flat fee related not to the services provided but to the investment they made (IFC).

## **3 Conclusions**

As we could see, the markets within health systems are clustered in two sets: primary, output, front-stage markets which are very visible and where the patient directly or his/her doctor acting as agent is the demand whereas the supply consists of health care providers. The second set of markets, secondary, input, back-stage markets have in this case, the healthcare providers on the demand side and the manufacturers of various inputs on the supply side. In both types of markets there is asymmetric information in favor of the supplier, providing it market power. The most important provider of health services but equally an integrator and consumer of inputs, is the hospital. It is important to notice that professional training for medical personnel addresses only its function on the primary, front-stage markets, as supplier of health

services. Unfortunately the other function of the health services provider, that of customer on the secondary, back-stage market is not matched by the same thorough training necessary to perform well as an informed economic agent. In many cases, doctors who have been trained to treat patients have to take decisions regarding reimbursement of drugs, procurement of equipment or investment in new facilities. Informed decisions in this case require training in health technology assessment, health economics, and health care management. On the primary front-stage markets allows for abuse of the agency function, who may induce demand, and on the secondary, back-stage markets allows for supplying ineffective drugs and equipment. This may explain the continuous increase in health care expenditures, which leads to a decrease in efficiency.

State intervention should be focused on increasing allocative efficiency and investing based on good knowledge of the market, the purpose being increased system efficiency, by controlling the market power of suppliers.

The paper is useful for health economics and health care management students, and is trying to raise attention about the educational requirements of policy makers and managers within the healthcare system.

The paper is based on references which are not always up-to-date, this being a limitation. Country HiTs are updated on average at 15 years. For reasons related to the paper format and size, only key markets within the health care system were analyzed. Markets for general supplies, ancillary services and utilities were not discussed.

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# Digital Divide Evaluation in High Education from Distance Learning Perspective



Cigdem Tarhan, Can Aydin, and Vahap Tecim

**Abstract** Digital divide is a term that refers to the gap between demographics and regions that have access to modern information and communications technology, and those that don't or have restricted access. This technology can include the telephone, television, personal computers and the Internet. Well before the late twentieth century, digital divide referred chiefly to the division between those with and without telephone access; after the late 1990s the term began to be used mainly to describe the split between those with and without Internet access, particularly broadband. The digital divide typically exists between those in cities and those in rural areas; between the educated and the uneducated; between socioeconomic groups; and, globally, between the more and less industrially developed nations. Even among populations with some access to technology, the digital divide can be evident in the form of lower-performance computers, lower-speed wireless connections, lower-priced connections such as dial-up, and limited access to subscription-based content. The reality of a separate-access marketplace is problematic because of the rise of services such as video on demand, video conferencing and virtual classrooms, which require access to high-speed, high-quality connections that those on the less-served side of the digital divide cannot access and/or afford. And while adoption of smartphones is growing, even among lower-income and minority groups, the rising costs of data plans and the difficulty of performing tasks and transactions on smartphones continue to inhibit the closing of the gap. This paper examines the question of distance education and its pivotal role in promoting success, social change and development in Turkish education system in terms of digital divide concept. The case area is Izmir city which is the 3rd biggest city in Turkey. From started at the beginning of the twenty-first century, information technologies have been using at different levels of education; for example, the smart boards and tablets at high school level, distance learning at universities. Especially, distance learning is very popular in universities different levels of education. However, they have not the same chance to reach and use internet for their education. Some of the students only use the department

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computer laboratories and the others use own cell phones and internet capacities in order to follow courses. This paper aims to discuss the differences from the perspective of digital divide concept. Different levels of university students are observed in Dokuz Eylül University, made questionnaires. One sample t-test, ANOVA and spatial statistical methods (weighted average center, weighted standard distance and weighted standard deviation ellipse) were used in the analysis of the data. In the evaluation of the results, the students were determined as gender and cities where they graduate as factor. Among the students, it has been found that men use information technologies more effectively than women who have information technologies. Additionally, results of the spatial statistics there is no digital divide between regions of country according to city where students graduated.

**Keywords** Digital divide · High education · Information technology

## 1 Introduction

Increasing access to and use of information and communication technologies (ICTs) in developing countries is a phenomenon, which is hailed by many as a positive development that would stimulate a knowledge-based economy and society in these countries. The underlying assumption is that higher levels of and more equitable access to ICTs would stimulate economic growth, enhance national, regional, organizational and individual competitiveness, enable democratic participation and foster social equality. However, digital divide, that is, the division of the globe in general and individual countries, regions, organizations, and individuals as “technology haves” and “have-nots”, is casting a long shadow on these hopes (<http://www.irma-international.org/viewtitle/38312/> 2017).

Web based distance learning courses promise different learning options anytime and anywhere. However, some students with disabilities are locked out of these opportunities when courses are designed in such a way that they are inaccessible to individuals using assistive technology.

This paper’s case area is in Izmir, Dokuz Eylül University. Associate degree (two years) who raised the level of the intermediate element Izmir Vocational School continues its training activities in two sections, namely Technical Programs with Economic and Administrative Programs. Primarily located in Izmir and 23 programs responding to the needs of our school within the intermediate element of the Aegean region. The total number of students studying in these programs is 10.344 as of October 2016 ([www.imyo.deu.edu.tr](http://www.imyo.deu.edu.tr) 2017).

