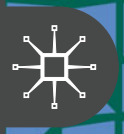

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Asian Nations and Multinationals

Overcoming the Limits to Growth

Edited by
Bernadette Andreosso-O'Callaghan
Jacques Jaussaud
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Abbreviations

AANS	Average Nearest-Neighbor Strength
ACFTA	Asean—China Free Trade Area
ADB	Asian Development Bank
ADF	Augmented Dickey–Fuller test
AFTA	ASEAN Free Trade Area
AIC	Akaike information criterion
ANND	Average Nearest-Neighbor Degree
ANNS	Average nearest-neighbor strength
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BERD	Business Expenditure on Research and Development
BLR	Binary Logistic Regression
BRI	Bank Rakyat Indonesia
CAP	Common Agricultural Policy
CARIFORUM	Caribbean subgroup within the African, Caribbean and Pacific (ACP) group
CB	Vietnam Cooperative Bank
CCP	Chinese Communist Party
CEE	Central Eastern Europe
CEO	Chief Executive Officer
CGE	Computable General Equilibrium model
CPI	Consumer Price Index
CSR	Corporate Social Responsibility
DIW	Department of Industrial Works
EEC	European Economic Community
EESC	European Economic and Social Committee

EIU	Economist Intelligence Unit
EPU	Economic Policy Uncertainty
ERP	Enterprise Resource Planning
EU	European Union
EU15	15 EU Member Countries
EU25	25 EU Member Countries
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FEDIOL	EU Vegetable Oil and Proteinmeal Federation
FTA	Free Trade Agreement
FTAAP	Free Trade Area of the Asia-Pacific
GATT	General Agreement on Tariffs and Trade
GCR	Greater China Region
GDA	Global Development Alliance
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GSP	Generalized Scheme of Preferences
GTAP	Global Trade Analysis Project
HCYU	Ho Chi Minh Communist Youth Union
HQ	Hannan Quinn
HQs	Headquarters
HRM	Human Resource Management
IC	Information criterion
IFC	International Finance Corporation
IISD	International Institute for Sustainable Development
IJV	International joint venture
ILO	International Labour Organization
ILUC	Indirect Land Use Change
IP	Intellectual Property
KPI	Key performance indicators
LUC	Land Use Change
M&As	Merger-acquisitions
MCAR	Missing Completely at Random
METI	Ministry of Economy (of Japan)
MF	Microfinance
MFIs	Microfinance Institutions
MNCs	Multi-National Companies
MNEs	Multi-National Enterprises
NAFTA	North-American Free Trade (Area) Agreement
NBR	Negative Binomial Regression
NGO	Non-governmental organization
NISA	Nuclear and Industrial Safety Agency

NRA	Nuclear Regulation Authority
NSO	National Statistical Office
NSTDA	National Science and Technology Development Agency
NTBs	Non-Tariff Barriers
OECD	Organisation for Economic Co-operation and Development
OECF	Overseas Economic Cooperation Fund
PBR	Price-to-Book Ratio
PCFs	Vietnam People's Credit Funds
PGDP	Provincial Gross Development Product
QAP	Quadratic Assignment Procedure
R&D	Research and Development
RATS32	Regression Analysis of Time Series
ROA	Return on Assets
ROE	Return on Equity
ROSCA	Rotating savings and credit associations
RSPO	Roundtable on Sustainable Palm Oil
SC	Schwarz Criterion
SDG	Sustainable Development Goals
SHG	Self-help group
SITC	Standard International Trade Classification
STI	National Science, Technology, and Innovation Policy Office
TPP	Trans-Pacific Partnership
TSD	Trade and Sustainable Development
TTIP	Trans-Atlantic Trade and Investment Partnership
TTO	Technology Transfer Office
TYM	Tao Yeu May
UILs	University-Industry Linkages
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
USD	United States Dollar
USDA	United States Department of Agriculture
USTR	United States Trade Representative
VBARD	Vietnam Bank for Agriculture and Rural Development
VBSP	Vietnam Bank for Social Policies
VFU	Vietnam Farmer's Union
VVA	Vietnam Veteran Association
VWU	Vietnam Women's Union
WANND	Weighted Average Nearest-Neighbor Degree
WB	World Bank
WOSs	Wholly-Owned Subsidiaries
WTO	World Trade Organization
WWII	Second World War

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CHAPTER 1

Introduction: Asian Nations and Multinationals—Economic and Human Resource Challenges

Robert Taylor

Abstract Asia remains the world's fastest growing economic region, where China is destined to be a key player. The Chinese leaders, however, rule through one-party authoritarianism, implying the ineffectiveness of Western liberal democracy as a vehicle of economic growth in developing countries. The efficacy of the Chinese template will necessarily depend on its economic success, increasingly fostered through increased productivity rather than the accumulation of production factors. In the development of the knowledge economy and concomitant human capital, China may serve as an example to other Asian nations as it plays a greater economic role in the region, as reflected in the ASEAN-China Free Trade Area (ACFTA). It is an open question whether an authoritarian social and political tradition will be conducive to innovation in the region.

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Keywords Foreign direct investment (FDI) · Authoritarianism · Innovation · Productivity · ASEAN-China Free Trade Area (ACFTA) · Human resource management

In the wake of mediocre or slow growth in Western countries, Asia remains the world's fastest growing economic region, facilitated in part by inward and outward foreign direct investment (FDI). This is a feature of globalisation, a process made possible by advanced technology which is set to continue, in spite of its desirability being questioned, examples being Britain's Brexit decision and the accession of Donald Trump to the United States presidency. In contrast, even though President Trump's November 2017 visit to Asia suggested American re-engagement with the region, Asian nations, especially China, in partial response to the America first policy, have posed as champions of free trade and globalisation.

As a key player China's domestic policy will increasingly impact upon the economic fortunes of East and Southeast Asian countries, and there is evidence that its one-party state, with continuing governmental control of major industrial sectors, even while giving play to market forces, appears an attractive template for those countries which still retain a semblance of an authoritarian political tradition. At the Nineteenth Chinese Communist Party (CCP) Congress, held in October 2017, Xi Jinping, enshrined his thought in the Party's constitution and reiterated his vision of a new era of socialism with Chinese characteristics, derived from one-party authoritarianism. In tandem the Chinese official media have decried the weakness and ineffectiveness of Western liberal democracy. In short, the Chinese leaders continue to stake their legitimacy on rising living standards, a *sine qua non* of which is one-party rule, without which provincial particularism and ethnic diversity, the latter especially in the country's Western borderlands, would lead to internal dissension. In fact, China's current political stability and economic success have drawn approval from the Asian leaders, mainly in the context of battles against corruption, notably in the Philippines. As will be discussed later, it can, however, be argued that only countries with representative government providing the prerequisites of free thinking and innovation, can provide the framework for economic progress, the question being whether the Chinese can maintain growth momentum without political liberalisation.

Is, for example, CCP control of social media compatible with the internet as a source of innovation and economic growth (Editors, East Asia Forum 2017; US-China Business Council 2017b).

Thus the relevance of a Chinese template will necessarily depend on economic success, the CCP's objective being to achieve the goal of becoming a moderately well-off society by doubling Gross Domestic Product (GDP) from its 2010 level to a target of per capita US$9000 by 2020. Significantly, however, the per capita target is to address social inequality by taking millions of the population out of poverty (McCahill 2017b). In his work report at the beginning of the CCP Congress Xi Jinping outlined a populist message, implicitly stressing public accountability by strengthening party discipline concerning issues like bribery, integral to the anti-corruption campaign. In Marxist terms, Xi Jinping stated that the greatest contradiction in Chinese society was between unbalanced development and the people's ever growing expectation of a better living standard.

Thus policies to address these issues included the elimination of poverty, better infrastructure to reduce the urban–rural divide as well as improved education and public health (McCahill 2017a). China's economic strategy reflects these priorities; as the country enters a new pattern of slower growth but faster structural change, the focus is on increases in productivity rather than accumulation of production factors. In short, the emphasis is on quality rather than quantity, with a stress on capacity reduction in such areas as steel, aluminium and cement. In contrast, a greater role is to be accorded to knowledge-intensive industries and services. Significantly, during President Trump's visit to China in November 2017, China's Foreign Ministry stated that, in accordance with the country's own timetable, barriers to entry by foreign investors to such sectors as banking, insurance and securities securitie would be substantially eased, presumably to gain experience as yet inadequate in China (Cai and Zhang 2017; US-China Business Council 2017c, d).

To further the knowledge economy the Chinese leaders face a number of challenges related to education, healthcare, human resources, labour law and the environment. With the cumulative effects of the now abandoned one-child policy, China now no longer enjoys an excess labour dividend, and employees, whether rural migrants or city dwellers, will need better education and retraining, making it imperative, for instance, that compulsory education be extended from nine to twelve years, thus ensuring better qualified human capital (Cai and Zhang 2017).

While an OECF report issued in 2010 noted the strengths of upper secondary vocational education in China, involving a range of specialisms and the commitment to workplace training, it called for closer consultation with employers on skills provision and recommended enhanced fiscal transfers at provincial and county levels (OECD Directorate for Education, Education and Training Policy Division 2010).

Prior to the 1980s, modern healthcare was largely an urban phenomenon in China but the advent of social media has precipitated greater public awareness of provision, especially in view of the adverse effects of environmental degradation on human life. In 2015 the National Planning Comprehensive Blueprint targeted key areas for development, including the reiteration of the importance of multi-institution practice practitioners, a tentative move towards cooperation with the private sector, by which medical practitioners currently working in private hospitals will enjoy added flexibility in practice in the non-public sector. An intended objective could be, as in Western countries, an attempt to reduce pressure on the public sector by allowing a greater role for the private sector in admitting patients paying fees (Norton Rose Fulbright 2015).

Healthcare reform is an integral part of human resource management, a stated priority at both national and corporate levels in China. Knowledge workers, given their role in innovation requiring substantial individual initiative, demand more sophisticated means of control. Additionally, in view of greater acknowledgement of employee rights, China's Ministry of Human Resources in 2017 issued Three New Regulations to Strengthen Enforcement of Labour Laws, by which companies would be given a rating on their compliance with legislation based on a series of random checks and inspections (DLA Piper, Be Alert Asia 2016).

Air pollution and environmental degradation have been the price paid for economic growth in China and increasingly impact upon welfare and living standards. Accordingly, in 2015 a new environmental protection law took effect in China. There are, however, constraints on the Implementation of the new law. Enforcement is impeded by fragmented environmental governance, and local governments are often more interested in economic growth at all costs. Moreover there is a spirit still of rule by law rather than rule of law. Government officials often intervene, and a public environmental litigation system, whereby individuals may bring lawsuits against officials is in effect absent. Legislation, of course,

also has a favourable economic dimension; in addition to better health for the populace through the promotion of, for example, electric vehicles and other environmentally friendly products, inward foreign investment and overseas market penetration may be facilitated (Zhang and Cong 2015; US-China Business Council 2017a; McCahill 2017a).

Maritime disputes in the South China Sea have not to date seriously impeded further economic integration in the Asian region, where China, through trade and investment, is destined to play a major role. In fact, the Chinese leaders may be said to be projecting their country as a regional power, and integral to this is the economic relationship. China's main rival for influence is the United States and President Trump's abandonment, at the time of writing, of the Trans-Pacific Partnership (TPP) provides a further window of opportunity. Recent trade flows may be cited as evidence of growing economic dependency between China and Southeast Asia. During the period between 2005 and 2014 trade flows, that is, the sum of exports and imports of goods between the ten ASEAN nations, namely Brunei Darussalam, Cambodia, Lao PDR, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam, and China tripled, with a total of US$380 billion in 2014. While ASEAN overall trade only doubled, China's share rose to 15% of that total. Moreover China is already among the top five trading partners for every ASEAN nation, even though that dependency varies. The six more advanced economies of the region have more diversified trade but less developed countries like Cambodia and Vietnam are more reliant on China. In addition, economic growth in the region has been spurred by the initiatives in 2010 of the ASEAN-China Free Trade Area. In turn, intra-regional trade is being furthered by the participation of Chinese and ASEAN companies in transnational production networks (Li and Amer 2017; Berry 2017; Abbate and Rosina 2016). These transnational production networks are a product of ODI, with momentum coming from both China and the ASEAN nations. In China's case, application procedures will be facilitated as the country moves towards capital account liberalisation. Some industries in China suffer from overcapacity and this can be reduced if enterprises move production overseas where demand is still increasing and labour costs are lower. The ASEAN nations themselves seek Chinese investment to renew capital stock, to promote employment for the growing number of young of working age and to improve productivity and competitiveness, especially as in coming years their economies move up the value chain. Sectoral investment,

however, varies according to levels of economic development. Resource-rich countries like Cambodia and Indonesia have benefited from investment in the primary sector. Additionally, Chinese textile and clothing have been relocating labour-intensive production to such countries as Cambodia, Laos, Myanmar and Vietnam to take advantage of lower wage costs. Again, reflecting different phases of production, consumer electronics and car parts have played a major role in Chinese investment in Malaysia, Thailand and Singapore, although in the latter state most Chinese investment goes to the service sector. Furthermore Singapore is the region's major financial centre and is the top ASEAN investor in China (Garcia-Herrero 2015; Kubny and Voss, n.d.; Abbate and Rosina 2016).

These trends in the growth of trade and investment have been reflected in the stated goal of the ASEAN-China Free Trade Area (ACFTA) to increase the region's trade with China to US$1 trillion by 2020 and to stimulate the growth of Chinese FDI from US$50 billion to US$150 billion, with US$10 billion being funded by the China-ASEAN Investment Cooperation Fund (CAF), established in 2010. Achievement of these objectives will be facilitated by the removal of non- tariff barriers and impediments to trade in services and investment, as envisaged by the China-ASEAN Summit in 2015. Thus, in summary, Chinese trade and investment will increase economic integration (Abbate and Rosina 2016).

Moreover development in the region will bring in its human resource management challenges similar to those currently being addressed in China. A number of initiatives in these areas are already being taken at ASEAN Community level. Nevertheless a reservation must be entered regarding the effectiveness of such initiatives, given that the practice of consensus informs the decision-making process which will inevitably impact on Community policies. This, in turn, could prove an obstacle to further economic growth, essential for employment creation and improvement in social welfare across the region. Moreover the development of human capital is consequently crucial for competition in global markets (Emmers 2017; Basri 2017).

Informing discussions at ASEAN Community level has been focused on the development of physical infrastructure and connectivity, both crucial for boosting GDP. Improved physical infrastructure furthers production and distribution; connectivity between countries facilitates

investment flows and movement of skilled workers. Connectivity helps mobility of human capital. This is the objective of the ASEAN University Network (AUN) which is designed to develop academic and professional resources in the region and create a knowledge-based society. Similarly, the ASEAN Human Resource Blueprint, adopted at the meeting in Phnom Penh, Cambodia in April 2010, outlines such features of human resource management as merit-based recruitment, training and performance-based remuneration, all a reflection of Western experience and increasingly also being adopted in China. While health service provision differs across ASEAN, attempts have been directed at promoting universal health coverage across the region.

Industrial growth in ASEAN, as in China, is being achieved at the cost of environmental degradation, itself injurious to human health. The two volumes of ASEAN Environmental Law, Policy and Governance are wide-ranging, covering areas like biodiversity, water resources management, health and trans-boundary pollution, although enforcement lies largely with individual nations (Centre for Strategic Studies 2017; ASEAN Education Ministers Meeting 2017; ASEAN Human Resource Blueprint 2010; Sriratanaban 2015; Kheng 2009).

The issues discussed above impact upon human capital and have implications for future economic growth. Thus, to meet the challenges presented, the Asian nations must effectively deploy human resources. Keys to productivity and market competitiveness are creativity and innovation, in the past fostered by the values inherent in civil liberties and representative government. It is an open question whether the countries of Asia with authoritarian social and political traditions will be able to create such a conducive environment (Editors, East Asia Forum 2017; US-China Business Council 2017b). This introduction informs the content of the following chapters. The book investigates more specifically the main challenges in overcoming the limits to growth both from the viewpoint of Asian nations and of multinational companies (MNCs). It is structured in four parts: Part I is devoted to *Trade Issues and International Business Strategies*; Part II to *International Trade, Agriculture, Food Supply and Sustainable Development*, Part III embraces issues falling under the broad heading of *Firms and Societies in Asia Facing New Challenges*; these issues are for example natural disasters as well as the difficult access to credit by large parts of the population in Southeast Asia, and Part IV concludes.

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PART I

Trade Issues and International Business Strategies

CHAPTER 2

Free Trade Agreements and Responsible Business: Examples from the EU's Bilateral Agreements in East and Southeast Asia

Erja Kettunen-Matilainen and Claes G. Alvstam

Abstract This chapter analyses the impact of free trade agreements on responsible business in Asian emerging economies. We review the origins of the discussion on sustainable development in international negotiations and conventions, and explore the EU's three FTAs with Asian countries, i.e., South Korea, Singapore and Vietnam with respect to references to corporate social responsibility and sustainable development. Our main finding is the gradual evolution of the EU's FTAs towards including more explicit clauses on environmental and labour issues. This conforms to the idea of multilateralising regionalism, i.e., that issues may be first agreed in bilateral or regional FTAs and then gradually transferred to the multilateral level. Despite not incurring direct impacts on

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firms, this may serve as an institutional push for countries to address the need for responsible business in national legislation.

Keywords FTAs · EU · Asia · Sustainable development · Corporate responsibility

1 Introduction

This chapter discusses the impact of free trade agreements (FTA) on responsible business in Asian emerging economies. The topic is timely because of the accelerated pace at which FTAs are negotiated, signed and enforced, and because they are becoming more comprehensive, yet their contents have raised concern among consumers and the larger civil society alike. Between 2011 and 2018, trade agreements have been concluded particularly in East and Southeast Asia, which is the case also for bilateral FTAs of the European Union (EU) (Ahnlid 2012; Alvstam et al. 2017; Lindberg and Alvstam 2012a, b). The EU has signed an FTA with South Korea, concluded negotiations with Singapore and Vietnam, concluded an agreement in principle with Japan and is negotiating with several others in the region. The EU's agreements with Asian countries are so-called "new generation" FTAs, being wider and deeper than those before, and are also adhering to the idea of sustainable development and responsible business.[1]

The existing literature is relatively scarce on the question of FTAs and responsible business, which evidently is because of the mere recent nature of the topic. Some of the recent research, however, has opened the debate. Heron (2011) discusses the unequal dynamics of North-South trade negotiations and how the development needs of the Caribbean states are met in their negotiations with the EU. Lechner (2016) investigates preferential trade agreements across the world and the variation in how non-trade issues, such as human rights, labour standards and environmental protection, are included, and finds that strict provisions are explained by either import pressure from the partner

[1] The agreements, such as the EU-Korea FTA, cover also non-tariff barriers, aim to open trade in services and investments and include provisions in competition policy, government procurement, intellectual property rights (IPR), and transparency in regulation and sustainable development (DG Trade 2018a).

country or large differences in wage levels (ibid., p. 865). In comparison, Tschopp and Hamilton (2012) propose a Corporate Social Responsibility (CSR) reporting in free trade agreements that would add mechanisms of transparency and accountability addressing the social and environmental concerns that come with FTAs. Further, Cuyvers (2014) examines the case of the EU's FTAs with Asian countries and makes a comparative legal analysis on the sustainable development clauses in the EU-Singapore FTA which could provide a basis for the EU's possible negotiations with the Association of Southeast Asian Nations (ASEAN)[2] in the future.

Yet the existing literature seems not to consider the potential implications of 'responsible business' in FTAs on businesses. Therefore, we aim to address the regulation of trade regarding a research problem: *How do free trade agreements affect the responsibility of business in Asian emerging economies?* Responsible business, or corporate social responsibility (CSR) is understood as the social obligations and impacts of business in society (Crane and Matten 2007). It is usually considered as a corporate-driven code of conduct—not only due to stakeholder pressure, but because it is institutionalised at the corporate level in strategic CSR actions and practices (Bondy et al. 2012). However, the role of states in CSR is increasingly drawing research interest as well (Gjølberg 2010), which is important especially considering the institutional voids in emerging economies where CSR is not as widely practised as in developed economies (Su et al. 2016). The lack of institutions promoting CSR may result in firms engaging in unethical conduct when they are dependent on locally available resources (Oinas and Kettunen 2017). In contrast, multilateral and regional state institutions—such as the new FTAs—contain provisions for responsible business that emphasise the role of states (e.g., Wagner 2017).

It is this sphere of FTAs at different levels that we explore, i.e., the interplay between bilateral and multilateral trade agreements in addressing the idea of responsible business. Based on an analysis of the EU's three bilateral FTAs with Asian countries, we argue that while the FTAs are non-binding on the issue of responsible business, they mediate forces that push towards more strict rules on sustainability. By doing so, we respond to recent calls for inquiry into trade agreements that are

[2] Member countries: Indonesia, Malaysia, the Philippines, Singapore, Thailand, Vietnam, Cambodia, Laos, Myanmar, and Brunei.

changing the institutional frameworks governing global business (Meyer and Peng 2016). The significance of the research is in that FTAs may be changing the rules of foreign trade and may act as incentives for ethical business.

2 Conceptual and Empirical Approach

The theoretical approach to our research problem is the idea of *multilateralizing regionalism* (Baldwin 2006; Baldwin and Low 2009; Baldwin and Thornton 2008) that refers to a process of transferring regionally agreed issues to the multilateral level. The issue of corporate responsibility in international trade agreements is deeply embedded in the contemporary discourse on whether globalisation as a process gives more or less deterministically rise to increasing inequalities between countries, as well as to a development where individuals are left behind. In this context, the question is whether multinational firms should take a wider responsibility to mitigate the negative effects of globalisation. The majority of scholars who have warned against the risks that globalisation may lead to increasing inequalities are not biased against globalisation as such, but urge that trade and investment liberalisation and increasing international interdependence have to be coupled with policies aimed at reducing poverty gaps, within as well as between countries (e.g., Alvaredo et al. 2017; Collier 2007; Krugman 2012; Milanovic 2016; Rodrik 2018; Stiglitz 2018). There is also a growing literature within the field of international business that aims at more directly addressing these issues (e.g., Cuervo-Cazurra et al. 2017; Judge et al. 2014; Kobrin 2017; Meyer 2017). One possible starting point could be that the multilateral level, i.e., the World Trade Organization (WTO) framework should be the most appropriate platform for carrying out common rules and standards that increasingly have been incorporated in regional trade agreements. Such an endeavour can be seen as a part of the wider theories on multilateralising regionalism.

This discussion originally emerged as a response to the proliferation of regional trade agreements, the 'spaghetti bowl' of FTAs (Bhagwati 2008). In multilateralising regionalism, the process of regional FTAs is seen as a starting point for the so-called WTO-Plus agreements that aim to reach further than what has been the ambition in the stalled multilateral Doha Development Agenda talks. The question then is how to transfer the regionally agreed issues to the WTO level. One way to do

this is a step-by-step approach as suggested by Lindberg and Alvstam (2012a), by gradually harmonising bilateral/regional agreements that would allow for coordinating the issues multilaterally. This is because of the profound change in global commerce from 'trade-in-goods' to 'trade-in-tasks', i.e., the notable increase of global trade in intermediate goods and services (Baldwin and Robert-Nicoud 2014). Provisions on these issues are also included in the new comprehensive FTAs of the '21st century regionalism' (Baldwin 2014) that have become quite complex and deep compared to traditional FTAs that only addressed merchandise trade.

Therefore, multilateralising the new FTAs is extremely challenging because of their depth, and harmonizing should be done on an issue to issue basis (ibid.). In this process, the Asian countries could be central because of the growing number of FTAs in the region (Baldwin and Thornton 2008). Thus, a bilateral or interregional FTA can serve as a stepping-stone rather than a stumbling block towards a broader and more comprehensive economic partnership agreement, comprising ethical codes of conduct regarding e.g., labour conditions, environmental standards and regulations, the United Nations (UN) Sustainable Development Goals, intellectual property rights and anti-corruption provisions (UNCTAD 2014; Schwieder 2016).

Countries differ as to their institutional frameworks, and the process towards stronger governance structures securing sustainable development can be supported by an *institutional push*, understood as authorities initiating formal rules to regulate the business environment (Peng 2003; Puffer and McCarthy 2007). Especially in the case where there is no 'pull' from the civil society to advance CSR locally, bilateral FTAs have a potential to serve as a 'push' for developing countries—in particular, to adopt rules on working conditions and the protection of the environment in national legislation. This is plausible, as not all Southeast Asian states have ratified International Labour Organization (ILO) conventions such as those on the abolition of forced labour or the freedom of association (Cuyvers 2014, p. 437).

Sustainable development, then, is a broader concept than responsible business. It is often defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs", following the UN World Commission of Environment and Development statement from 1987 (UN 2018a). The aim of sustainable development is to achieve in a balanced manner

economic development, social development and environmental protection (ibid.), with a goal of socially inclusive and environmentally sustainable economic growth (e.g., Sachs 2015, p. 3). These have been formulated into the *2030 Agenda for Sustainable Development* adopted in 2015 that includes 17 Sustainable Development Goals (SDGs) addressing, e.g., poverty, health, urbanisation and responsible consumption and production. The UN (2018b) notes that trade liberalization can have both positive and negative effect on sustainable development: growing trade induces economic growth but not necessarily without cost to the ecosystem. Developing countries should be integrated into the multilateral trading system while at the same time ensuring that this contributes to sustainable development. So far, the SDGs provide the most coherent sustainable development framework to develop business models with positive societal contributions (van Tulder and van Zanten 2018, p. 1).

Empirically, we explore the adoption of CSR in the EU's agreements by operationalizing the broad research problem into two questions: (1) How is the issue of sustainable development treated in international trade negotiations? (2) How are the measures for corporate social responsibility filed in the EU's three FTAs with Asian countries? Based on these, we debate the expected implications for businesses. The questions are addressed by investigating the three agreements: the EU-Korea FTA that has been in force since 2011, the EU-Singapore FTA concluded in 2014 and the EU-Vietnam FTA concluded in 2015, the two latter not yet ratified or brought in operation.

The empirical analysis is based on FTA texts and reports, as well as personal interviews with trade policy officials.[3] Interviews deal with the motives, agendas and contested issues of the negotiations, the role of businesses and the main challenges. The agreement texts are analysed applying a content analysis of keywords to find out how responsible business and sustainable development are treated. References to international conventions and negotiations are sought to reveal the dynamics between the multilateral and bilateral/regional levels. These help us understand

[3] Interviews were conducted with six persons: an official of the EU Delegation in Korea, Seoul; two officials of the Finnish Ministry of Foreign Affairs, Department of External Economic Relations, Helsinki; a representative of the EU Chamber of Commerce in Malaysia, Kuala Lumpur; and two officials of the Finnish Embassy in Korea, Seoul; all took place between December 2015 and May 2017.

the possible complexities and different viewpoints and how the issue is presented in the final agreement texts.

3 The Origins of 'Sustainable Development' in International Trade Negotiations

The notion of sustainable development has its origins in the international debate on environmental protection from the 1960s when environmental consciousness started to gain prominence among both researchers and the civil society. One of the earliest international meetings to discuss the challenge of maintaining sustainability together with economic growth and development was in the UN Conference on the Human Environment in 1972 in Stockholm (Sachs 2015, p. 4). The term 'sustainable' appeared the same year in the Club of Rome report *Limits to growth* that presented an idea of a world system that would be sustainable and capable of satisfying the basic material needs of the people. The concept of 'sustainable development' was introduced in 1980 in the *World Conservation Strategy* published by World Conservation Union (Reid 1995, p. xiii). It was discussed in the UN World Commission on Environment and Development led by Brundtland, and its report *Our Common Future* in 1987. Then, the United Nations Conference on Environment and Development organised in Rio de Janeiro in 1992 aimed at agreeing on sustainable development including both economic and social development. It resulted in an agreement on climate change, which later led to the Kyoto Protocol, a commitment to reduce greenhouse gas emissions.

At the same time, developed countries brought the topic of sustainable development into the negotiations to establish the WTO in the early 1990s. It received opposition from developing countries that were concerned about possible protectionism and the supposed need for openness and dialogue with the civil society. The issue was discussed with minor results (IISD 1996, p. 8). Then, the first WTO ministerial meeting was held in Singapore in 1996, but developing countries rejected the idea again due to it being 'hidden protectionism' and that developed countries had a comparative advantage here. It was noted that in questions related to labour issues, the ILO had the apparent competence. The developed countries tried to keep up the idea of sustainable development

in the WTO Seattle meeting in 1999, but again, developing countries opposed this categorically.[4]

However, the situation has changed during the last two decades. Developing countries no longer view the issue as a direct threat to competitive advantage, as there are no sanctions on 'misconduct'. One of the first agreements to include references to sustainable development is the EU-CARIFORUM[5] Economic Partnership Agreement from 2008.[6] Also the Canada-Peru FTA from 2009 contains references to CSR in several chapters and is accompanied by side agreements on environment and labour cooperation (Wagner 2017, p. 202). The statements of sustainable development are becoming more common, which opens the potential for possibly harmonizing the issue into a multilateral agreement later.

4 The EU's Three FTAs in Asia: Towards Corporate Social Responsibility

The EU has been one of the parties using the institutional push in striving to advance the sustainable development agenda in different international settings (see, e.g., European Commission 2017). The difficulties in negotiating the issue globally led it to take a unilateral approach: the EU decided to give tariff preferences through its Generalized Scheme of Preferences (GSP) to developing countries that implement international labour conventions and environmental agreements (e.g., Cuyvers 2014).

The EU regards sustainable development as being central to its current FTAs. Where do the ideas of sustainable development derive from, and what is the role of businesses? Largely, the pressure comes from outside of the business sphere: the labour unions and the civil society are active in lobbying on the norms of the working life and bringing them in the EU's agenda. The role of businesses is small—apart from firms in cleantech or related industries that may see business opportunities in sustainable development, there is relatively little interest and a "cautious approach" towards the issue among firms.[7]

[4] Interview A.

[5] CARIFORUM is the Caribbean subgroup within the African, Caribbean and Pacific (ACP) group.

[6] The agreement can be found at http://ec.europa.eu/trade/policy/countries-and-regions/regions/caribbean/.

[7] Interview A.

4.1 Corporate Social Responsibility in the FTA Texts

The EU's agreements with Korea, Singapore and Vietnam are relatively similar when it comes to how the issues on sustainable development and CSR are dealt with. All three include references to international conventions. The structure of the 'Chapter on trade and sustainable development' is almost the same in all cases. The agreements differ slightly in exact wordings, reflecting the formulations that each negotiating party has been ready to accept. Some of the similarities on sustainable development issues include, for example, the right of each party to establish its own levels of environmental and labour protection; a commitment to respect the fundamental rights at work[8]; and facilitating trade in environmental goods and services (renewable energy, energy efficient and ecolabelled goods). There are no sanctions in case the CSR measures are not met. Yet there are some differences as to the details and concrete examples on sustainable development and CSR in the three FTAs, as shown next.

4.1.1 The EU-Korea FTA

Of the three FTAs, this is the vaguest in its statements on sustainability. It has the shortest text in chapter 13 on Trade and sustainable development, and also the least detailed as to concrete examples and fields in which it is to be implemented. It disregards many of the issues that are included in either or both of the two other agreements. For example, 'sustainable fishing practices' is not mentioned as in the two other agreements and 'greenhouse gas' is not referred to, contrary to the agreement with Singapore. Further, 'biological diversity' does not appear in the chapter on sustainability, but on Intellectual Property.

The relative briefness of the text on sustainable development can be explained by its novelty at the time of the negotiations in 2007–2010. This is especially so regarding the Korean side; the issue was new for Asian countries.[9] Yet at the time, this was the EU's most comprehensive

[8]The freedom of association and the right to collective bargaining; the elimination of forced labour; the abolition of child labour; and the elimination of discrimination in employment.

[9]Interview B.

FTA in which many new issues were negotiated.[10] Thus, the agreement can be seen as a first example of a new scope for the EU's bilateral FTAs.

'Corporate social responsibility' is briefly mentioned in the Article on trade favouring sustainable development, which states that the parties strive to promote fair and ethical trade as well as trade in goods involving CSR. There are markedly fewer notes on 'labour' compared to the Singapore FTA. The reason might be Korea's internal difficulties with labour issues, as the relations between the state and labour unions have become rather inflamed in Korea.[11] In the possible negotiations for amendments to the FTA, the EU wants to draw attention to the imports of products from South Korean factories located in North Korea because of problems with worker rights in the factories.[12]

4.1.2 The EU-Singapore FTA

This FTA, and its chapter 13 on Trade and sustainable development, has more numerous notes and concrete examples of the different spheres regarding the environment, compared to the one with Korea. The Singapore FTA refers to, for example, trade in timber and timber products, sustainably managed forests, trade in fish products (in a separate Article) and the need to reduce greenhouse gas emissions. In fact, this agreement was named the first 'Green FTA', and the text was drafted without much difficulty (Cuyvers 2014, p. 440). The agreement refers to the efforts to promote CSR practices "which are adopted on a voluntary basis" and as agreed in several international fora. Labour issues are mentioned more frequently than in the two other FTAs.

The Singapore FTA has its origins in the failure of the EU's interregional negotiations with ASEAN in 2007–2009 and was thus a 'second-best' option for the EU to open talks with individual member countries beginning with Singapore.[13] The EU's overall aim is to reach

[10] This was the EU's first ever FTA with an Asian country. Negotiations were launched in 2007 and the FTA signed in October 2010, ratified in May 2011 and provisionally applied in July 2011. The agreement fully entered into force in December 2015.

[11] Interview C; Interview A.

[12] Interview D.