Izmir Vocational School accepts the students in two ways. If candidate students have vocational high school diploma, they have a right to enroll their departments without university exam. The other students with high school diploma, they must enter the university exam once a year and get the specific point in order to enroll the departments. Additionally, Izmir Vocational School has night training which is realized between 5 pm and 10 pm for especially worked students who are work.

These differences make heterogeneous type in the classes during educational success. All the freshmen students enrolled the university have to take Turkish, English and History classes mandatory. From starting 2017, Izmir Vocational School has implemented web based distance learning system for these three classes. The paper aims to examine the distance learning studies with the respect of digital divide because of the heterogeneous type.

This paper outlines a research that investigated vocational school students' levels of access to, use of and preferences for new technologies for learning. The study was based in the Technical Programs of Dokuz Eylul University. It sought to look at actual access and use of ICT by current students, and highlights the complexity around concepts of a 'digital divide' in relation to their distance learning courses. A questionnaire including both quantitative and open-ended questions was utilized, allowing a mixture of statistical and qualitative data to emerge. This paper focuses on selected aspects of the qualitative data, addressing themes around barriers to ICT, use of learning materials and preferences around online and paper-based learning. A mixed picture of access, use and preference is evident. There is a clear preference for a mixture of online and printed materials, implying a continuing need for a variety of access points to learning materials. As new technologies develop, it is increasingly important to avoid inadvertently contributing to a 'digital divide' by excluding students with less than 'ideal' access to ICT.

### **Digital divide**

The digital divide can be defined as "the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access ICTs and to their use of the Internet for a wide variety of activities" (<https://www.oecd.org/sti/1888451.pdf> 2017).

UNESCO accepts the gender divide as "one of the most significant inequalities to be amplified by the digital revolution" (Primo 2003). Bimber (2000) found that there is a significant gap between genders in terms of accessing and using the Internet. Broos and Roe (2006) found also gender is one of the major factors structuring the digital divide.

Age is one of the major demographic factors affecting ICT use. It is found that the Internet penetration rate among younger residents is substantially higher than that among elders in both developed and developing countries (Friedman 2001). There are various studies explored age factor in digital divide literature. For example, Loges and Jung (2001) investigated the digital divide between old and young Americans and they reported significant differences between old and young Americans in Internet access. Vicente and López (2008) analyzed Internet adoption in the new member states and candidate countries of the European Union and concluded that younger individuals are the most likely to use the Internet in all the countries. Even though Internet and e-mail use has greatly increased between 1995 and 2002, Enoch and Soker (2006) found that there remains a steady and significant gap between the different age groups, especially between the youngest and the oldest university students. Many observers believe that the digital divide is basically a generational phenomenon and it will disappear in time as younger computer literate cohorts replace

**Table 1** Information society statistics 2007–2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<i>ICT usage in enterprises</i>										
Computer usage	88.7	90.6	90.7	92.3	94.0	93.5	92.0	94.4	95.2	95
Internet access	85.4	89.2	88.8	90.9	92.4	92.5	90.8	89.9	92.5	93
Having website	63.1	62.4	58.7	52.5	55.4	58.0	53.8	56.6	65.5	66
<i>ICT usage in households and individuals</i>										
Computer usage (total)	33.4	38.0	40.1	43.2	46.4	48.7	49.9	53.5	54.8	54
Male	42.7	47.8	50.5	53.4	56.1	59.0	60.2	62.7	64.0	64
Female	23.7	28.5	30.0	33.2	36.9	38.5	39.8	44.3	45.6	45
Internet usage (total)	30.1	35.9	38.1	41.6	45.0	47.4	48.9	53.8	55.9	61
Male	39.2	45.4	48.6	51.8	54.9	58.1	59.3	63.5	65.8	70
Female	20.7	26.6	28.0	31.7	35.3	37.0	38.7	44.1	46.1	51
Households with access to the Internet	19.7	25.4	30.0	41.6	42.9	47.2	49.1	60.2	69.5	76

Resource <http://www.tuik.gov.tr/UstMenu.do?metod=temelist> 2017

older non-users (Broos and Roe 2006). However, since ICT is always evolving, new advanced ICTs may cause new digital divides between younger and elder residents.

Vicente and López (2008) found that educational attainment is one of the main determinants of Internet use; education positively affects the likelihood of an individual using the Internet. According to the results of their study, university education has a stronger effect than high school education in terms of Internet usage. Goldfarb and Prince (2008) found that high-income, educated people were more likely to have adopted the Internet by December 2001 in the US.

Today information technology is more accessible and affordable than even before. While the telecommunications infrastructure has grown and ICT has become less expensive and more accessible, today more than ever, the invisible line that separates rich from poor, men from women and the educated from the illiterate also separates the connected from the disconnected (<https://www.hse.ru/mirror/pubs/lib/data/access/ram/ticket/2/1492171177dafd29dbd72071167b72bef313270c7/Markin-Nazarbaeva-Exploring.pdf>, 2017).