[13] The EU-Singapore negotiations were launched in March 2010 and completed in October 2014. The agreement has been approved by the European Commission and needs to be agreed upon by the Council and the European Parliament before it can be put fully in force (DG Trade 2018b).

mutually compatible agreements with all ASEAN countries, which is important for businesses.[14] One of the main problems in the negotiations is the opening of public procurement markets because that is where "local tycoons and ministers make money" in all countries except Singapore.[15]

4.1.3 The EU-Vietnam FTA

This FTA has the longest text in chapter 13 on Trade and sustainable development. The main novelty, which is not found in the two other FTAs, are the new separate Articles on sustainable development issues with relatively long statements and clarifications:

- Article 5: climate change
- Article 6: biological diversity
- Article 7: sustainable forest management and trade in forest products
- Article 8: sustainable management of living marine resources and aquaculture products

Also, corporate social responsibility is noted, similar to the Singapore FTA. Promotion of CSR is stated to include the exchange of information and best practices, education and training and technical advice. The paragraph on CSR is the longest of the three agreements. In addition, CSR is listed as one of the fields of cooperation. Therefore, this agreement shows progress in the EU's objective to include provisions on sustainable development in its comprehensive bilateral FTAs. It is the EU's third FTA in Asia,[16] which has potentially made it possible for the EU side to learn from the two previous negotiations. According to an observer, it was interesting how quickly the FTA was negotiated, Vietnam being "aggressive" in pushing to clear the questions in the FTA negotiations.[17]

[14] Interview B.

[15] Interview E.

[16] The negotiations were launched in June 2012 and concluded in December 2015. The agreement text was published in February 2016, now being under legal review after which it needs to be ratified by the European Parliament (DG Trade 2018c).

[17] Interview E.

4.2 Implications for Businesses

We come up with three observations that are relevant for businesses: first, the EU's three Asian FTAs show an evolution towards more detailed references to sustainable development and CSR. Second, the topics are presented in relatively general terms, however, mostly referring to existing international conventions on environmental and labour issues. Third, there are no sanctions on the possible ignorance of the provisions by the parties. This makes the FTAs observant of the complex issues, but relatively powerless in executing any endorsements in case of misconduct.

For businesses, the implications are indirect, and might be visible in the long run through institutional changes in partner countries. Firms are guided by regulations at multiple scales (local, national and international), and the rules and practices affecting business conduct may be locality-specific and change slowly. Also the European Commission (2017) notes that the provisions on sustainable development are still unfamiliar for many of the EU's trade partners and thus challenging to implement. Institutional structures and monitoring practices are only being put into place; for example, the dispute settlement mechanism has not yet been used.

However, companies take part in the formulation of FTAs through industry associations lobbying for their interests in the preparation of FTAs.[18] Businesses also have a role in the monitoring of the implementation of FTAs. In the EU, this is organised through advisory groups, such as the Employers' Group of the European Economic and Social Committee that includes entrepreneurs and entrepreneur associations from industry, commerce, services and agriculture (EESC 2018). These provide arenas for interactions in trade policy where states and multinational firms may push for more transparent and consistent responsible trade practices that have a bearing on corporate decision-making.

5 Conclusion

References to sustainable development and responsible business have been gradually included in FTAs in the 2000s. We find an evolution in the EU's FTAs towards more explicit and detailed notions of sustainable development and CSR. The EU's first Asian FTA, with Korea, has

[18] Interview F.

relatively brief and vague clauses on sustainable development, whereas the second one with Singapore was more detailed and the third with Vietnam is the broadest and most explicit on both sustainable development and CSR. However, the implications for businesses are only indirect. This is because the EU's FTAs are not legally binding and therefore do not lead to sanctions in cases of misconduct. There are no direct consequences, such as extra tariff duties if labour or environmental provisions are not met. Instead of sanctioning, the EU has chosen a route of negotiating in case of possible disputes with trade partners on responsible business.

Our findings indicate, first, that the EU has been successful in reaching the objective of including sustainable development in its FTAs, having been among the leading proponents of the issue internationally. However, the EU is left with solving the problem of 'mixed agreements' within its own decision-making structure, as the issues of labour and environmental protection are partly under the national EU states and not the EU common trade policy. Second, Asian emerging economies are gradually accepting the clauses of sustainable development in bilateral FTAs, and thus, the agreements may serve as an *institutional push* to introduce formal rules and regulations (cf. Peng 2003; Puffer and McCarthy 2007) on labour and environment. Third, this increases the possibility of reaching a broader understanding on the issue in future multilateral trade negotiations, conforming to the idea of *multilateralizing regionalism* (Baldwin 2006, 2014). However, trade liberalisation needs to be complemented with policies addressing poverty in developing countries (Alvaredo et al. 2017; Milanovic 2016; Rodrik 2018; Stiglitz 2018) in order to achieve the core idea of sustainable development.

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CHAPTER 3

Control and Coordination of Chinese Subsidiaries in France

Johannes Schaaper and Ni Gao

Abstract France is nowadays an attractive country for Chinese investors. With their direct investments in France, Chinese companies pursue mainly market and asset seeking goals. However, Chinese often lack international experience, which makes performance of their subsidiaries in France difficult to achieve. Our research tries to understand how Chinese companies use coordination and control mechanisms to manage their subsidiaries. We held interviews with 17 managers in charge of Chinese subsidiaries in France. We find that Chinese companies use four main dimensions of coordination and control to manage their subsidiaries in France: (i) control through the share of capital in a subsidiary, with a clear preference for wholly-owned subsidiaries or large majority shares in joint ventures; (ii) decentralised decision-making to compensate for the lack of international experience of Chinese managers; (iii) formalisation of the subsidiary's organisation through a mix of reporting,

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ERP and written documents; and (iv) control by international human resources coming from the Chinese headquarters, including expatriates with rather observational roles and frequent short-term assignments.

Keywords Chinese foreign direct investment · France · Qualitative research · Management of subsidiaries · Control and coordination

1 Introduction

Chinese direct investments in France have been growing steadily for the last 10 years. In 2017, China was the second largest Asian investor in France, just behind Japan, with 65 investment projects creating 2234 jobs (Business France 2018). Among these projects, the investments of the major Chinese groups BYD (automobile and equipment manufacturer), MINYOUN (hotel and real estate) and Aviation Industry Corporation of China (AVIC) are the most prominent examples, due to the volume of investment and the numerous jobs that resulted from these investments.

Chinese companies appreciate the size of the French market, the quality of its transport infrastructure, its geographical localisation in Europe and innovative capabilities. Moreover, for 2017, France recorded a growth rate of 2% (INSEE 2018), which is the highest since 2011. For Chinese investors, France has become the second most attractive country in Europe behind Germany and ahead of the United Kingdom (Business France 2018).

Chinese companies pursue two main goals with their foreign direct investment (FDI) in France. The first motive is market-seeking, where Chinese companies want to increase their sales in French and European Union markets. Some Chinese companies are looking at the francophone West African markets, with which France has historical connections. Some Chinese companies also target entering specific protected European markets where direct access for Chinese companies is complicated, like the telecommunications sector, through establishing a subsidiary in France. The second FDI goal is strategic asset-seeking. Chinese firms acquire strategic assets, with the aim of enhancing their global competitiveness, including internationally recognised brands, industry-related technology, advanced production methods to upgrade their

industrial capacity and R&D and innovation capabilities to develop higher added-value products and services.

Chinese investors are aware of the difficulties of their internationalisation route in France. Chinese companies often lack international experience and are perceived as novices on the international scene, which makes the successful performance of Chinese subsidiaries abroad more difficult to achieve. Moreover, the relatively high cultural differences between France and China add difficulties to the management of Sino-French subsidiaries. Therefore, the headquarters-subsidiary relations between the parent company in China and its subsidiary in France are important, particularly with respect to the issues of coordination and control. In this chapter, we focus on the following questions: How do Chinese companies coordinate and maintain control over their subsidiaries in France? What are the means used by Chinese companies to ensure the most effective control?

To answer these questions, we first reviewed the literature on coordination and management control of subsidiaries abroad. We then conducted face-to-face interviews with managers of 17 Chinese subsidiaries located in France, which will be analysed. The structure of this chapter follows the same logic. The first part is devoted to the literature review, the second part details the data collection and analysis methodology and the third part discusses the results of our qualitative survey.

2 Coordination and Control of Subsidiaries Abroad: What Does Academic Literature Teach Us?

According to Mintzberg (1979), any organisation faces the complex issue of dividing labour into tasks and subtasks to support specialisation, and to plan the coordination of these tasks. An organisation can thus be defined as "the total sum of the ways in which its divides its labour into distinct tasks and then achieves coordination among them". In international management, coordination is a major and fundamental concern for companies (Martinez and Jarillo 1989). Mintzberg (1979) identifies six main mechanisms for coordinating work within an organisation: direct supervision, mutual adjustment, standardisation of work processes, standardisation of output, standardisation of skills and standardisation of norms, also called socialisation. These coordination mechanisms are the means to achieve a sufficient level of integration between different

divisions within the same organisation and to optimise overall operational performance.

Geringer and Hebert (1989) define control as "the process by which one entity influences, to varying degrees, the behaviour and output of another entity through the use of power, authority and a wide range of bureaucratic, cultural and informal mechanisms". They add that as organisations expand in size, they face increased complexity and differentiation in their structures, as well as the risk of conflict, opportunistic behaviour and competing goals between or within units. As a result, top management confronts the crucial need to monitor, coordinate and integrate the activities of the organisation's units.

Martinez and Jarillo (1989), studying coordination mechanisms in multinational corporations (MNCs) between 1953 and 1988, gather research into three main streams. The first concentrates on the organisational structure of multinational corporations, including their departmentalisation, international divisions and product and area or matrix organisations. The second stream focuses on decision-making centralisation, or autonomy, and bureaucratic control, which includes formalisation, standardisation and reporting. These first two streams focus on formal mechanisms, whereas a third stream investigates more subtle mechanisms, such as informal communication, transfer of managers, behavioural control, socialisation, expatriation, visits, networks of people and corporate culture.

Ghoshal and Nohria (1989), studying headquarters–subsidiary relations, find that the optimal fit between environmental contexts and subsidiaries requires a differentiated combination of three elements: centralisation of decision-making, formalisation (use of systematic decision-making rules and procedures) and normative integration based on consensus or shared values as bases for decision-making. Centralisation implies governance mechanisms in which the decision-making process is hierarchical, where headquarters (HQs) makes most crucial strategic and policy decisions. The level of centralisation reflects the degree of autonomy that HQs grant to subsidiaries to make decisions about their own strategies and policies. Formalisation is considered as routine decision-making and resource allocation, through manuals, standard procedures, rules and policies with monitoring to ensure that rules have not been violated. Normative integration leads to shared values. The main instruments of normative integration are the period of time

that subsidiary managers work at HQs, the presence of HQs mentors for subsidiary managers and the number of HQs visits to subsidiaries. Progressively, normative integration is referred to as socialisation, a designation that continues to be used widely in organisation theory.

Harzing and Noorderhaven (2006) acknowledge that Ghoshal and Nohria's (1989) triptych centralisation-formalisation-socialisation is relevant in the context of western MNCs in Asia, though they consider expatriation as a stand-alone complementary control dimension. Expatriation has had crucial influences on the development of western MNCs' businesses in Asia, and on the development of control systems (Harzing 2001; Jaussaud and Schaaper 2006). In international management literature, expatriation plays an important role in controlling foreign subsidiaries (Jaussaud et al. 2012). Western multinationals often send their own expatriates to manage subsidiaries abroad. They facilitate communication with the parent company and transmit central information. However, the high costs and frequent failures associated with expatriation have prompted MNCs to rely on both short-term assignments to subsidiaries in Asia (Bonache et al. 2010) and localisation of management positions (Schaaper et al. 2013).

During the last decade, new forms of control have emerged, especially worldwide Enterprise Resource Planning (ERP) and intensive travel. Introduced in the early 1990s, ERP systems support globalisation. They centralise control and standardise processes. ERP also makes real-time data available worldwide, which creates flexible and decentralised organisations. With a quantitative survey of 156 companies in China, Wang (2007) asserts that the deployment of ERP leads to flatter, more decentralised and standardised organisational structures.

The development of high-speed, global travel, as well as the progress in information and communication technologies, have changed the way people work, especially across national borders. International short-term assignments complement crucial but costly expatriation. The main purposes of short-term missions are to provide expert knowledge, solve technical problems, conduct audits, attend meetings and deliver training. They also complement expatriates in their control function and play an important role in circulating information throughout the network of subsidiaries (Tahvanainen et al. 2005).

Multinational companies use different control and coordination mechanisms to manage their subsidiaries abroad. Abundant research has shown the way western multinationals use control and coordination

dimensions to manage their subsidiaries in Asia. However, there is a dearth of research on "reverse international management", i.e. management of subsidiaries in developed countries owned by emerging countries multinationals. Our research goal is to understand how Chinese companies combine the different modes of coordination to better control their subsidiaries in France.

3 Empirical Methodology

The main purpose of this study is understanding how Chinese companies combine the different modes of coordination to exert control over their subsidiaries in France. Only a few empirical studies have explored this question (Shen and Edwards 2006; Fan et al. 2013; Wang et al. 2014). Therefore, we opted for qualitative interviews with, mostly Chinese, managers of Chinese subsidiaries established in France.

3.1 The Empirical Field Is France

France is a developed, industrialised country and an attractive destination for Chinese outward FDI. In 2017, France's GDP of 33,400 euro per capita is the 9th highest in Europe. With 66 million inhabitants, its total GDP of 2.5 billion euro is the third largest in Europe, after Germany (3.5 billion) and the UK (2.6 billion), and 6th largest worldwide. The French consumer market offers good opportunities for Chinese firms. Furthermore, France is located in the Western part of the European Union. It is bordered by the North and Mediterranean Seas and the Atlantic Ocean. The air, road, maritime and rail transport systems are highly developed. Its neighbouring countries, Belgium, Luxembourg, Germany, Switzerland, Spain and Italy and the UK (connected by tunnel), also offer very attractive consumer markets. Therefore, France is clearly a gateway to European markets. French firms have competitive advantages in many sectors, including aviation, nuclear power, chemical industries, medicine and agriculture. France's strong mathematics, physics, and engineering cultures lead to the creation of excellent research output and innovation centres, both public and private. According to the statistics of the World Intellectual Property Organisation (WIPO 2017), France ranks 6th worldwide in terms of international patents ownership. This has attracted the attention of Chinese companies, especially those looking for strategic assets.

Table 1 Sample characteristics

Case	*Founded*	*Ownership*	*Age years*	*Employees worldwide*	*Industry sector*	*Manufacturing/ trade service*	*Entry year France*	*Entry mode*	*Subsidiary capital structure*	*Employees in France*
C1	2006	SOE	9	1000	Consumer goods	Service	2012	M&A	IJV 70%/30%	15
C2	1997	SOE	18	30,000	Maritime transport	Service	1999	Green-field	100% China WOS	23
C3	1995	SOE	20	19,000	Real estate industry	Service	2012	Green-field	100% China WOS	6
C4	1996	Private	19	1400	Nuclear industry	Manufacturing	2013	M&A	100% China WOS	10
C5	2001	Private	14	4000	Wig manufacturing	Manufacturing	2012	Green-field	100% China WOS	20
C6	1988	Private	27	150,000	Telecommunications	Service	2003	Green-field	100% China WOS	650
C7	1955	SOE	60	16,000	Engine manufacturing	Manufacturing	2011	M&A	100% China WOS	100
C8	1996	Private	19	2500	Broadcasting and cable TV	Service	2009	Green-field	100% China WOS	5
C9	1996	Private	19	1200	Wolfberry processing	Manufacturing	2012	M&A	100% China WOS	20

(continued)

Table 1 Continued

Case	*Founded*	*Ownership*	*Age years*	*Employees worldwide*	*Industry sector*	*Manufacturing/ trade service*	*Entry year France*	*Entry mode*	*Subsidiary capital structure*	*Employees in France*
C10	2004	SOE	11	110,000	Chemical industry	Manufacturing	2006 2007	M&A M&A	100% China WOS IJV 80%/20%	3100
C11	1903	Private	112	28,000	Beer production	Manufacturing	1995	Green-field	100% China WOS	5
C12	1991	Private	24	10,000	Medical equipment	Manufacturing	2008	M&A	100% China WOS	47
C13	1946	SOE	69	55,000	Diesel manufacturing	Manufacturing	2009	M&A	100% China WOS	190
C14	1978	SOE	37	130,000	Steel manufacturing	Manufacturing	1995	M&A	100% China WOS	25
C15	1980	SOE	35	16,000	Service sector	Service	1992	Green-field	100% China WOS	20
C16	1961	SOE	54	130,000	Maritime transport	Service	1991	Green-field	100% China WOS	30
C17	2008	Private	7	100	Mining industry	Mining	2013	M&A	IJV 75%/25%	20

Notes SOE = state-owned enterprise, M&A = merger and acquisition, WOS = wholly-owned subsidiary, IJV = international joint venture. For the IJVs, the first percentage listed refers to the amount held by the Chinese partner, and the second percentage is the amount held by the French partner
Note also that Chinese enterprise (C10) conducted two acquisitions, in 2006 and 2007

3.2 *Sample of Chinese Subsidiaries in France*

Table 1 contains an overview of the face-to-face interviews we held with managers of 17 Chinese subsidiaries in France.

Our sample contains both state-owned enterprises (SOEs) and private companies, which invested in various industrial and service activities, including manufacturing, transport and services. This conforms with the classification by Rui and Yip (2008), which ranks Chinese acquisition firms in three categories: large SOEs, impelled by the Go Global policy, public share-issuing companies and private companies. Concerning the preferred entry mode, most of the investing Chinese companies use wholly-owned subsidiaries (WOSs) to settle in France (15 out of 18 cases), of which 8 are through greenfield investments and 7 are through merger-acquisitions (M&As). Three Chinese companies opted for an M&A through an international joint venture (IJV) with a local French partner. However, in the case of the IJVs, the Chinese partner holds a strong majority part of the IJV shares (70, 75 and 80%, respectively).

3.3 *Interviews*

To prepare for the interviews, we wrote a semi-structured interview guide in French and Chinese. The interview guide started with questions about the history of the MNC in its home country and their internationalisation in France. We then focused on the management of Chinese subsidiaries in France, asking the respondents to describe their expatriation and localisation policies, including the number of expatriates and local managers, their roles and management positions, the level of centralised decision-making, the use of formal control and informal control mechanisms. Again, we asked the respondents to explain in greater depth, where relevant, the reasons for their management practices. The interviews were held in 2015. They lasted between 45 minutes and 2.5 hours. Deliberately, we did not record the interviews, because doing so with the Chinese subordinate expatriates would have required permission from corporate hierarchies, which is difficult to obtain within Chinese corporate culture. Instead, during the interviews we took carefully handwritten notes and immediately after the meeting we fully wrote out the content of the interview. We sent back the written transcriptions to the interviewees and asked for their feedback and validation.

3.4 Data Analysis

The data analysis followed the qualitative methodology of Silverman (2006) and Miles and Huberman (1994). After the full transcription of the interviews, we distributed the text of the full transcription of the 17 interviews into a thematic content analysis grid, with one column per interview and one row per item on the interview questionnaire. Then, on the basis of our research questions and expectations, we drew up an initial list of pre-specified codes (numbers, keywords, short phrases) related to the different modes of coordination that companies use to exert control over subsidiaries. We reduced the fully transcribed interview grid, question by question and interview by interview (i.e. cell by cell) according to these pre-specified codes. Thus, we obtained a reduced content analysis grid. We also added some supplementary variables drawn from external secondary data sources, such as websites, trade directories and Chinese government investment agencies, which enabled us to understand how Chinese companies combine the modes of coordination to exert control over their subsidiaries in France. In relation to our research questions, we looked specifically, row by row, for similarities and contrasts between the interviewed Chinese companies. We finished the analysis with repeated readings of the interviews.

4 Results: How Chinese Companies Keep Control Over and Coordinate Their French Subsidiaries?

Chinese companies coordinate and exert control over their French subsidiaries by combining four main dimensions: control through the share of capital that the parent company owns in the subsidiary, control through decentralised decision-making for better local adaptation, control through formalisation of the subsidiary's organisation and control through international human resources which the Chinese parent company sends to their subsidiary in France.

4.1 Contractual Control Through the Share of Capital That the MNC Retains in a Subsidiary

Since the end of the 1990s, there is a real trend to use more often wholly-owned subsidiaries instead of international joint ventures as an entry mode, for several reasons. First, most sectors have been opened to full

foreign-owned investments. Second, WOSs offer better control, are easier to manage and induce less conflict than IJVs. Third, WOSs are less prone to leakage of sensitive know-how and allow better transfer of acquired technologies. However, in some cases IJVs still offer a good alternative solution. In particular, local partners might facilitate administrative procedures, are useful for developing local distribution or logistics networks and have deeper knowledge of local consumers' needs.

15 Chinese companies in our sample (C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16) have chosen the wholly-owned subsidiary as entry mode into France. Seven firms undertook a merger-acquisition of an existing French firm, whereas 8 firms entered through a greenfield investment, i.e. they created a new subsidiary. Three Chinese investments in France were undertaken with a local French partner, in the form of an IJV. However, in all three cases, the Chinese partner acquired a large majority share of the capital of the IJV. We see that Chinese firms in France prefer to invest while retaining a high share of the capital, 100% in most cases. The first reason for the preference for 100% acquisitions is that foreign investors in France are not obliged to join with a local partner in a joint venture, as is sometimes still the case for French investments in China, which allows them to fully acquire existing French firms. The second reason is related to the asset-seeking goal which several Chinese companies in our sample pursue. To accelerate the integration of the acquired assets, the best way to do so is to take full control over companies abroad. Seven companies in our sample (C4, C7, C9, C10, C12, C13, C14), which undertook 100% M&As of existing French firms, explained that they aimed to upgrade their technologies and knowledge. Full, 100% acquisitions allowed them not only to obtain patents, technologies and knowledge quickly, but also to integrate research and development teams, local managers and qualified employees.

Nine companies in our sample (C1, C4, C7, C9, C10, C12, C13, C14, C17) explained that they had only limited international experience. Consequently, they wanted to obtain knowledge in international management, but also knowledge about European consumer behaviour, marketing and international financing. Their full acquisitions in France enabled them to improve their management techniques and to transfer the best practices to the parent company in China.

Three Chinese companies (C1, C10, C17) chose the creation of an IJV, partnering with a French company, while taking a large majority

stake in the capital, respectively 70%, 80% and 75%. These majority stakes allowed the Chinese companies to reduce risk while benefitting from the knowledge of the French partner, including technical knowledge, local market knowledge and management skills.

Overall, we see that that the Chinese companies in our sample opt for either full control or large majority stakes in IJVs, to keep control over their French subsidiaries. This high control level enables the Chinese companies to access technologies, to acquire knowledge in France and to transfer this knowledge to the parent company in China, with the aim of improving its global competitiveness.

4.2 Control Through Decentralised Decision-Making

Centralisation means that decision-making is hierarchical, such that HQ makes most crucial strategic decisions, which subsidiaries have to execute. At the opposite end, autonomy or decentralisation means that subsidiaries can make decisions about their own strategies, without direct control from HQs. Our interviews show that about half of the strategic decisions, which engage the subsidiary for a long period, are centralised at the parent company level, while operational decisions, which are implemented at a day-to-day management level, are largely decentralised.

The main reason for Chinese companies to practise decentralised decision-making is that the Chinese managers do not have sufficient knowledge of French and European markets, which exhibit large cultural differences with the Chinese market. European consumer behaviour is different both in terms of preferences and purchasing habits. A lack of knowledge about these markets prevents Chinese HQs from making the right decisions. Therefore, decentralising decision-making especially in the field of marketing and HRM, allows Chinese companies to correctly adapt their strategy to the local consumer needs.

The decentralisation of decision-making provides advantages for the Chinese parent company. First, it enables Chinese companies to benefit from the knowledge of local managers and to quickly implement decisions. Second, the decision-making autonomy enjoyed by local managers creates a sense of belonging and trust between the Chinese parent company and the French subsidiary. This in turn reduces turnover of local managers. As such, the autonomy of local managers is an effective way for the Chinese parent company to learn from their managerial practices

and thus compensate for the international inexperience of Chinese managers.

4.3 Control by Formalising the Subsidiary's Organisation

Formalisation is routinised decision-making through rules and procedures. The Chinese companies in our sample put formalisation at the centre of their coordination and management control system, with the aim of better supervising and controlling the activities and operations of its subsidiaries in France.

All the 17 subsidiaries in our sample report frequently to their parent company in China, at least once a month. According to our interviewees, reporting facilitates communication between the parent company in China and the subsidiary in France and enables the HQs to measure the performance of their subsidiary. In the context of decentralised management, reporting also enables the Chinese HQs to verify that the subsidiary complies with its general rules. In addition to reporting, nine companies in our sample (C2, C4, C6, C7, C10, C12, C13, C15, C16) implemented an ERP with the aim of coordinating international operations, including production, inventories, accounting, purchasing and sales on the same central platform. ERPs allow Chinese HQs to standardise processes, to maintain a global overview and to optimise coordination and communication between subsidiaries and HQs. Seven companies (C1, C4, C5, C6, C8, C15, C16) in our sample stressed the importance of written standardisation of processes as it contributes to better coordination of work between the parent company in China and the subsidiary in France.

In short, in the context of the decentralised management practised by most Chinese companies in our sample, formalisation plays a complementary and necessary role in coordinating and controlling subsidiaries in France.

4.4 Control by International Human Resources

Sending expatriate managers to a foreign subsidiary helps to ensure that the way the subsidiary is managed is in line with the interests of the parent company (Belderbos and Heijltjes 2005). Expatriates, as such, can be considered as a mechanism of social control. Our interviews show that control by expatriation is relatively weak for Chinese companies

in France. Only nine of the seventeen subsidiaries in our sample have a Chinese Chief Executive Officer (CEO). This result is rather different from the French case in China, where French companies grant a central role to expatriates in their Chinese subsidiaries, and underline the importance of appointing an expatriate CEO (Schaaper et al. 2011).

In addition to a low level of expatriation, the Chinese companies in our sample frequently send assignees to their subsidiaries in France on a short-time basis. A short-term assignee is less costly and more flexible than expatriates while performing some of his or her functions (Mayerhofer et al. 2004). The short assignments practised by the companies in our sample are sometimes intended for high-level Chinese executives briefly visiting the French subsidiary. The duration of assignments varies greatly, depending on the company and the mission, but in our sample, this type of travel rarely exceeds 6 months. In most cases, Chinese assignees come to France alone, without their family, while keeping their main job in China.

The main purposes of short-term assignments are usually to set up projects, provide expert knowledge, support technical problem solving, conduct audits, deliver training courses and undertake negotiations and supervisory activities (Welch et al. 2007). Through their frequent travel, international short-term assignees also collect and transfer information and knowledge about foreign markets and operations through the subsidiary network of the MNC as well as between HQs and foreign subsidiaries. Moreover, sending managers and engineers on short-term assignments contributes to their personal managerial development and prepares them for future expatriation (Tahvanainen et al. 2005). Chinese companies confirm that short-term assignments can sometimes offer young Chinese executives the opportunity to work with French or European teams so that they gain international experience, preparing them for future expatriation.

5 Conclusion

The main objective of this research is to understand how Chinese companies use various coordination and control mechanisms to manage their subsidiaries in France and maintain control. In order to provide empirical answers to our research questions, we conducted 17 face-to-face interviews with managers in charge of Chinese subsidiaries in France. We note that Chinese companies use four main dimensions of coordination

and control to manage their subsidiaries in France: control through the share of the capital they retain in a subsidiary, control by decentralised decision-making, control by formalisation of the subsidiary's organisation and control by international human resources coming from the Chinese HQ.

Regarding the share of capital, Chinese companies have a clear preference for wholly-owned subsidiaries or a large majority share of the capital in case of a joint venture. This strong equity investment facilitates the acquisition and transfer of technology and knowledge to the parent company in China.

As regards control by centralisation, Chinese companies primarily decentralise and grant decision-making autonomy to local managers in order to compensate for the lack of international experience of Chinese managers. Such decentralisation allows Chinese companies to better meet the needs of local consumers. It also establishes a relationship of trust and cooperation with local French managers, which creates a sense of belonging, which strengthens long-term cooperation.

Formalisation is a central tool for Chinese companies to coordinate foreign activities and exert control over French subsidiaries. The Chinese companies in our sample formalise the relationship between HQs and the subsidiaries through a mix of reporting, integrated ERPs and written standards.

The Chinese companies do not intensively control their subsidiaries through expatriation. Expatriates have more observational roles. In addition, the Chinese HQs frequently send short-term assignees to their subsidiaries in France. This international HRM policy generates exchanges and communication between managers of the parent company and those of the subsidiary, with an emphasis on non-hierarchical information flows between managers. This allows them to share more informally the company's values and goals. It also allows Chinese managers to progressively gain international management experience.

Our research has limits. First, due to the small sample size, we cannot generalise our results to a broader context. The control and coordination mechanisms that Chinese companies implement in their subsidiaries abroad can also be radically different if the strategic objectives of the subsidiaries are not market-seeking or asset-seeking in developed countries, but the acquisition of natural resources, in Africa, or low-cost production, in Southeast Asian countries. In such cases, the Chinese control model and management style are probably different.

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CHAPTER 4

Understanding the Evolution of the World Trade Network: An Analytic Network Process Framework

Guoqin Zhao and Sam Dzever

Abstract This paper combines weighted and non-weighted networks to analyse the evolution of the world trade web for the period 1995 through 2013 (with a particular focus on China) deconstructing the most influential factors and related characteristics. The results show that the world trade web has a relatively high density and increasingly tighter structure indicating the existence of closer trade relationships. However, the web is still an extremely asymmetric network that is led by the main trading powers. Therefore, whether weighted or non-weighted the symmetric index of the world trade web fluctuation is around 0.1. Based on specific situations of countries in this web our research finds that most countries have relatively high trade partners and low trade intensity and that only a few countries show high trade disparity. And from fluctuation of correlation between related nodal indexes, countries

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with fewer trade partners tend to trade with countries with relative more trade partners. Meanwhile, countries with low trade intensity tend to trade with countries with high trade intensity. The feature of "disassortative-mating" and "rich club" still exists in this web which has no significant improvement compared with that in previous research. Moreover, the structure of "hub and spoke" becomes increasingly more obvious. Furthermore, analysis of influential factors shows that only the difference in foreign direct investment has a relatively larger impact on the world trade web structure among the major factors (e.g. exchange rates, inflation rate) affecting trade flows. At the same time an important finding of this research is that economic and trade organisation and regional trade agreements among different countries have significant influence on the world trade web. Geographical association, difference in foreign direct investment, economic and trade organisation and regional trade agreement association can explain 30.3% of the variation of the world trade web. Supported by these conclusions the following policy initiatives are suggested as the way forward for China: first of all, China needs to participate in global governance at a more deeper level. It is suggested that China not only obey and uphold international trade rules but also promote and lead the formation of trade rules. Through this mechanism China will be able to develop and maintain a multilevel trade system. Secondly, due to the significant influence of cooperation China needs to carry on internal mediation in APEC and promote FTAAP gradually in order to reduce negative impact caused by TPP. China should increase its regional trade agreements in the Asia-Pacific area through which it can establish its own "hub and spoke" structure. At the same time the "One Belt and One Road" strategy will help China transform political trust and economic complementarity to cooperation benefits for all its trading partners in the region.

Keywords World trade web · Economic and trade cooperation · Analytic network process framework · China

1 Introduction

Since the beginning of this century the structure of world trade network has changed significantly. On the one hand with the deceleration progress of global multilateral negotiations brought about in part by the

failure of the "Doha Round", regional economic integration has developed rapidly leading to regional trade agreements. Statistics from the World Trade Organization (WTO) show that the number of effective regional trade agreements within the framework of WTO/GATT has reached a total of 293. Since 2008 we have seen the conclusion of an average one new regional trade agreement each month. Trading powers are seeking more trade benefits through dominating regional trade agreements leading to the so-called Spaghetti Bowl effect. On the other hand fluctuations of market factors involving crude oil prices, gold prices, exchange rates and interest rates have become increasingly more frequent giving rise to structural changes in the world trade network. Despite these developments the traditional way of analyzing world trade that focuses on unilateral or bilateral trade flow is not likely to interpret sufficiently enough the structural changes caused by the rise of regional trade agreements and fluctuating market factors. Hence it becomes necessary to turn to the *analytic network process method* which provides a better basis for analyzing trade relations in order to better discern the tendencies and influential factors underlying the nature and extent of world trade networks. The objective of our research is to utilise analytic network process model in order to better explain the evolution of world trade networks.

2 Literature Review

Scholars who have studied trade patterns from a web perspective include Snyder and Kick (1979)who constructed an unweighted network with trade data from 1965 and analysed the core-periphery structures of 118 sample countries. Smith and White (1992) compare the change of core-periphery structures of unweighted international trade network in 1965, 1970 and 1980. With the development of complex network analysis techniques more researchers now apply this method to study world trade network. Li et al. (2003) have studied complexity and synchronicity of world trade network, and Serrano et al. (2007), Garlaschelli and Loffredo (2004) have found that world trade network countries with high nodes degree tend to have closer trade relations with countries with low nodes degree. Research by Bhattacharya et al. (2008) finds that the number of trading countries constituting half of world trade volume has reduced during the last few years. Fagiolo et al. (2010) study the difference between weighted network and unweighted network in dynamic

evolution. Tzekina et al. (2008) analyse community structure changes in the world trade network. Chen Yinfei (2011) discusses the impact of mortgage crisis on the world trade network utilising weighted and unweighted network method.

Apart from analyzing the world trade network structure, previous studies also focus on the related economic and social phenomena. Studies by Luis et al. (1991) and Kali et al. (2006) show that trading powers of high density always have higher economic growth rate through getting access to advanced technology, increasing market access and competition rate. Fagiolo et al. (2009) point out that countries of similar industrial strength tend to form network blocks. Benedictis and Tajoli (2008) find significant heterogeneity in choosing trade partners. Dai Zhuo (2012), through research into China-AFTA relations, suggests world trade network structure in addition to factors in traditional gravity model including national territorial area, income gap and the impact of financial crisis.