Turkey, as a candidate country to the European Union (EU), strives for overcoming the digital divide problem as part of a strategic objective of the i2010 Strategic Plan, parallel to its membership negotiation and integration processes with the EU. To this end, different dimensions of digital divide in Turkey, such as gender, education level, location (urban-rural), and age are evaluated in this chapter, by using the current academic literature, statistical figures provided by Turkish government agencies, and examining strategy documents and current legislation, such as Turkey's Information Society Strategy and Action Plan documents, and the Universal Service Law (<http://www.irma-international.org/viewtitle/38312/> 2017).

Table 1 shows the information society statistics of Turkey between 2007 and 2016. According to the table, computer usage and internet access have increasing regularly. However, having website is not the same trend. It is clearly presented in the table; computer and internet usage ratios for female have increasing faster than the male ratios. The significant increasing is in households with access to the Internet ratio, the number of this ratio has increased approximately four times.

Table 2 presents the number of fixed telephone, mobile telephone and internet subscribers between 1998 and 2016 (TUIK 2017). The data of 2016 is by the end of June. According to the table, the number of fixed telephone subscribers has decreasing. On the other hand, the numbers of mobile telephone and internet subscribers have rapidly increasing.

### Distance Learning

Distance education or distance learning is the education of students who may not always be physically present at a school. Traditionally this usually involved correspondence courses wherein the student corresponded with the school via post. The

**Table 2** Number of fixed telephone, mobile telephone and internet subscribers

Year	Number of fixed telephone subscribers	Number of mobile telephone subscribers	Number of Internet subscribers
1998	16,959,500	3,382,137	229,885
1999	18,054,047	7,562,972	436,610
2000	18,395,171	14,970,745	1,629,156
2001	18,904,486	19,502,897	1,619,270
2002	18,914,857	23,323,118	1,309,770
2003	18,916,721	27,887,535	906,650
2004	19,125,163	34,707,549	1,474,590
2005	18,978,223	43,608,965	2,248,105
2006	18,831,616	52,662,709	3,180,580
2007	18,201,006	61,975,807	4,842,798
2008	17,502,205	65,824,110	5,804,923
2009	16,534,356	62,779,554	8,849,779
2010	16,201,466	61,769,635	14,443,644
2011	15,210,846	65,321,745	22,371,441
2012	13,859,672	67,680,547	27,649,055
2013	13,551,705	69,661,108	32,613,930
2014	12,528,865	71,888,416	41,272,940
2015	11,493,057	73,639,261	48,617,291
2016 <sup>a</sup>	11,248,495	73,650,996	55,305,748

*Resource* TurkStat, Ministry of Transport, Maritime Affairs and Communications, Information and Communications Technologies Authority

<sup>a</sup>Data is by the end of June



widespread use of computers and the internet have made distance learning easier and faster, and today virtual schools and virtual universities deliver full curricula online. The capacity of Internet to support voice, video, text and immersion teaching methods made earlier distinct forms of telephone, videoconferencing, radio, television, and text based education somewhat redundant. However, many of the techniques developed and lessons learned with earlier media are used in Internet delivery.

Distance learning can expand access to education and training for both general populace and businesses since its flexible scheduling structure lessens the effects of the many time-constraints imposed by personal responsibilities and commitments. Distance education can also provide a broader method of communication within the realm of education. With the many tools and programs that technological advancements have to offer, communication appears to increase in distance education amongst students and their professors, as well as students and their classmates. The distance educational increase in communication, particularly communication amongst students and their classmates, is an improvement that has been made to provide distance education students with as many of the opportunities as possible as they would receive in in-person education. The improvement being made in distance education is growing in tandem with the constant technological advancements.

Barriers to effective distance education include obstacles such as domestic distractions and unreliable technology, as well as adequate contact with teachers and support services, and a need for more experience. Some students attempt to participate in distance education without proper training with the tools needed to be successful in the program. Students must be provided with training opportunities (if needed) on each tool that is used throughout the program. The lack of advanced technology skills can lead an unsuccessful experience. Schools have a responsibility to adopt a proactive policy for managing technology barriers.

The modern use of electronic educational technology (also called e-learning) facilitates distance learning and independent learning by the extensive use of information and communications technology (ICT), replacing traditional content delivery by postal correspondence. Instruction can be synchronous and asynchronous online communication in an interactive learning environment or virtual communities, in lieu of a physical classroom. "The focus is shifted to the education transaction in the form of virtual community of learners sustainable across time. One of the most significant issues encountered in the mainstream correspondence model of distance education is transactional distance, which results from the lack of appropriate communication between learner and teacher. This gap has been observed to become wider if there is no communication between the learner and teacher and has direct implications over the learning process and future endeavors in distance education. Distance education providers began to introduce various strategies, techniques, and procedures to increase the amount of interaction between learner and teacher. These measures e.g. more frequent face-to-face tutorials, increased use of information and communication technologies including teleconferencing and the Internet, were designed to close the gap in transactional distance.