Overall, previous studies provide evidence and reference to this paper, but there is still room for improvement. In studying world trade network structure some researchers have adopted unweighted network leaving room for a deeper discussion. At the same time domestic research on China has focused primarily on trade patterns and China's status in international trade while less attention has been paid to the most influential factors in the evolution of trade networks. Some studies have attempted to add new variables in the gravity model but can hardly avoid multicollinearity. In view of this therefore the present research, which is based on previous studies, has attempted to observe the development of world trade network with both unweighted and weighted networks and discusses the factors influencing the world trade network structural change with QAP regression method.

3 The Evolution of World Trade Network from 1995 to 2013

3.1 Research Method and Data Processing

A network is a set of nodes and the nature of relationships that exist between the nodes. Due to differences between the strength of a relationship a network is divided into unweighted and weighted network,

the former reflecting the relationships between nodes and the topological characteristic of network, while the latter depicting more comprehensive and precise characteristics of a network by weighting relationship between the nodes. Our research, adopting both unweighted and weight networks, has attempted to study the evolution of world trade network. A total of 124 regions and countries within the framework of world leading trade organisations and effective regional trade agreements are chosen as samples. Bilateral import and export data and GDA (inflation factors excluded) during 1995–2013 derived from the databases of UNCTAD and the World Bank have been utilised.

In this paper, matrix A^t represents unweighted network in t period; matrix W^t represents weighted network in t period, $t=1995, 1996, 1997 \ldots 2013$. a_{ij}^t in A^t means if two countries have trade cooperation in t period (export from country i to country j or import of I from $j \neq 0$), $a_{ij}^t = 1$; Otherwise, $a_{ij}^t = 0$.

In weighted network W^t, w_{ij}^t is represented by import and export trade between i and j, specifically,

$$w_{ij}^t = \frac{1}{2}\left(\frac{e_{ij}^t}{GDP_i^t} + \frac{I_{ij}^t}{GDP_j^t}\right) \tag{1}$$

e_{ij}^t stands for export trade volume from i to j in period of t; I_{ij}^t stands for import trade volume of i from j in period of t; GDP_i^t stands for GDP of i in period of t; GDP_j^t stands for GDP of j in period of t. In order to make $w_{ij}^t \in [0, 1]$, according to Onnela et al. (2005), value of weighting matrix is divided by maximum value of W^t. But based on difference of statistical calibre, value of w_{ij}^t and w_{ji}^t is asymmetric. Therefore the processing method has no effect on analysis results.

3.2 *Results of the Analysis*

3.2.1 Fluctuation of Overall Network Attributes

In network analysis method network density, as one of the overall indices, is used to measure closeness between network nodes. Measurement method involves calculating the ratio between the number of actual relations of unweighted and undirected network and the possibly maximum number of relations. Network density of unweighted network matrix during 1995–2013 is shown in Fig. 1 (left). Since 1995, world trade

network density has increased, showing that more countries are joining the world trade system. However, due to the impact of the financial crisis, world trade network density has fluctuated a little since 2009.

Figure 1 depicts the fluctuation in the overall attributes of the world trade network. The left side of the figure represents network density fluctuation while the right side represents fluctuation in the symmetry index.

The overall attributes of world trade network include network symmetry index. Symmetry is a summary of the difference between two countries in bilateral trade. The concept was first proposed by Fagiolo et al. (2009) whose approach is to build matrix Q to describe the difference between W and W^T, that is:

$$q_{ij} = w_{ij} - (1 - w_{ij})I_n \tag{2}$$

I_n stands for $n \times n$ identity matrix; when $i \neq j, q_{ij} = w_{ij}$, hence

$$S(Q) = 1 - \frac{\sum_i \sum_j q_{ij} q_{ji}}{\sum_i \sum_j q_{ij}^2} \tag{3}$$

It can be inferred $S(Q) \in [0, 1]$ in Fig. 1 (right) that the symmetry index fluctuation of world trade network during 1995–2013 shows low symmetry of unweighted and weighted network of world trade during that period. Following the outbreak of subprime mortgage crisis the index picked up a little, indicating in the world trade network that the decline of core trade countries helps the balancing of trade status and world trade network symmetry.

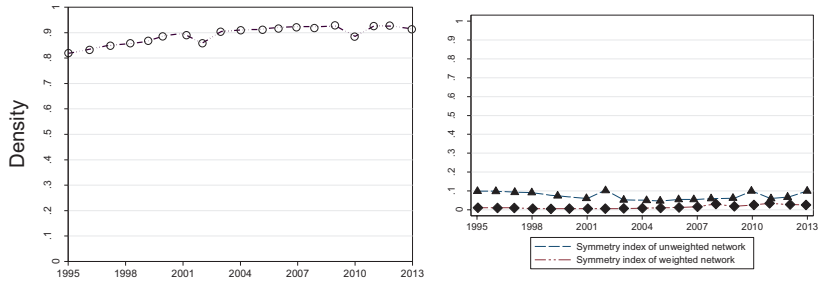

Fig. 1 Fluctuation in the overall attributes of world trade network for the period 1995–2013

3.2.2 Fluctuation of Nodes Attributes

Among the indices reflecting network nodes attributes, the most concern: nodes degree and average nearest-neighbour degree (ANND) of unweighted network, nodes strength, average nearest-neighbour strength (ANNS) and weighted average nearest-neighbour degree (WANND) of weighted network. In unweighted network nodes, degree refers to the number of nodes connected to one node. Accordingly, in world trade network, nodes degree of a country means the number of countries which have trade relationship with it. Its formula is:

$$d_i = \sum_j a_{ij} \tag{4}$$

It is found, through Kernel density estimation with data of countries nodes degree in 1995, 2004 and 2013 (left of Fig. 2), that during this period most countries have a large number of trading partners while few countries have a small number of trading partners; and on the other hand, the quantitative number of countries with few trading partners has fallen, demonstrating in a way, the closeness of world trade relationships.

The average nearest-neighbour degree of unweighted network measures the average degree of all nodes connected. In world trade network, the index refers to average nodes degree of a country's trade partners. Its calculating formula is:

$$ANND_i = \frac{1}{d_i} \sum_j a_{ij} d_i \tag{5}$$

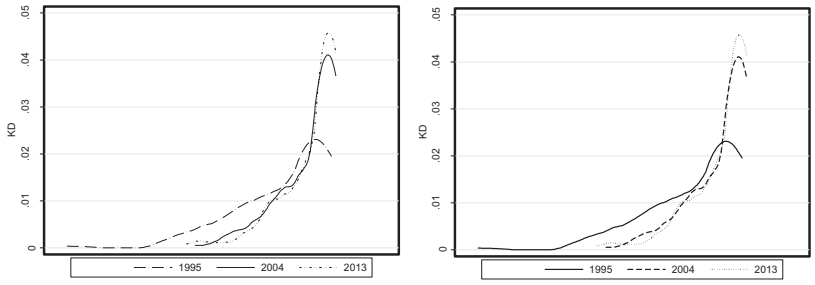

Fig. 2 Kernel density estimation of nodes degree and nodes strength of world trade network in 1995, 2004 and 2013: nodes degree (left), nodes strength (right)

In weighted and unweighted network nodes, degree corresponds to nodes strength, and the weight of network nodes. In the world trade network, nodes strength refers to the intensity of trade between a country and its trading partners. The calculating formula is as follows:

$$s_i = \sum_j w_{ij} \tag{6}$$

From the right of Fig. 2 it can be seen that most countries have low trade intensity and few have high trade intensity. Nodes strength Kernel density difference of the three years shows that the number of countries with low trade intensity has been declining indicating that the gap between trading powers and small trade countries has narrowed somehow but still remains significantly large.

The average nearest-neighbour degree corresponds to the average nearest-neighbour strength and weighted average nearest-neighbour degree. ANNS focuses on the average strength of a country's trading partners; WANND, based on ANND, is calculated with w_{ij}/s_i weight. WANND corresponds to a weighted average of a country's overall trading partners' nodes degrees. Their calculating formulas are:

$$ANNS_i = \frac{1}{d_i} \sum_j a_{ij} s_i \tag{7}$$

$$WANND_i = \frac{1}{s_i} \sum_j w_{ij} d_i \tag{8}$$

Figure 3 shows the fluctuation of ANND and WANND during 1995–2013. It can be easily seen that the two indices share similar change tendency and both are increasing. That the average value of WANND is higher than ANND shows that the higher-weight edge is associated with higher-connectivity nodes. In the world trade network this demonstrates that countries having greater trade strength tend to establish trading relationship with countries which have more trade partners.

In addition to the above indices, others such as difference index revealing edge weight distribution of connected nodes also reflect connectivity of nodes. In the world trade network it depicts whether a

country focuses on one trading partner or chooses a number of partners. Its calculating formula is as follows:

$$disparity_i = \frac{(N-1)\sum_j (\frac{w_{ij}}{s_i})^2 - 1}{N-2} \tag{9}$$

Clustering coefficient is another important connectivity index which measures the proportion of the possibly largest connecting number of nodes connected to one node. Weighted network clustering coefficient is calculated based on unweighted network clustering coefficient, according to Onnela et al. (2005):

$$WCC_i = \frac{\frac{1}{2}\sum_{j\neq i}\sum_{h\neq(i,j)} w_{ij}^{\frac{1}{3}} w_{ih}^{\frac{1}{3}} w_{jh}^{\frac{1}{3}}}{\frac{1}{2}d_i(d_i-1)} \tag{10}$$

From the left of Fig. 4 it can be seen that in most countries trade is highly dispersed while in a few countries trade is highly concentrated.

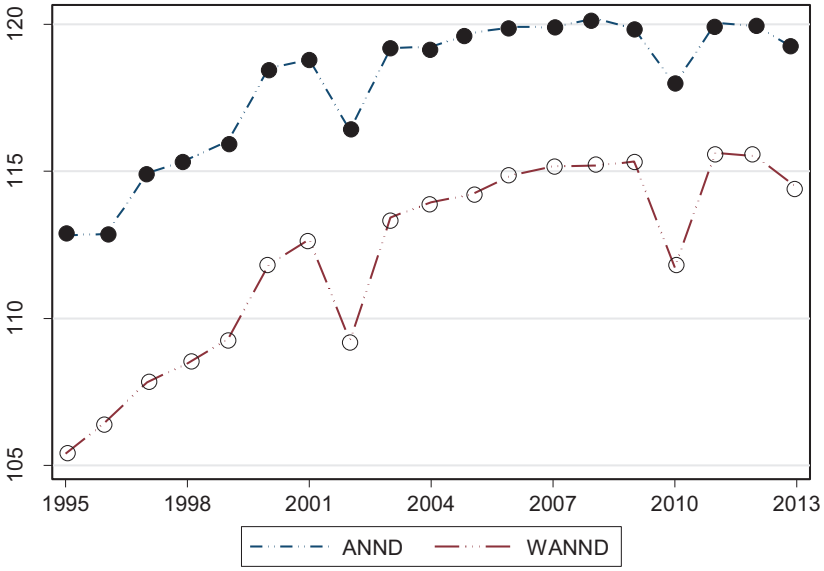

Fig. 3 Fluctuation in the average value of ANND and WANND during 1995–2013

Trade between countries tends to be dispersed. The right of Fig. 4 shows that most countries do not have frequent trading contacts with trading partners which means that a number of countries in the world trade network do serve as a trading bridge. However, with the average weighted clustering coefficient increasing, the number of bridges tends to be declining.

3.2.3 Fluctuation of Nodes Attributes Correlation

Another important perspective in studying the evolution of world trade network is the fluctuation of nodes attributes correlation. The left of Fig. 5 shows the fluctuation of correlation coefficient of three pairs during 1995–2013—i.e. nodes degree vs. nodes strength, nodes degree vs. difference and nodes strength vs. difference. It can be seen that some countries with high trade intensity do appear to have a large number of trading partners although this is not always the case. From the perspective of difference, the number of a country's trading partners and its trade intensity are negatively correlated to trading partner difference. Negative correlation is more pronounced in nodes degree. In the world trade network it means that countries with more trading partners show more significant difference than countries with higher trading intensity.

The left of Fig. 5 represents fluctuation of correlation coefficient between nodes degree and nodes strength, nodes degree and difference, nodes strength and difference; while the right of the figure represents fluctuation of correlation coefficient between nodes degree and ANND,

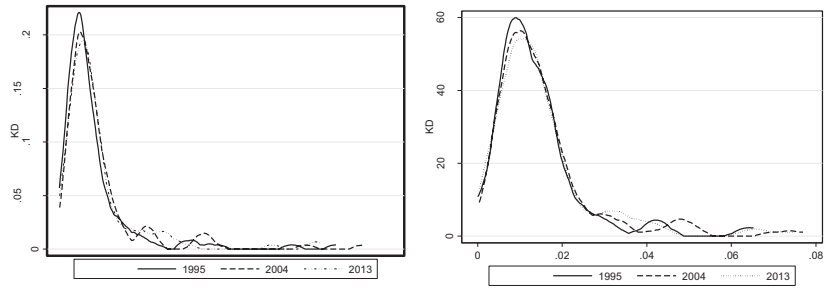

Fig. 4 Kernel density estimation of nodes difference and weighted network clustering coefficient of world trade network during 1995, 2004 and 2013: nodes difference (left), weighted network clustering coefficient (right)

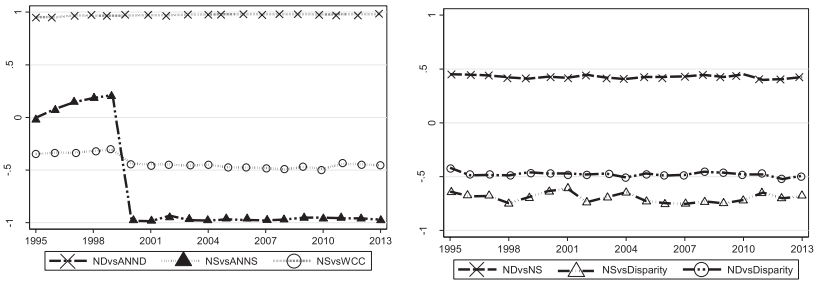

Fig. 5 Fluctuation in world trade network nodes attributes

nodes strength and ANNS, nodes strength and weighted clustering coefficient.

Figure 5 also shows the fluctuation of correlation coefficient between nodes degree and ANND, nodes strength and ANNS, nodes strength and weighted clustering coefficient during 1995–2013. It can be seen, in terms of nodes degree vs. ANND, that high-degree nodes tend to connect to low-degree nodes which becomes more pronounced since 2000.

In the world trade network it means that countries with more trading partners tend to establish trading relationship with countries with less trading partners. In regional trade the former serves as a "hub" within the hub and spoke structure; while the latter serves as spoke. The same is true for nodes strength vs. ANNS whose correlation coefficient fluctuates around −0.4 demonstrating high trade intensity of a number of countries and their trading partners. The above two correlation indices reflect network attribute of a negative match in world trade network. Correlation coefficient between nodes strength and weighted clustering coefficient remains steady around 1 which reflects a high weighted correlation coefficient of countries with high trade intensity which effectively explains the ever increasingly close trade relationship between trading powers.

4 Analysis of Influencing Factors of the World Trade Network Evolution Using QAP Method

4.1 Model Specification, Analytical Method and Data Processing

Previous research, through the study of fluctuation of trading conditions, discuss how the evolution of the world trade network gives rise to the

change in the benefits of trade between countries, indicating that the influential factors of trading conditions may also have significant impact on the evolution of the world trade network. Previous research into the world trade network have proposed important influencing factors of trading conditions which include: the level of economic development, the rate of customs duties and the exchange rate of a country.

In our research, PGDP excluding inflation effect (*pgdp*), weighted average tariff rate (*wtr*) of all merchandise, inflation rate (*ir*), foreign direct investment (*fdi*), real effective exchange rate (*reer*) and High-technology Exports as Percentage of Manufactured Exports (*eht*) are chosen as alternative explanatory variables. Data from the World Bank WDI database, UNCTAD database and EIU Country database constitute the basis of our analysis. Given that trading partners mostly come from the same trading organisations or regional trade agreements, we propose that factors influencing the world trade network also should include: geographic relativity (*gr*) and cooperating organisations or regional trade agreement correlation. Our model for explaining this is as follows:

$$W = f(pgdp, tfp, wtr, ir, fdi, reer, eht, gr, or) \tag{11}$$

The variable W in formula (11) is a matrix of calculated relational data of formula (1). Because variables also serve as a matrix form data, difference value of three pairs of variables (*pgdp, wtr, ir, fdi, reer, eht*) is calculated as a matrix of the variables. Construction method of *gr* is as follows: if two countries are located on the same continent their corresponding matrix element value is 1, otherwise 0 and thus a two-value symmetric matrix is set up. *Or* has two meanings: first, if two parties are members of the same cooperation organisation or regional trade agreement, matrix element value is 1, otherwise 0 and variables matrix is *ora*. Second, in the framework of the world trade network the number of times two parties in one cooperating organisation or regional trade agreement is chosen as element value of the corresponding matrix, a multi-value variables matrix *orb* is then set up. The year 2012, whose data is relatively new and complete, is chosen as the sample year. Also, to remove the influence of incomplete data on the result of the analysis, among 124 countries and regions, the top 100 in total volume of export and import trade in 2012 are chosen as samples giving rise to the final sample size of 84.