**Table 3** Traffic analytics: unique visitor table—April 2016—October 2017 (k)

Personal questions	ICT usage	Distance learning
Age	Mobile phone ownership	Course taking
Gender	Mobile phone operating system	Course following
Type of high school diploma	Personal computer ownership	Device for course following
Education type in Vocational Sch.	Mobile application choices	Mid-Term exam entrance
	Social media preferences	Mid-Term exam problems
	Time consumption for ICT	Mobile distance learning preferences

## 2 Methodology

Survey method was performed in the study in order to investigate information technology usage in distance learning and digital divide in education. Before the questionnaire was designed, the related literature was examined in depth. Conceptual debates and empirical studies are encountered in current national and international literature. In order to collect data in the survey the scale under three topics were acknowledgement from the literature. In this context, a scale consisting of 25 expressions was designed by the expertise of the literature. Descriptive statistics were used to be analyzed the questionnaire results.

In the questionnaire, the questions are about department, education type, age, gender, high school type, smart telephone and computer owner, social media and distance learning (Table 3).

## 3 Findings and Results

According to the questionnaire results, in terms of digital divide aspects firstly, personal questions were examined. 70% of the students are men and 30% of the students are women. The average age is 20. 65% of the students have vocational high school diploma so they enroll the university without entering university exam. The rest of the students, 35%, have high school diploma.

All students have smart mobile phones. Their operating systems are android—70% and IOS—%30. Personal computer ownership ratio is 80%. However, 50% of this ratio is using a shared computer in their house. Almost all students have 3G and 4.5G internet packages in their mobile telephones; however, they have not Wi-Fi in home. As mobile application usage, 30% of the students are using e-government applications. Also, 20% are using internet banking and 10% are playing games with

their mobile phones. In terms of social media usage, Facebook has 70% ratio, Instagram has 20% ratio and twitter has 20% ratio. The students spend approximately 5 h/day for social media. They also communicate via Facebook with 80% ratio.

From the distance learning point of view, the students (70%) just follow the courses once before Mid-Term exam. 15% of them has never follow the courses. They use mostly their personal computers (30%) to follow courses. Additionally, 10% of the students use their friends' computer for courses. The same ratio (10%) use internet café and 11% of them use mobile phone to follow the courses. The university offered a trial exam to the students before Mid-Term exam. 50% of the students took this opportunity. The students use their personal computers (45%) for Mid-Term exam. 20% of them use their friends' computers and 20% of them use their mobile phones to enter Mid-Term exam. In terms of ease of use the graphical user interface usage, 40% of the students have no obstacles to use the system. However, 25% of them could not use the system, because of this, they get low grades from Mid-Term.

As a conclusion, distance learning in especially university level is one of the future education type in the World. However, ICT usage, education level, age, gender etc. factors cause digital divide in terms of students. To inform students and encourage using computers should be the first act in the schools at all levels before universities. Also, the schools have to prepare computer labs in order to be followed the web based distance learning courses.

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# Public Corporate Governance: Upcoming Changes Regarding the Implementation of International Public Sector Accounting Standards (IPSAS) and Corporate Social Responsibility in Public Sector



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and Foteini I. Pagkalou

**Abstract** The upcoming changes following the mandatory implementation of IPSAS in public entities, as well as those of the wider public sector and the corporate social responsibility of public entities, are cutting edge issues that will dominate changes in the public sector the following years. This paper aims to highlight the significant changes affecting not only Greece but also all EU countries. We present the changes that have been made to date as well as the upcoming required changes in Greece and the EU. We carry out a comparative analysis between the current and the forthcoming situation, both for the public governance and for the change of the public accounting and its procedures. Also, we compare the corporate social responsibility of European and Greek legislation and of the various convergences between IPSAS and IAS. Through the construction of a flowchart of proposed convergence actions, we point out possible failures—deviations that may occur during the transition time as well as all actions that should be taken accordingly. With this paper, we provide a roadmap for the transition and transformation of the administrative accounting operations of public entities.

**Keywords** Public administration · Public accounting · Corporate governance · Social responsibility · IPSAS · IAS

**JEL Classification Codes** H83 · M14 · M41

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## 1 Introduction

On June 13, 2018, Presidential Decree 54, “Presentation of the content and the time to start the implementation of the General Government Accounting Framework”, was published in the Official Gazette Issue 103, A. It defines the accounting framework governing general government entities that are within Hellenic Statistical Authority’s (ELSTAT) registry. It is a continuation of the major effort to modernize Greek accounting legal framework that started in 2015 with the implementation of Law 4308/2014 (Greek Accounting Standards), which harmonized the accounting of the private sector with the European legislation. Also, it is an integrated framework that incorporates all the principles of compiling financial statements, financial reporting, and budgeting of government entities, based on ESA (European System of Accounts), Government Finance Statistics and IPSAS. As it is a very challenging project, the implementation will be completed gradually over the next four years with the aim of upgrading the accountability and reliability of the state’s financial data. It covers globally and consistently all sub-sectors of the general government and presents all necessary information, accounted for on accrual basis, in order to provide data, based on IPSAS and ESA standards. The provisions of Presidential Decree No 54 shall be applied by the Central Administration on 01/01/2019 with the exception of: (a) paragraph 3 of Article 3 “Joint Accounts Plan” only in respect of the functional classification; (b) Article 10 “Consolidated Financial Reports” (c) paragraphs 2.4 and 2.5 of Chapter C ‘Property, plant and equipment’ in Annex 5 and (d) of Chapter F ‘Provisions’ in the Annex of the Decree. The exempted provisions of (a), (b), (c) and (d) are fully applicable on 01.01.2023 at the latest and at a date to be determined by the relevant presidential decree. The other entities of the General Government, which fall within the scope of this Presidential Decree, are obliged to fully apply the provisions of it until 01.01.2023 at the latest and at a date to be determined by the issuance of a corresponding presidential decree.

## 2 Literature Review

The administration of public funds requires transparency, accountability, completeness, and control for public sector entities. Accounting should be directed so as public administration relies on specific goals and results (Veggeland 2014). The application of the IPSAS is understood within the context of strengthening efficiency and improving both the quality and comparability of financial information reported by Public Sector Entities (PSEs) deriving from the New Public Management (NPM) theory which was first introduced by Hood (1991) as a set of broadly similar administrative doctrines which dominated the bureaucratic reform agenda in many OECD countries from the late 1970s. Full accrual basis is referred to as the best accounting practice today in private and in public sector alike. Most of the literature that examines accrual accounting in the public sector mainly from a cost-benefit

approach. As Christensen (2002) supports, PSEs often embrace features of bureaucratic environments where several implementation barriers may come into play that can increase the cost or time required to implement accounting changes. According to Khan and Mayes (2009) the existence of an acceptable cash accounting or modified cash accounting-based system, political support, support of the legislature, technical capacity and adequate information systems are the pre-conditions that are beneficial for any implementing entity to consider. If the entity fails to consider extant pre-implementation factors when in the process of applying IPSAS it may result in limited understanding of the influences between technical accounting, legislative, political, and management aspects, leading to increasing the overall risks during the implementation but also the post-implementation phases. Any organization moving from cash-based accounting to accrual-based accounting faces many challenges. As business practices must be aligned with the new accounting requirements, the work challenges facing any PSE seeking to implement accrual based IPSAS lies not only in the accounting arena but also across all organizational processes. To recognize that this is a project that reaches well beyond that of accounting in any given public sector entity it is the first important step in adopting accrual based IPSAS. The scope of a project to adopt accrual based IPSAS will most certainly affect all business practices and external stakeholders who will receive new information in the annual financial statements. Thus, a successful project management (PM) of IPSAS implementation must consider the reaction of all internal and external stakeholders of the PSE, their involvement and communication. It is crucial the formation of a PM team, one that its members are attentive to the nature of the project and combine the broader interests of the PSE with demanding accounting work. Accounting should be directed so as public administration relies on specific goals and results. Public sector accounting raises an international interest in fiscal policy, budget reporting, European and international public sector accounting standards (IPSAS), harmonization of public accounting, government accounting and national accounts (Manes Rossi et al. 2015). Adaptations from cash-based accounting to accrual-based accounting are of primary importance in relation to the reliability of the ultimate public entity's deficit or surplus (Jorge 2013). The need to apply harmonized public accounting standards is of major importance (European Commission 2013) and relates to COUNCIL DIRECTIVE 2011/85/EU of 8 November 2011 "on requirements for budgetary frameworks of the Member States". From the fact that the accrual basis financial statements also present the cash flow statements, the cash and accrual basis should be treated as complementary rather than as competitive methods (Luis Cortes and Marti 2012). The European Union Member States are in the process of using modern accounting methods based on the accrual basis near IPSAS (Bellanca and Vandernoot 2014). The spreading of accrued accounting is based in part on the number of PSEs that follow it (Pina and Torres 2003). The public accounting rules, which are directly related to accountability and transparency, are under constant review and the reporting process has become an important factor in the direction of fiscal recovery (Naughton and Spamann 2015). The global financial crisis and the debt crisis are directly linked to public sector accounting (Abanyam and Angahar 2015). On the other hand, financial planning is the common basis for decision-making accounting and control accounting. The use