Explanatory and explained variables in formula (11) contain relational data. Generally, relation test cannot be finalised with regular method.

Due to significant correlation between variables, regular test method may result in multicollinearity in parameter estimation, enlarging standard deviation and causing meaningless variables significance testing. In our research, Quadratic Assignment Procedure (QAP), a nonparametric method not requiring mutual independence of independent variables, is chosen as a test method due to its steadiness in processing relational data (Barnett 2007). Two main steps are included: the first is to identify correlation of dependent and independent variables and then remove insignificant independent variables; the second is to identify standard regression coefficient of each variable matrix and then observe its explanatory power.

4.2 QAP Correlation Analysis

In QAP correlation analysis, based on matrix permutation, correlation coefficient is produced through comparing similarity of elements in two matrixes and then a nonparametric test on correlation coefficient is conducted. Correlativity between world trade network and alternative influencing factors is analysed through the QAP method.

The result of 5000 times of random permutations is shown in Table 1. Actual correlation coefficient is calculated based on the value of two matrices. The average correlation coefficient is calculated based on the 5000 times of random permutations. Maximum and minimum value is the maximum and minimum value of correlation coefficient through random calculation. $P \geq 0$ indicates the rate of correlation coefficient through random calculation which is greater than or equal to actual correlation coefficient; $P \leq 0$ indicates the rate of correlation coefficient through random calculation which is less than or equal to actual correlation coefficient.

The result of our analysis shows that there is significant correlation between world trade network W and trade organisation and its geographic location which is consistent with hypothesis. The result of correlation test of trade correlation matrix and attributes data matrix shows that *tfp, ir, fdi, reer and eht* are significant at the level of 5%, *pgdp* at 10%, while *wtr* does not have significant correlation with world trade network matrix. These variable matrices, however, do not have high actual correlation coefficient except *fdi*.

Putting aside *pgdp, wtr, tfp, ir, reer and eht* and conducting QAP correlation analysis (Table 2) on other four individual variable matrixes, it

Table 1 QAP correlation analysis result of world trade network matrix *W* and other influencing factors

Variables	*Actual correlation coefficient*	*Significance level*	*Average correlation coefficient*	*Standard derivation*	*Minimum value*	*Maximum value*	$P \geq 0$	$P \leq 0$
pgdp	0.070	0.063	−0.001	0.042	−0.109	0.173	0.063	0.937
wtr	−0.049	0.117	0.001	0.043	−0.128	0.197	0.883	0.117
tfp	−0.044	0.041	−0.000	0.046	−0.075	0.273	0.960	0.041
ir	−0.062	0.040	−0.001	0.042	−0.106	0.219	0.960	0.004
fdi	0.297	0.000	−0.000	0.042	−0.090	0.253	0.000	1.000
reer	−0.044	0.044	0.001	0.047	−0.075	0.267	0.956	0.044
eht	0.095	0.025	−0.001	0.042	−0.112	0.195	0.025	0.975
gr	0.220	0.000	−0.001	0.017	−0.062	0.064	0.000	1.000
ora	0.219	0.000	0.000	0.018	−0.061	0.0769	0.000	1.000
orb	0.215	0.000	−0.000	0.018	−0.055	0.082	0.000	1.000

Table 2 QAP correlation analysis result of influencing factors

Variables matrix	*fdi*	*gr*	*ora*	*orb*
fdi	1.000			
	(0.000)			
gr	0.000	1.000		
	(0.389)	(0.000)		
ora	0.000	0.459	1.000	
	(0.395)	(0.000)	(0.000)	
orb	0.000	0.443	0.927	1.000
	(0.134)	(0.000)	(0.000)	(0.000)

Table 3 Result of model fitting

R^2	*Adjusted* R^2	*Probability*	*Sample size*
0.303	0.303	0.000	6972

can be seen that three variable matrices show high and significant correlation. These may have overlapping influence on the world trade network and the problem of multicollinearity should be avoided.

4.3 QAP Regression Analysis

The purpose of QAP regression analysis is to study regression relationship between multiple matrices and a single matrix, and to evaluate the significance of determination coefficient R^2. Due to the large sample size, 5000 times random permutations are conducted and the result of the analysis is shown in Tables 3 and 4. Adjusted determination coefficient R^2 in Table 3 is 0.303 meaning that the four matrix variables can explain 30.3% of the variation in the world trade network matrix relationship. Here, probability refers to probability of determining the coefficient of random permutation no less than that which is actually observed—i.e. the probability of one-tailed test. The value 0 means the adjusted coefficient R^2 is significant at the level of 1%. Sample size 6970 refers to observed value of 84 cortege matrix excluding diagonals.

Table 4 shows regression coefficient and test index of variable matrix through QAP regression analysis. Probability 1 refers to probability of regression coefficient of random permutation no less than that which is actually observed; Probability 2 refers to probability of regression coefficient of random permutation no more than that which is actually observed; regression coefficient of *fdi* difference is significant at the

Table 4 Regression coefficient and test index of variable matrix through QAP regression analysis

Variables	*Nonstandard regression coefficient*	*Standard regression coefficient*	*Significance probability value*	*Probability 1*	*Probability 2*
intercept	0.008294	0.000000			
fdi	0.000000	0.297125	0.000	0.000	1.000
gr	0.004934	0.125279	0.073	0.073	0.927
ora	0.006155	0.153534	0.040	0.040	0.960
orb	0.004476	0.140769	0.090	0.090	0.910

level of 1% reflecting the increasing integration of trade and investment. Geography-related matrix *gr* is significant under the level of 10%. The "first come" trade relations conforms to anticipation. As to the two relation matrices reflecting trade organisation cooperation and regional trade agreement cooperation, two-value matrix is more powerful and significant than multi-value matrix.

5 Conclusions and Implications

Our research, which adopts network analysis method and QAP, discusses the evolution of the world trade network and its influencing factors.

Its conclusions are as follows:

1. The world trade network is highly dense and increasingly close, reflecting increasing trade contact between trading countries. However, in a highly asymmetric network dominated by trading powers, no matter weighted or unweighted, symmetric index of the world trade network fluctuates around 0.1. Most countries have a large number of trading partners and low trade intensity. The gap in trade is large in few countries. Correlation fluctuation of indices shows that countries with fewer trade partners tend to establish trading relations with countries with more trade partners. Countries with high trade intensity always have trade partners with average low intensity. Compared to previous studies (Serrano et al. 2007), the characteristic of negative match is reflected in the degree and strength of trading nodes which has not improved in recent years. A few countries in the world trade network

meanwhile boast a large number of connections, hence the "rich man's club" phenomenon proposed by Saramaki et al. (2007) has not changed much.

2. Analysis of the most influencing factors on global trade shows that difference in FDI (among other important influencing factors such as, for example, exchange rate and inflation rate) on trade flows has significant influence on the world trade network. Along with the rapid pace of the world economy and trade integration, capacity will become more important in measuring comprehensive national power of a country and international competitiveness of an enterprise. Foreign investment flows in a country will drive import and export industry whose development will bring about more foreign investment, creating a beneficial economic recycle. Our research finds that cooperation between trading organisations and regional trade agreements between countries have significant influence on the structure of the world trade network. Geographical correlation, differences in FDI, and cooperation among trading organisations can explain 30.3% of world trade network.

The implications of the above conclusions as far as China is concerned is that first it should be deeply involved in global economic governance. Since joining the WTO China's core status in the world trade network has been vigorously promoted with positive effects on regional trade and economic growth. But at the same time frictions in trade have also increased considerably. Therefore, on the one hand China should adhere to, and stand up for, international trading rules and on the other actively promote and lead the way in the development of equitable international trading rules, as well as protect and contribute to the development of a more diverse and multi-level trading system.

Secondly, China should explore new regional cooperation opportunities. The cooperation frequency and range of trade organisation and regional trade agreement have significant impact on the international status of a country. While embracing and promoting regional cooperation, China also faces pressure from traditional trading powers. Transpacific Partnership Agreement (TPP) framework represented by developed countries will not give up world trade leadership. Therefore, the Chinese government should, on the one hand, push ahead with Free Trade Agreement of the Asia Pacific (FTAAP) under the framework of APEC in order to reduce the negative effect of being excluded

from TPP. And on the other hand, the government should, based on geopolitics, actively promote bilateral free trade agreements among its Asia-Pacific trading partners and build the "hub-spoke" framework with China at its core and push forward the Belt and Road Initiative in order to transform mutual political trust, geographic proximity and economic complementarity into mutual benefits of trade cooperation. Finally, the Chinese government should attach great importance to substitute and complementary relationship between trade and investment and build a bidirectional capital flow model of attracting foreign investment and globalisation.

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PART II

International Trade, Agriculture, Food Supply and Sustainable Development

CHAPTER 5

EU Enlargement: The Impact on Agricultural and Food Exports from Selected Asian Countries to the EU Market—A Gravity Approach

Utai Uprasen and M. Bruna Zolin

Abstract The process of EU economic integration took place gradually. The 5th enlargement in 2004 was the largest expansion of the EU. It affected the agricultural sector notably due to the economic structure of the new members from Central and Eastern Europe. This chapter aims to examine the effect of the 5th enlargement on exports of agricultural and food products from 8 major Asian countries towards the EU market. The refined gravity model is employed, using annual data during 1999–2015 with 12 product groups. The empirical findings reveal that the total exports of agricultural and food products from Hong Kong and Korea reduce, whereas exports from Indonesia increase. There was no significant change in exports of total agricultural products and food

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from China, India, Japan, Malaysia and Thailand. However, changes in exports of certain products in various countries are found.

Keywords European Union · Economic integration · EU enlargement · Agricultural and food exports · Asia

1 Introduction

The European Economic Community (EEC) was set up with the Treaty of Rome in 1957. Its underlying objective, namely the creation of conditions for the stability and prosperity of EU citizens, was ambitious and affected by the consequences of WWII. The Common Agricultural Policy (CAP), introduced in 1962, is one of the oldest policies adopted by the EU and is heavily anchored in the European integration project. Even if the CAP has been amended several times, the most important reforms were those in 1992 and 2003. In 1992, support prices were cut and in 2003, the majority of all direct payments from production were decoupled.

The current EU comprises 28 members. The 2004 enlargement (the fifth enlargement) was the biggest expansion of the EU. It incorporated 12 countries, ten of them, from Central and Eastern Europe. Agriculture represented heated issue at the negotiation phase, due to its extent and to the profound differences existing in the agricultural sector of the new and old member states (Bach et al. 2000). As a consequence, the CAP was dramatically reformed.

The process of economic integration took place gradually. In 1986, the Single European Act, signed by 12 European countries, provided the basis for a vast six-year programme aimed at sorting out the problems with the free flow of trade across EU borders and thus creating the 'Single Market'. Over the years, the EU has sought to strengthen its role in the international context, not only in economic terms but also with regard to the different geopolitical areas (Josling et al. 1998). Starting with these premises, the article aims to examine the effect of the enlargement on exports of agricultural and food products from some selected Asian countries towards the EU market. In this study, EU countries with a population of less than 5 million have not been considered.[1]

[1]The EU countries analysed are Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Spain, Sweden and the United Kingdom.

The selected Asian countries are China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia and Thailand. We could not include Vietnam, because the data series needed to feed the model was not available. Our research redefines the gravity model of Yang and Martinez-Zarzoso (2014). Data from about 38 countries (20 EU member states, 8 Asian countries and 10 of the EU's main trade partners such as the USA, Brazil, Russia, Switzerland, Norway, Turkey, Canada, Argentina, Australia and South Africa) cover the period 1999–2015.

2 Literature Review

Trade creation and trade diversion emanating from economic integration induce changes in trade patterns among the member states and between member and non-member countries (Viner 1950). The existing literature on the subject can be grouped into two categories: *ex-ante* and *ex-post* analysis. Herok and Lotze (2000) analysed the impact of the fifth enlargement by focusing on agriculture under the Computable General Equilibrium (CGE) model. They predicted that imports of food products from the EU15 to Central Eastern Europe (CEE) countries would have increased drastically in 2005, while imports of agricultural and food products from Third-World countries into the new member states would have reduced. Similarly, Frandsen et al. (2003) demonstrated that the domestic price supported payments and production, which in turn distorted international trade leading to adverse effects on the developing countries' export capacity. In addition, Bartošová et al. (2007), using data available for the period 1996–2005, asserted that accession to the EU would increase exports of agricultural products from CEE countries towards the EU15 by between 60 and 200%. Moving on to ex-post analyses, the effects of EU enlargement from 1985 to 2000 on agricultural trade creation and diversion for 6 major agri-food products were analysed by Sarker and Jayasinghe (2007), using a gravity model. The results suggested that the EU members traded more with each other than they did with non-members as far as the following products were concerned: red meats, vegetables, grains, fruits, and sugar. In addition,

We included Ireland as a whole considering North Ireland and the Republic of Ireland together.

the results also showed that for five of the six commodities mentioned, the EU had reduced its openness to trade with the rest of the world. However, in their study, the dependent variable in the equation is total bilateral trade. This imposes an equality constraint on the coefficients of exports and imports, which may not be reasonable. Sun and Reed (2010) employed the export of agricultural products as a dependent variable in their research. Using data available between 1993 and 2007, the findings indicated that significant trade creation existed. The EU15 and EU25 increased intra-trade between member states by 71.6% and 56.8%, respectively. With regard to trade diversion, exports to external, non-members EU15 countries lowered by 6.8%, while the imports from the non-EU15 countries reduced by 8.6%. The limitation is that the time span is not long enough to scrutinise trade creation and trade diversion in the EU25. Romania and Bulgaria were excluded from the study.

3 Methodology

3.1 The Model

The gravity model is a widely used approach when analysing the trade effects of economic integration. By transposing Newton's law of gravitation to the area of international economics, the first gravity model was developed by Tinbergen in 1962 (Tinbergen 1962). Anderson (1979) was the first to develop a theoretical foundation of the gravity model. More recently, a theoretically based log-linear gravity equation had been derived (Anderson and van Wincoop 2003). The gravity model of Yang and Martinez-Zarzoso (2014) has been adopted in our study. Nonetheless, we have refined their research firstly by considering the effects of changes in the exchange rate on country exports, given that the theory of international trade establishes the relationship between exports and currency values. The depreciation of domestic currency generally boosts exports and vice versa resulting in currency appreciation. In addition, it has been argued that one of the reasons why a certain country, such as China, shows high export values is because of its artificially low currency values (Auboin and Ruta 2011). Since China is one of the EU's major trade partners, omitting exchange rates from the model is likely to render a misleading interpretation of the majority of the changes in exports. Secondly, while they have used aggregate trade data, we have focused on the sectoral level of agricultural products and food.

The model examines the trade effect on selected 8 Asian countries from total 38 studied countries by augmenting with relevant dummy variables.

Since data at the sectoral level usually contain multiple zero values of trade flows, we tackle this problem by adopting the fixed effects of the Poisson Pseudo Maximum Likelihood approach (FE-PPML)[2] as the main estimation method in our study (Santos Silva and Tenreyo 2006), provided that there is no consensus on a standard method for solving the problem of zero trade flows (Santos Silva and Tenreyo 2009). Our equation is reported in the Appendix. The equation illustrates that exports are determined by using the standard variables of the gravity equation such as GDP, population, distance and the exchange rate. To capture the effects of EU enlargement on exports, the binary dummy variables are included in the equation.

Accordingly, the expected sign of the resulting coefficient estimates can be described as follows. The coefficient of the multiplication of the GDP is expected to be positive, as the GDP variable is a proxy for country size. The anticipated sign of the coefficient from the multiplicative population term is negative since it implies the self-sufficiency of the respective country pairs. According to Frankel (1997), a country with a sizeable population can count on larger natural resources and wider domestic market.

Therefore, it is less dependent on imports. On the other hand, high consumption reduces the quantity of products available for export. Consequently, a country with a large population is less dependent on international trade. Geographical distance remains intrinsic to transport costs. Hence, it is expected to give a negative coefficient estimate. The exchange rate in our equation is quoted as exporter currency per currency of trade partner. A depreciation of the exporter's currency against the currency of the importer is associated with an increase in exporter exports. Therefore, the real exchange rate and exports are presumed to have a positive relationship. As for the coefficients of the binary dummy variables, having the same language and sharing a common border generally facilitates trade between countries. Consequently, they are also presumed to give positive coefficient estimates. The predicted signs of the three dummy variables which indicate the changes in exports within the EU and between the EU and the non-EU countries

[2]The reason is that it still gives a robust result although heteroscedasticity is present in the estimation. In addition, the fixed effects method is employed to check for the multilateral resistance terms (Anderson and van Wincoop 2003).