of accounting models by the private sector has been a research point for assessing the financial health of PSEs (Fischer and Montondon 2005). Moreover Groves et al. (1981), Brown (1991), Nollenberger (2003) and Pallis et al. (2018) integrate the financial position of a public sector entity into its ability to finance public services on an ongoing basis by distinguishing between cash solvency, financial solvency, long-term solvency and service-related solvency. Berne and Schramm (1986) link the financial situation of a public entity with the possibility of fulfilling their financial obligations to their creditors (Ritonga et al. 2012). This is also the opinion of Wang et al. (2007) who defines separately the financial position of a public entity from its financial performance. According to Kloha et al. (2005), the financial situation is dealt with based on distress and the ability to carry out activities, debt servicing and meeting the needs of society on a long-term basis. Similarly Jones and Walker (2007), interpret the financial difficulty as the lack of ability to maintain the level and nature of services provided to citizens in order to maintain a stable quality of service for them Hendrick (2004). links the economic situation of a public entity to the ability of meeting its financial obligations and services to society. Significant papers to the understanding of public sector accounting changes have relied on Luder's governmental Accounting Innovation Model also known as the "Contingency Model" (Lüder 1992), Ouda (2004). raised the fact that no studies provide any understanding of how to form an implementation framework in order to apply accrual accounting into practice. The same, introduced a basic requirements model to address the lack of research for the successful implementation of accrual accounting in the public sector. A few critical assumptions that need to be present for successful transition to accrual accounting where proposes by the basic requirement model. The assumptions consist of: (a) the more correspondent the public administrators' culture with the culture upon which the governmental accounting system is premised, the more easily change occurs; b) support from leaders in the public sector, both political and within the bureaucracy, support from professional and academic bodies; (c) establishment of intensive communication strategy; (d) willingness and qualifications of the staff required to develop and implement the accounting changes; (e) consultation and coordination with the PSEs that will apply the accrual accounting; (f) estimation of the adoption costs is critical in determining the financing required for the implementation process; (g) overcoming and tackling of some specific accounting issues in initial phase; (h) building an appropriate information technology capacity Rivenbark and Roenigk (2011). Define the financial position of a public entity as its ability to meet short-term liabilities, services and capital requirements as derived from its financial statements. Liapis and Spanos (2015) make an attempt to transform past public budget statements to cash flow statements in order to make them comparable with the current requirements of the accrual-based accounting system under IPSAS. Also, Spanos and Liapis (2018) continue to conclude that the common structure of financial statements under IAS/IFRS and IPSAS allows the convergence of budgeting and control mechanisms between Public and Private Sectors.



### 3 Research Goal

Following the research of Aggestam-ca (2010), our research goal in this paper is to describe the theoretical framework in order to provide overarching PM best practices that can then be applied in Greek PSEs (GPSEs) for the adoption of accrual based IPSAS. To achieve that, we suggest several steps following a PM approach for the transition process. The steps are as follows:

1. The assessment of the most fit and proper Project Management methodology among PProjects IN Controlled Environments (PRINCE2) and Network Analysis (Critical Path Method; Program Evaluation and Review Technique) to address in the most efficient way the special needs of each entity during the transition process.
2. The investigation of budget and control systems in Greek PSEs (GPSEs) as they arise from the logging and reporting structure of accounting data under the provisions of the European System of Accounts (ESA), Government Finance Statistics (GFS) and International Public Sector Accounting Standards (IPSAS).
3. The analysis of the institutional framework of financial management of GPSEs.
4. The analysis of the structure and procedures for the preparation of budgets, audits, and model audits of GPSEs and their correlation with the financial statements of the ones of the private sector.
5. The sensitivity analysis and use of stochastic methodology on key budgeting assumptions to assist in compiling, reviewing, and reporting on them.
6. To draw conclusions on the sound management of public money and to avoid bureaucratic procedures for transferring funds from one code to another.
7. The development of flow chart on the procedures and activities of the financial management of the public entities.
8. The analysis of public accounting, government governance, accountability, disclosure and transparency.
9. The Ex-ante and Post ex-poste test to apply changes in accounting standards, as well as to prudential and ex-post control over the management of public money.
10. Assessing the cost of the procedures for handling the financial management of PSEs based on Activity Base Costing and the Balance Scorecard of the present situation.
11. Assessing the cost of transition from old and to new standards and implementing new control procedures.
12. Assessing the correlation of public procurement procedures with the proper functioning of public entities.
13. Record and describe the job roles and qualifications required for the key positions of the employees of Financial Management and accounting departments of GPSEs.

## 4 Methodology

In order to carry out the research, we suggest the analyses of cases of Greek public entities like Municipalities, Universities, and Research Institutions. According to Yin (2003), multiple case studies are often considered more compelling, and the overall study is considered to be more robust. The innovative aspects of the method we propose is the initial fit and proper analysis of different project management methodologies in order to evaluate the most proper for the process of transition to IPSAS. Thus, this research approach we believe will be based partly on unusual case study analysis, taking the form of a participatory action research, which will allow the researchers to understand the criteria that will be adopted in order to define the process of transition for the reporting entities and their effects on financial accounting operations and disclosures. In the case of “action research,” the researchers will interact with the members of the organizations in a collaborative venture. As Ryan et al. (2002) describe, the researchers must actively involve in the implementation of new accounting and reporting procedures and tool. The participation will be active on both sides and will be more than either a consultancy project or an intra-organizational problem-solving exercise. As denoted by Smith (2019), action research generates results which will be of interest to the host organizations and make contribution to the knowledge in the area. Greenwood and Levin (2006) suggests that action research requires a conjunction of three elements: research, action, and participation.

## 5 Suggestions

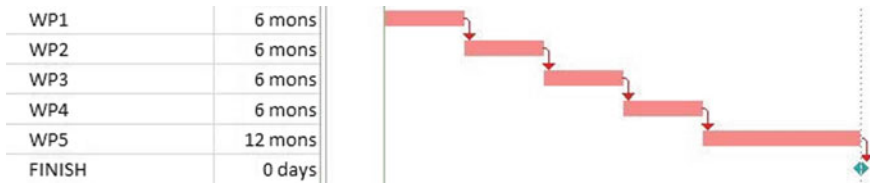
During the process of transition to IPSAS and regardless of the PM methodology that will be selected, the research team is crucial to follow the following steps.