($d\ eu\_exp\_eu_{eit}$, $d\ eu\_exp\_non_{eit}$ *and* $d\ non\_exp\_eu_{eit}$) are uncertain. The expected signs of coefficients that indicate the impact of the fifth EU enlargement on exports from eight Asian countries to the EU are uncertain. This is because the reduction of trade barriers between the EU member states may induce the level of intra-bloc trade and therefore reduce the trade volume *vis-à-vis* the Asian countries. Conversely, EU enlargement expands the export market for Asian nations. Hence, the net effect on Asia depends on these two factors.

3.2 Data

The panel dataset, based on a 12-month period, covers agricultural products, using the EU definition and the Standard International Trade Classification (SITC) Rev. 3 categories. The analysis involves 12 groups of agricultural products and food (Table 1). For simplicity, the new name of each product group is defined in the last column of Table 1.

The data for exports (in 1000 USD) were obtained from the UN Comtrade database. The statistics concerning gross domestic product (GDP at 2010 constant price, USD) and population size were

Table 1 Analysed agricultural and food products

Group	*Description SITC codes*	*SITC codes*	*Product*
1	Live animals, meat, dairy products	00, 01, 02	Live animals
2	Fish, crustaceans and molluscs	03	Seafood
3	Cereal and cereal preparations	04	Cereals
4	Vegetables and fruits	05	Vegetables and fruits
5	Sugars and preparations and honey	06	Sugars
6	Coffee, tea, cocoa and spices	07	Colonial products
7	Animal feedstuffs and miscellaneous edible products	08, 09	Feedstuffs
8	Beverages and tobacco	1	Beverages and tobacco
9	Fur skins, natural rubber, fibre, silk, cotton and wool	21, 231, 261, 263, 264, 265, 268	Textile fibres
10	Oil-seeds and oleaginous fruits and animal and vegetable oils	22, 4	Animal and vegetable oils
11	Cork and wood	24	Woody plants
12	Animal and vegetable raw materials	29	Animal and vegetable materials

compiled by the World Bank World Development Indicators. The real exchange rate series were constructed using the nominal exchange rate values from the Penn World Table (PWT) and data on countries' consumer price indices (CPI), obtained from the International Monetary Fund's International Financial Statistics (IFS). Distance in kilometres is the weighted distance measure, which was acquired from the French Institute for Research on the International Economy (CEPII). The dummy variables for language similarity and common borders were also extracted from the CEPII databases.

4 Empirical Results

4.1 Standard Variables of Gravity Equation

The empirical results reveal that most of the fundamental variables produce the sign predicted by the gravity model with the value of R^2 ranges from 0.50 to 0.80 across industries. The multiplication of GDP of exporters and importers has a positive effect on the exports of total agricultural products and all 12 of the studied product groups. A 1% increase in the multiplication of GDP raises exports of total agricultural products by 1.06%. The coefficients from 12 product groups lie between 0.70 and 1.43%. The coefficient estimate of the population variable is −0.95 for total agricultural exports. They are negatively significant in 7 product groups.

Turning to the impacts of the real exchange rate, only 2 of the product groups studied show a significant effect on exports bearing the expected signs. Generally, a 1% increase in real exchange rate increases the exports of aggregated agricultural products by 0.09%. The estimated coefficients from our model indicate that trade costs, proxied by distance, are completely in line with the prediction of the model. All 12 product groups together with the total agricultural exports show the significant negative signs. Findings assert that increases in trade costs reduce exports in general. The coefficients of dummy variables of language similarity and common borders also give the sign expected. While the exports of 10 product groups give significant positive coefficients for language similarity, all 12 product groups show the significant positive effects from the common border variable. The same effect is also found in total agricultural exports. The coefficients of three dummy variables indicate that the process of European economic integration has

expanded trade among member states but has had no significant effect on trade with non-EU countries. The further estimation details can be obtained from the authors upon request.

4.2 *The Impact on Exports of the Selected Asian Countries*

Asia has become the world's most dynamic region in international trade and the European Union is one of the most important partners for Asian countries (Abler et al. 2009).

Besides Japan (Fig. 1), the total trade between the EU and Asian countries has increased over time, especially in the case of China. The eight selected Asian countries hold approximately 17% of extra-EU total trade in agricultural and food products.

The effects of the enlargement on exports can be examined through the coefficients of dummy variables of eight Asian countries (γ_1 to γ_8 in the gravity equation). The percentage change in exports is calculated and presented in Table 2.

The empirical results indicate that only 3 out of 8 countries receive a significant impact on the exports of total agricultural products to the EU market. Hong Kong and Korea exports of total agricultural products reduced by −0.49 and −0.30%, respectively. Conversely, the total exports of agricultural products from Indonesia to the EU increased by 0.26% after the EU enlargement. There was no significant change in exports of total agricultural products from China, India, Japan, Malaysia and Thailand. However, the analysis at a product group level reveals

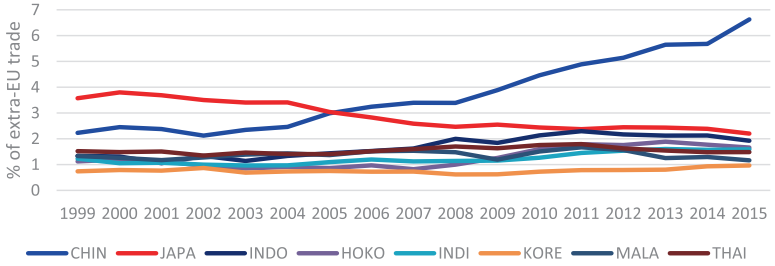

Fig. 1 The EU's agricultural trade with major Asian countries during 1999–2015 (*Source* Author's calculations based on data from the UN Comtrade database)

Table 2 The percentage changes on exports from selected Asian countries to the EU market

Product	*China*	*Hong Kong*	*India*	*Indonesia*	*Japan*	*Korea*	*Malaysia*	*Thailand*
Live animals	−0.58	3.14 (a)	−0.37	−0.53 (c)	−0.30	0.08	−0.08	0.08
	(0.56)	(0.37)	(0.36)	(0.43)	(0.25)	(0.28)	(0.21)	(0.38)
Seafood	0.22	−0.83 (a)	−0.10	−0.24	−0.13	−0.45 (a)	−0.73 (a)	0.01
	(0.17)	(0.18)	(0.16)	(0.17)	(0.38)	(0.16)	(0.20)	(0.11)
Cereals	−0.49	−0.59 (a)	0.21	−0.41 (b)	−0.44 (a)	0.63 (b)	0.34	0.22
	(0.42)	(0.22)	(0.21)	(0.23)	(0.20)	(0.25)	(0.23)	(0.16)
Vegetables and fruits	−0.19	−0.57 (a)	−0.25 (a)	−0.23	−0.14	2.22 (a)	−0.37 (a)	−0.51 (a)
	(0.13)	(0.17)	(0.10)	(0.21)	(0.13)	(0.25)	(0.11)	(0.19)
Sugars	−0.10	−0.69 (b)	−0.21	−0.01	−0.06	−0.61 (a)	−0.20	0.68 (b)
	(0.31)	(0.51)	(0.34)	(0.39)	(0.42)	(0.35)	(0.41)	(0.21)
Colonial products	−0.15	−0.78 (a)	−0.42 (a)	−0.39 (a)	−0.14	0.12	−0.35 (c)	−0.32
	(0.21)	(0.18)	(0.17)	(0.18)	(0.14)	(0.71)	(0.24)	(0.59)
Feedstuffs	0.43 (b)	−0.54 (a)	1.32	0.57 (b)	0.03	0.34 (b)	−0.18	1.27 (a)
	(0.16)	(0.09)	(0.59)	(0.18)	(0.21)	(0.13)	(0.33)	(0.17)
Beverages and tobacco	−0.13	−0.30 (b)	0.30	−0.21	1.44 (a)	0.25	−0.50	−0.08
	(0.37)	(0.16)	(0.31)	(0.26)	(0.26)	(0.37)	(0.48)	(0.20)
Textile fibres	0.06	−1.00 (a)	3.71 (a)	3.44 (a)	−0.27	−0.21	1.53 (a)	1.89 (a)
	(0.20)	(0.62)	(0.17)	(0.18)	(0.66)	(0.55)	(0.19)	(0.14)
Animal and vegetable oils	−0.56 (a)	0.48	0.12	1.14 (a)	−0.06	0.82	0.57 (a)	14.33 (a)
	(0.26)	(0.38)	(0.15)	(0.26)	(0.21)	(0.76)	(0.17)	(0.45)
Woody plants	1.39 (a)	−1.00 (a)	1.41 (b)	0.88 (b)	−0.80 (a)	2.56 (c)	−0.24 (c)	−0.37 (b)
	(0.28)	(1.01)	(0.44)	(0.27)	(0.23)	(0.69)	(0.14)	(0.21)
Animal and vegetable materials	−0.21	−0.65	−0.20	−0.11	−0.04	−0.21	−0.01	0.02
	(0.16)	(0.75)	(0.16)	(0.13)	(0.37)	(0.19)	(0.26)	(0.22)
Total agricultural products	0.05	−0.49 (a)	−0.03	0.26 (c)	−0.16	−0.30 (a)	0.05	0.03
	(0.09)	(0.06)	(0.09)	(0.11)	(0.11)	(0.07)	(0.09)	(0.09)

Note 1. Statistical significance is denoted as (a), (b), (c) for 1, 5 and 10%, respectively
2. Percentage changes in exports = exp (coefficient) − 1, where coefficient is the value of γ_1 to γ_8 in gravity equation
3. Numbers in parentheses are standard errors of the corresponding obtained coefficients

that EU integration generated changes in exports of certain products in various countries, as follows.

China: while the enlargement decreased the exports of animal and vegetable oils by −0.56%, it boosted the exports of feedstuffs by 0.43%. In addition, the exports of woody plants increased by 1.39%. Since the three product groups affected accounted for only 12.54% of total exports of agricultural products to the EU market, the impact of the enlargement on aggregate agricultural exports is not significant.

Hong Kong: most exports from Hong Kong to the EU decreased. The findings reveal that exports of 9 product groups declined after the fifth EU integration, namely seafood, cereals, vegetables and fruits, sugars, colonial products, feedstuffs, beverages and tobacco, textile fibres and woody plants. These 9 product groups constitute 92% of total exports of agricultural products to the EU. Feedstuffs, which alone accounts for 73.53% of agricultural products, reduced by −0.54%.

India: in contrast to Hong Kong, EU enlargement did not affect the majority of exports of agricultural products from India to the EU market. Empirical findings show that no significant impact was detected in 8 of the studied groups (live animals, seafood, cereals, sugars, feedstuffs, beverages and tobacco, animal and vegetable oils and animal and vegetable materials), which represented 62.22% of total agricultural exports from India to the EU. Nonetheless, the exports of two important product groups, vegetables and fruits and colonial products, reduced by −0.25 and −0.42%, respectively. In contrast, two product groups saw exports rise: textile fibres and woody plants. However, neither of them are India's key exports to EU countries.

Indonesia: the exports of 3 product groups (live animals, cereals and colonial products) decreased, whereas 4 product groups (feedstuffs, textile fibres, animal and vegetable oils, woody plants) increased exports from Indonesia to the EU market. Animal and vegetable oils, which is the largest exporting product group (representing 52.33% of total exports in agricultural products), grew by 1.14% after EU integration.

Japan: empirical results reveal that the exports of just 3 product groups, which constitute 14.63% of agricultural exports, were affected by EU integration. While exports of beverages and tobacco improved by 1.44%, exports of cereals and woody plants shrank by −0.44 and −0.80%, respectively.

Korea: the reduction in exports of total agricultural products from Korea to the EU following the fifth enlargement was mainly due to

declines in seafood exports (−0.45%) since it alone accounted for 52.89% of total agricultural exports. A decrease in exports is also registered in sugars, while there is a rise in exports of cereals, vegetables and fruits, feedstuffs and woody plants. Nonetheless, the export share of these 4 product groups is only 23.12% of total agricultural exports.

Malaysia: the findings indicate that exports of 2 product groups, animal and vegetable oils and textile fibres increased, whereas the exports of vegetables and fruit declined. Exports of animal and vegetable oils, which represented the majority share (56.76%) of agricultural exports, expanded by 0.57%. There were also reductions in exports of the other 3 product groups: seafood, colonial products and woody plants (−0.73, −0.35 and −0.24%, respectively).

Thailand: the exports of 6 product groups, representing 57.03% of total agricultural exports to the EU, were not affected by EU enlargement. However, exports of vegetables and fruits, and woody plants declined by −0.51 and −0.37%, respectively. On the other hand, exports of the other 4 product groups increased after the enlargement of the EU, namely sugars, feedstuffs, textile fibres and animal and vegetable oils.

5 Concluding Remarks

Our research findings are presented as follows. Significant effects of enlargement on exports of total agricultural product exports from Asian countries to the EU market are found in 3 out of 8 countries. While both Hong Kong and Korea experienced a reduction in exports, Indonesia's exports of total agricultural products increased. A product group analysis reveals that China was more or less unaffected, with the exception of higher exports of woody plants. The EU's fifth enlargement did not significantly impact India and Japan with 8 out of 12 groups unaffected. The decline in Hong Kong's exports is present in 9 product groups, while Korea's decline was mostly due to reductions in seafood exports. By contrast, the rise in exports of animal and vegetable oils, which constitute 52.33% of the country's total agricultural product exports, was the major contributing factor of increased total agricultural exports from Indonesia to the EU. Malaysia is in a similar position. Exports of animal and vegetable oils, which represent the largest share (56.76%) of total agricultural exports to the EU, increased significantly after enlargement. Although there was no major impact of the enlargement on Thailand's total agricultural exports, the country was

still affected by the reduction of exports of vegetables and fruit. In general, this analysis shows that the process of European economic integration has expanded trade among member states but has had no significant effect on trade with Asian countries with regard to agricultural and food products.

It should be added that the chapter does not take into account the effects that the signing of any free trade agreement has produced in trade between the EU and the selected Asian countries. This is the case of Korea, which in 2011 signed an agreement with the EU. The issue requires further in-depth research.

Appendix

The gravity equation:

$$\begin{aligned}\ln(x_{eit}) = {} & \beta_0 + \beta_1 \ln(gdp_{et} * gdp_{it}) + \beta_2 \ln(pop_{et} * pop_{it}) + \beta_3 \ln dist_{ei} + \beta_4 \ln exc_{eit} \\ & + \beta_5\, d\, lang_{ei} + \beta_6\, d\, border_{ei} + \delta_1\, d\, eu\_exp\_eu_{eit} + \delta_2\, d\, eu\_exp\_non_{eit} \\ & + \delta_3\, d\, non\_exp\_eu_{eit} + \gamma_1\, d\, cn_{eit} + \gamma_2\, d\, hk_{eit} + \gamma_3\, d\, ind_{eit} + \gamma_4\, d\, ido_{eit} \\ & + \gamma_5\, d\, jp_{eit} + \gamma_6\, d\, kr_{eit} + \gamma_7\, d\, my_{eit} + \gamma_8\, d\, th_{eit} + \varepsilon_{eit}\end{aligned}$$

where

x_{iet} = exports from country e (exporter) to i (importer) in period t

$gdp_{et} * gdp_{it}$ = product of the countries' GDPs in period t

$pop_{et} * pop_{it}$ = product of the countries' populations in period t

$dist_{ei}$ = distance between country e and i

exc_{eit} = real exchange rate between country r and i in period t

$d\, lang_{ei}$ = dummy variable of language similarity, it equals to 1 if country e and country i use the same official language, otherwise 0

$d\, border_{ei}$ = dummy variable of common border, it equals to 1 if country e and country i share a common border, otherwise 0

$d\, eu\_exp\_eu_{eit}$ = dummy variable of trade effects, it equals to 1 if both countries e and i belong to the EU since 2004, otherwise 0

$d\, eu\_exp\_non_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e belongs to the EU and importer i does not since 2004, otherwise 0

$d\, non\_exp\_eu_{eit}$ = dummy variable of trade effects, it equals to 1 if importer i belongs to the EU and exporter e does not since 2004, otherwise 0

$d\,cn_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is China and importer i belongs to the EU since 2004, otherwise 0
$d\,hk_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is Hong Kong and importer i belongs to the EU since 2004, otherwise 0
$d\,ind_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is India and importer i belongs to the EU since 2004, otherwise 0
$d\,ido_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is Indonesia and importer i belongs to the EU since 2004, otherwise 0
$d\,jp_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is Japan and importer i belongs to the EU since 2004, otherwise 0
$d\,kr_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is Korea and importer i belongs to the EU since 2004, otherwise 0
$d\,my_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is Malaysia and importer i belongs to the EU since 2004, otherwise 0
$d\,th_{eit}$ = dummy variable of trade effects, it equals to 1 if exporter e is Thailand and importer i belongs to the EU since 2004, otherwise 0
ε_{eit} = error term

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CHAPTER 6

Asian Palm Oil Production and European Vegetable Oil Market: What Can We Learn in Terms of Sustainability?