- i. The division of the whole process into work packages (WPs).
- ii. The description of every work package using tables of WP as follows in Table 1. Work package description.
- iii. A Gantt flowchart showing the evolution of the whole process divided into work packages (WP) as provided in Fig. 1. The schedule of the different work packages and their data (Gantt Chart).

**Table 1** Work package description

WP Number	WP Title	
Starting Month	Ending Month	Person Months (PMs)
<u>Objectives: Description of Work: Tasks</u>		
<u>Deliverables: Milestones</u>		

Source Authors own work



**Fig. 1** The schedule of the different work packages and their data (Gantt Chart)

**Table 2** Milestones list

Milestone Number	Milestone Name	Related WP	Due Date (months)	Means of Verification

Source Authors own work

- iv. A table of milestones related to the Work Packages, the due date in months and the means for verifying the result as presented in Table 2. Milestones List.

## 6 Private and Public Sector—Corporate Social Responsibility

In recent years, the concepts of corporate sustainability, corporate social responsibility, corporate social performance, and environmental management received greater attention from both academics and professionals. According to Bansal (2005) corporate sustainability is achieved at the intersection of economic development, environmental protection, and social responsibility. CSR is usually associated with the approach of integrating social and environmental aspects into corporate activities, while the academic community has shown that CSR orientation is the key to stimulating long-term stability, growth and sustainable performance in a dynamic and changing environment (Gyves and O’Higgins 2008). According to Heikkurinen and Bonnedahl (2013), the orientation of sustainable development argues that organizations have the responsibility to take strategic responsibility for corporate sustainability. Since 2011, the European Commission has adopted a recent definition of Corporate Social Responsibility, defining it as “the responsibility of enterprises for their impact on society” seeking thus to show the potential of CSR through a set of values to contribute to the transition to a sustainable economic system. According to Kavoura and Sahinidis (2015) although several countries and companies have incorporated CSR into their processes and organizational structure, however many companies in the EU have not yet fully integrated social and environmental concerns into their activities and this is evidenced by the fact that only 15 EU Member States have national strategy plans to promote corporate social responsibility (European Commission, Compedium 2014), while at the time of writing this document Greece

has not yet implemented a national policy on the matter although it is in the final stage of implementing a relevant Plan. In Greece, Chytis et al. (2020) study the effect of corporate governance on tax planning during the adverse circumstances created by the economic crisis.

The public sector is an important part of international economic activities (Ball and Grubnic 2010; Walker and Brammer, 2012). Public sector organizations are defined by OECD (2015) as any government-controlled organization that develops public goods or services, in accordance with the Government's classification. Public Administration has a dual role to play in the scope of CSR, both to validate and support the concept of Corporate Social Responsibility in the Market and business and to act as application example of CSR in compliance with its principles. We report according to GRI (2005) that they are important employers, service providers, but also resource consumers related to significant aspects and impacts on the sustainability of the organization, while Ball and Grubnic (2010) report in their study that the public sector affects all other sectors due to their size and related activities. The efficiency of public administration depends not only on the mode of governance, but also on the ability to predict the needs and crises and to make appropriate decisions that will create long-term value. Examples of implementation are reported through country reports, as submitted in the latest EU Member States report to the European Commission in 2014, where CSR appears to be a value-for-money approach, can benefit, among others, to save resources, in the following ways: responsible management of water and energy in public buildings, rational movement of workers, proper management of public equipment, redefining the rules of ethics any public body based on the principles of CSR, collection and dissemination of public information with respect to CSR following the guidelines for the publication of reports on social and environmental data, promotion of socially responsible investment, integration of social and environmental criteria into public procurement, developing information tools for citizens on CSR, etc. Recently observed that there have been increasing research into the initiatives for reporting on the environment and the sustainability of public sector companies, such as on the adoption of social and environmental reports by Italian local authorities (Marcuccio and Steccolini 2005). Reporting on sustainability has become a key element in organizations and we note that voluntary sustainability reporting practices for public sector companies, are mainly based on the indicators and guidelines for sustainability reporting (GRI) (James Guthrie and Farneti 2008). However, although there have been several academic publications on the publication of sustainability reports in the public sector, their number was quite low compared to those that focus on corporate reports. Moreover, there has been little research on the causal relationship between the submission sustainability reporting in public sector organizations and management of organizational change for sustainability. The recently published study by Domingues et al. (2017) focuses on the contribution of sustainability reporting on sustainability through research of public services that have posted at least one sustainability report based on the guidelines of corporate responsibility indicators (GRI Standards) and researchers find a

shift in public sector services where they start using the sustainability report as a communication tool and this might be worthwhile to lead them to key organizational changes for their viability.

In Greece, responsibility for formulating a national strategy and legislation for Corporate Social Responsibility (CSR) for growth, innovation, and competitiveness, has gone to the Department of Entrepreneurship and Chambers of the Ministry of Economy and Development under the presidential decree 192/A/13-12-2017. Greece has not yet developed a national policy on Corporate Social Responsibility as it is one of the EU Member States who do not have, at the time of drafting this document, National Strategic Plan for the Promotion of CSR (European Commission, Compendium 2014). However, as shown by the data of GEMI and official announcements of companies and organizations on their official websites, many of these players have already chosen to be evaluated in accordance with international standards for CSR and act proactively to the development of the national policy framework. Despite the lack of a National Plan, considering the current institutional framework, it appears that provisions of the law on the obligation of enterprises already exists, based on criteria, to provide information on labor, environmental and social issues. In particular, it should be noted that on the basis of the size of the entities according to law 4308/2014 businesses are divided into very small entities, small entities, medium and large entities, while according to this separation and according to Law 4403/2016 incorporating the requirements of Directive 2013/34/EU into national law, the above entities they shall, in proportion to their economic size, to draw up: Management Report of the Board of Directors (Large, Medium and Small Entities), which includes both financial and non-financial indicators, including information relating to environmental and employee matters. Non-financial situation. Such an obligation applies to large public limited companies which are public interest entities and this situation contains.

information to the extent necessary to understand the development, performance, position and impact of the company's activities, at least in relation to environmental, social and employment issues, respect for human rights, anti-corruption and bribery issues. The development of CSR underlines the role of social accounting, including social and environmental information collection and analysis and presentation of data to stakeholders. Renewing now efforts to promote CSR, the European Commission seeks to create conditions conducive to sustainable development, responsible business behavior and sustainable production in the medium and long term. The above results and from the European Commission's Corporate Social Responsibility document—"Mapping the EU's Initiatives (2017) on Corporate Social Responsibility (CSR)/Responsible Business Conduct (RBC)" which was sent to the competent bodies of each EU country to develop a CSR strategy as an effort to update the data collected in 2014 (Corporate Social Responsibility—National Public Policies in the European Union, Compendium 2014) and record where each is located. Over the last two years it has been observed that countries that had already drawn up and implemented CSR projects tend to tighten up the rules or examine the possibility of incentives for targeted additional actions by businesses and organizations

as featured in the “Green Card” plan of the French National Assembly to the European Commission on Corporate Social Responsibility and Workers’ Security with which our country has also been compiled. Also, comparing the National Plans of the different countries, we find that the cultural differences between countries and societies may affect CSR, due to its dynamic concept, as well and the economic circumstances of a country may affect CSR activities. In addition, by comparing the existing EU countries for Corporate Social Responsibility for Enterprises and Organizations, and regarding the application of these principles by public bodies, there are limited, mainly non-binding, references. Among them, social clauses in public procurement which are recognized by many countries as a strong incentive to encourage different aspects of CSR, socially responsible investments, the construction of the single market for green products, to facilitate better information on the environmental performance of products and organizations, financial reporting obligations and anti-corruption policies that are evolving, the adoption of measures to protect public health and safety, etc. It is evident from the above that our country implements part of these good CSR practices in various sectors of the public, but it is fragmentary and often without providing a framework for compliance from the infringement of those principles. However, without drawing up a National Plan for Corporate Social Responsibility, all the above cannot be regulated. According to the National Strategy for CSR is expected to be completed this year with the program of the Ministry of Economy and Development, and we are in the process of preparing the study on how to implement the Corporate Social Responsibility in the Public and Private Sector in Greece and the submission of proposals related to the CSR draft of the relevant Ministry, a project that is in progress, and the Research Institute EPIAPAD of Panteion’s University.

## 7 Conclusions—Scientific Impact

In this paper we try to examine systematically the scientific literature regarding the implementation of IPSAS in PSEs the challenges and moreover the process for the implementation and to provide a basic theoretical framework for further research design and implementation. To our knowledge there are few researches regarding the implementation of IPSAS to Small and Medium PSEs, such as Universities and Municipalities, mainly in Spain, Belgium, Portugal, and Italy, as Brusca et al. (2013) and Gigli et al. (2018) state, especially under the perspective of a project management approach. Also considering that our proposal focuses on Greek PSEs we find a significant gap regarding the literature of implementing IPSAS using PM approaches in Greek Public Sector, so our research can be the starting point of a more thorough study.

Furthermore, by forming a national CSR strategy, Public Administration should be able to fulfill its twofold role in this area by defining and supporting responsible entrepreneurship actions by private sector and by implementing its own actions. The Public Sector, by its very nature, reflects many CSR principles and therefore the

implementation of CSR. In the public sector if this is applied it is bound to improve its economic, social, and environmental performance. Given that Greece is among the countries that have not submitted a National Plan for CSR in the EU, we should consider whether it can include when designing, the way in which non-financial data are controlled and captured of those implementing CSR actions, whether it follows international standards for reasons of transparency and comparison of these data. In this paper we contribute in setting the public and scientific scene for a systematic holistic approach of good public governance, both in public accounting and in CSR of Public Sector. In the future the proposed approach can be utilized in universities and municipalities, giving a head start and a test simulation mode, regarding the full obligatory implementation in 01.01.2023. Also the idea of combining PM methodologies for implementation of new Reporting Standards and CSR strategies can be further explored with other PM methodologies and be evaluated for the outcome and effectiveness.

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