Deborah Bentivoglio, Adele Finco, Giorgia Bucci and M. Bruna Zolin

Abstract Palm oil production has had an extraordinary evolution since 2000, especially in Southeast Asian countries. Its profitability is related to lower market prices due to it having the cheapest production costs, compared to the other EU oils. Market forces have stimulated its production and trade, with a shift in the use of land in tropical countries (particularly in Southeast Asia). Palm oil has a high smoke point for its saturated fatty acid content, which is much healthier than the performance of conventional oils produced and used in Europe (corn, sunflower and peanut oil). The controversy of which palm oil has been the subject is linked to the environmental sustainability aspects of the production process. According to the European Commission, palm oil cultivation over

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the past 20 years has been the cause of 20% of global deforestation. However, our results highlighted that the price trends of selected vegetable oils are related to their variations. This allows the advancing of some hypotheses. On the supply side, the production costs (decisively in favour of palm oil) and the environmental constraints are affecting the vegetable oil market. On the demand side, the number and price, on the one hand of substitute products, and on the other hand of the complementary good as well as consumer taste and preference, all influence consumer behaviour. Consumer income and its distribution and, in both cases, public policies affect the various choices to be made. Public action should therefore consider these variables. A single policy may not be sufficient to steer the market in the right direction, especially in the logic of market globalisation.

Keywords Vegetable oils · Palm oil · Rapeseed oil · Soybean oil · Asia · Europe · Price cointegration · Sustainability

1 Introduction

Palm oil (botanical classification *Eleaeis guineensis*) comes from the fruit of the oil palm tree, a tropical species that originated in West Africa, but now grows as a hybrid in many parts of the world, including Southeast Asia and Central America. Palm oil cultivation has a very different structure compared to the other main vegetable oils due to investments in plantations. The productive life of a plant is about 20–30 years and it starts to produce fruit only after 30 months. The plant, to grow and be productive, needs a tropical climate.

Palm fruit contains two types of oil: palm oil, which comes from the mesocarp or the fleshy part of the fruit, and palm kernel oil, which comes from the seed in the fruit. Finally, the shells that remain after the kernel oil has been extracted are called palm kernel shells. Palm oil is the highest oil yield crop, producing on average about 4–5 tonnes of oil/ha annually; this is 10 times more than soybean and 5 times more than rapeseed (Koh and Wilcove 2007; Fitzherbert et al. 2008; Sumathi et al. 2008; Corley 2009; McCarthy and Cramb 2009; Wilcove and Koh 2010; Castiblanco et al. 2013; Pirker et al. 2016). As raw material, it is used both for the food and non-food industry. Processed palm oil is important for the preparation of cosmetics, food, lubricants and fuels.

According to the USDA (2017), about half of the packaged products in supermarkets contain this oil. Direct palm oil competitors are soybean and rapeseed. Among edible oils, palm oil accounts for about 40% of all vegetable oils.

Given the substitutability of palm oil and its low cost, compared to other vegetable oils, the EU over the years has increased the use of this oil. Consequently, Europe is now a leading importer of palm oil.

In the existing literature, several studies have analysed vegetable oil price relationships (Yu et al. 2006; Campiche et al. 2007; Zhang and Reed 2008; Harri et al. 2009; Peri and Baldi 2010; Zhang et al. 2010; Esmaeili and Shokoohi 2011; Natanelov et al. 2011; Sanders et al. 2014; Rezitis 2015; Bentivoglio et al. 2018).

Starting from these premises, the paper aims to present and analyse the European vegetable oil market focusing on the role played by palm oil, a strategic commodity for some Southeast Asian countries. Moreover, this study seeks to explore the presence of cointegration linkages between palm oil and other selected vegetable oil prices. Because vegetable oil prices tend to move closely with one another, price differentiations (even if small) are sufficient to move preferences in international markets.

To achieve these aims, the paper is structured as follows. Section 2 presents an overview of the palm oil sector at world level (production, consumption and trade). Section 3 shows the EU vegetable oil market and trends. After a brief review on palm oil sustainability included in Sect. 4, details of the data used, the methodology and the results on price relationships are discussed in Sect. 5. The conclusions drawn from the study are presented in the final section.

2 Palm Oil Production, Consumption and Trade

According to USDA FAS data (2017), the global production of palm oil accounted for 34% of all vegetable oil in 2016, followed by soybean (29%), rapeseed (15%) and sunflower oils (9%). Global palm oil production has grown from 18 million tonnes in 1996 to 67 million tonnes in 2017, an increase of 273%.

Currently, Indonesia (54%) and Malaysia (31%), together, account for around 85% of global palm oil production. However, there has also been a remarkable increase in palm oil production in other parts of the world,

Table 1 Top five palm oil producers (2017)

Top 5 palm oil producers in 1000 tonnes	
Indonesia	36,000
Malaysia	21,000
Thailand	2200
Colombia	1320
Nigeria	970

Source Authors' elaboration on Index Mundi data (2017a)

namely, Thailand (about 2.2 million tonnes), Columbia (about 1.3 million tonnes) and Nigeria (about 1 million tonnes) (Table 1).

A significant change in the palm oil market took place during the past decade, when, in 2005 Indonesia surpassed Malaysia in the production of palm oil, becoming in 2006–2008 the world's leading producer (Fig. 1).

Indonesian production has more than doubled from 2006 to 2017 (+117%) while in Malaysia palm oil production grew more than 37% over the same period.

From the supply side, the availability of land in Indonesia has allowed this country to become the top producer (USDA 2007). The harvested area of palm oil in Indonesia increased from 5.2 million hectares in 2006 to 9.3 million hectares in 2017 (+78%). In Malaysia, the harvested area of palm oil increased from 3.7 million hectares to 5.2 million hectares over the same period (+40%).

The growth of production and the expansion of the palm oil area coincides with the increase in palm oil trade. In 2017, palm oil made up 33% of global total vegetable oil consumption, ahead of soybean (30%), rapeseed (16%) and sunflower oil (9%); global consumption rose from 17 million tonnes in 1996 to 63 million tonnes in 2017, making it the most consumed oil in the world (Fig. 2).

Global insecurity, high oil prices from non-renewable sources, political instability of the main suppliers and exporters of oil, and concerns about climate change, have increased the demand for renewable energy worldwide and, more markedly, in emerging Asian countries. However, India and China have also increased their use of non-renewable energy. China, in particular, as a strategic goal, aims to improve the energy efficiency of motor vehicles. Moreover, according to FAO forecasts (2012), by 2020 the global demand for palm oil will double and triple by 2050.

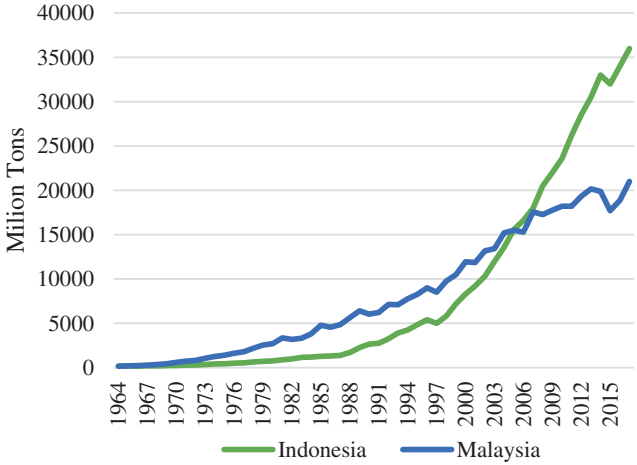

Fig. 1 Malaysian and Indonesian palm oil production (1964–2017) (*Source* Authors' elaboration on Index Mundi data 2017a)

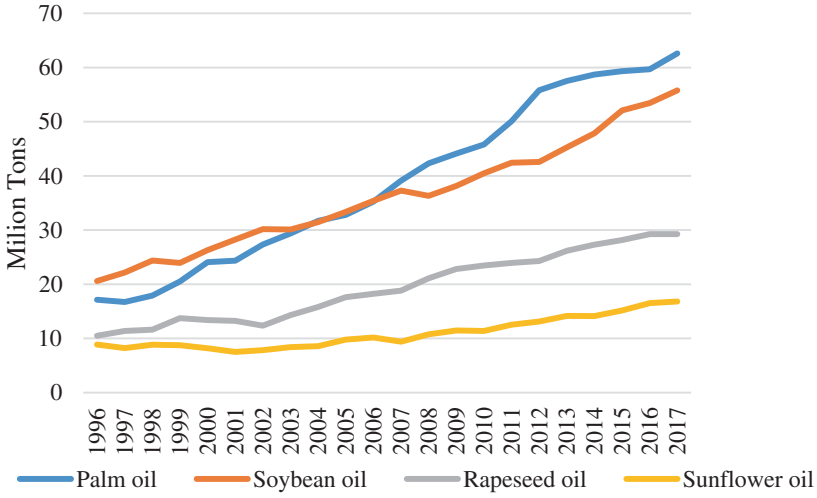

Fig. 2 Word consumption of vegetable oil (1996–2017) (*Source* Authors' elaboration on USDA FAS data 2017)

Table 2 Top five palm oil exporters and importers in 2017 (1000 tonnes)

Exporters		*Importers*	
Indonesia	26,200	India	9400
Malaysia	17,300	EU-27	6500
Guatemala	700	China	4900
Benin	570	Pakistan	3100
Papua New Guinea	550	Bangladesh	1600

Source Authors' elaboration on Index Mundi (2017b, c)

Palm oil is also the most traded vegetable oil in the world. As shown in Table 2, Indonesia and Malaysia are the largest palm oil exporters by far, and imports involve many different countries. More specifically, India, the EU and China are the biggest purchasers of Malaysian and Indonesian palm oil (55% of global imports).

3 European Vegetable Oil Production, Consumption and Trade

Over 2000–2016, European countries increased their production of vegetable oils by 86%, from 9.1 to 16.9 million tonnes (Fig. 3).

The EU is the world's largest producer of rapeseed oil. According to FEDIOL data, in 2016, European production of rapeseed oil accounted for 62% of all vegetable oils, followed by sunflower (18%) and soybean oil (16%). Specifically, since 2000 rapeseed oil production has increased substantially compared to other vegetable oils. Germany and France are the two largest producers of rapeseed in the EU, followed by Spain and Poland. The main driver of the demand for rapeseed oil is the biodiesel industry but food and industrial use of rapeseed oil also influence demand (USDA 2016a, b).

Rapeseed oil is also the main vegetable oil consumed in the EU (Fig. 4). In 2016, the consumption of rapeseed oil accounted for 41% of all vegetable oils, followed by palm oil (26%) and sunflower oil (17%). The consumption of rapeseed oil between 2000 and 2016 had a constant positive trend.

In the EU, palm oil plays an important role as a feedstock for energy (61%), especially for biodiesel, as edible oil for food (34%) and for non-food products, as animal feed and for industrial use (5%). From 2010 to 2014 palm oil used for non-energy purposes (for example, food, animal feed, etc.) declined, while palm oil consumption for energy (transport,

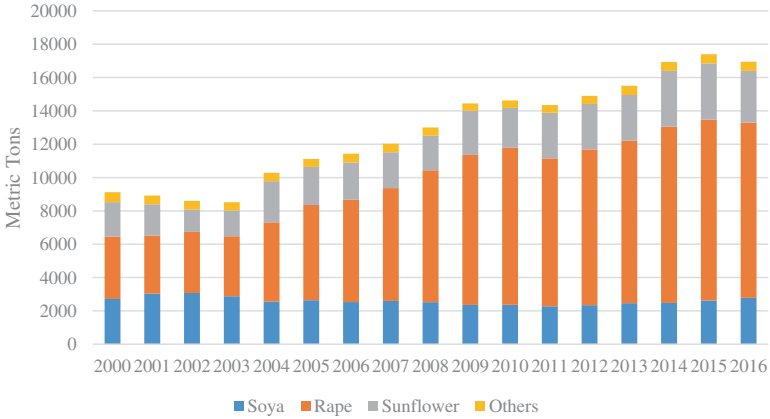

Fig. 3 Production of vegetable oil in the EU (2000–2016) (*Source* Authors' elaboration on FEDIOL data 2017)

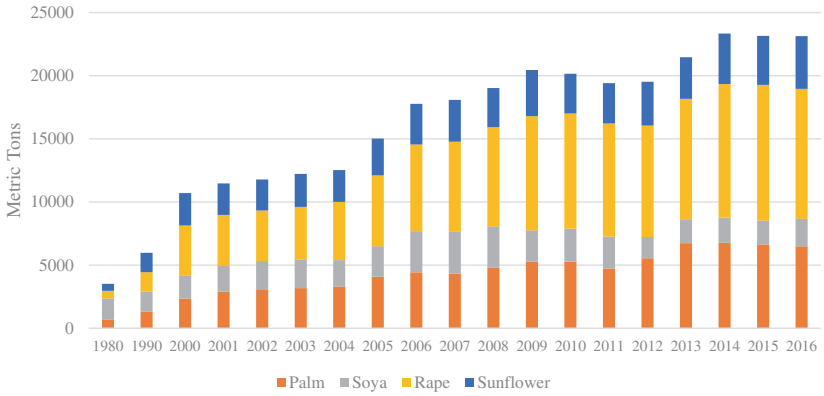

Fig. 4 Consumption of vegetable oil in the EU (2000–2016) (*Source* Authors' elaboration on FEDIOL data 2017)

electricity generation and heating) increased. The European vegetable oil demand is only partially satisfied by domestic rapeseed production and thus the EU largely depends on palm oil imports. Palm oil makes up the majority of the vegetable oils imported into Europe (70%). Europe's demand for palm oil increased from 2.5 million tonnes in 2000 to 6.7 million tonnes in 2015 (+168%).

4 Palm Oil Sustainability: An Overview

Palm oil production is a divisive issue. The arguments against range from protection of the environment and biodiversity (mainly due to deforestation), and food security and safety. The most visible change, caused by intensive oil palms plantations, is the huge loss of natural forests (FAO 2010). The main concerns are deforestation methods blamed for decreased biodiversity; changes to the consumption patterns and local population employment opportunities; greenhouse gas emissions and the destruction of endangered species (orangutans, Sumatra tiger, elephants, etc.). The cheapest way to clear land is to slash and burn and burning produces pollution. In response to consumer pressure, an increasing number of food industries have adopted prohibitions on the use in food of palm oil derived from plantations that occupy former forests. The growth in production, however, continues although at less high growth rates.

The Indonesian and Malaysian lands are rich in carbon. When forestlands are drained and burned, they release coal and methane gases into the atmosphere causing an increase in emissions and endangering the health of local populations. Deforestation also hampers human rights as plantation owners use forced labour and subcontract land under onerous conditions to local populations. The Indonesian Government has adopted some limitations on crop production and expansion and has promoted the reclamation of some over-exploited areas. The Malaysian government is considering the same measures.

At international level, the Roundtable on Sustainable Palm Oil (RSPO), a multi-stakeholder and not-for-profit initiative of the palm oil industry was set up in 2004. Producers, non-governmental organisations and other stakeholders, aiming at minimising the negative impact of oil palm cultivation on the environment, on local communities and on consumer choices, are part of the RSPO.[1] More specifically, consumer goods companies make up 46% of the members, producers and processers 33%, growers 11%, retailers 4%, NGOs and banks 4% (RSPO 2016). Some well-known global companies are members of the RSPO, such as,

[1]The RSPO is composed of 2941 members from 85 countries whose membership covers the entire supply chain: oil palm producers, processors or traders, consumer goods manufacturers, retailers, banks/investors, environmental, and social non-governmental organisations.

Unilever, IKEA, Ferrero and Nestlé while processors, such as, Wilmar, Sinarmas and Golden Agri Resources are also members.

Producers obtain sustainable palm oil certification if the following principles are applied (RSPO 2016):

1. *Commitment to Transparency*: growers and processors have to provide information and documentation on environmental, social and legal issues to stakeholders.
2. *Compliance with Applicable Laws and Regulations*: the member companies must comply with all local, national and international laws and/or regulations; prove their right to use the land where the plantation is located as well as compliance with local people user rights.
3. *Commitment to Long-term Economic and Financial Viability*: **the member companies must furnish** a management plan clearly explaining how the goal of long-term economic and financial viability is to be achieved.
4. *Use of Appropriate Best Practices by Growers and Processors*: operating procedures must be documented, implemented and monitored. The practices have to maintain soil fertility, minimise the degradation of soils and maintain water quality and availability. Companies must adopt appropriate integrated pest management approaches and have workers, smallholders and contract workers appropriately trained.
5. *Environmental Responsibility and Conservation of Natural Resources and Biodiversity*: the companies have to mitigate the negative and boost the positive impacts of the palm oil industry while demonstrating continuous improvements in their operations. Endangered species living in the plantations must be identified and their survival ensured, waste reduced, recycled, or reused and fossil fuel usage reduced and renewable energy usage optimised. The use of burning must be avoided for preparing land or replanting.
6. *Responsible Consideration of Employees and of Individuals and Communities Affected by Growers and Processors*: companies must adopt open and transparent methods of communication between growers, processors and local communities. Customary or user rights must be respected. Salaries and conditions for employees and for contract workers have to meet, at a minimum, legal or industry standards and must be sufficient to provide decent living wages.

The employer must respect the rights of personnel to form and join trade unions, and to prohibit the use of child labour. Growers and processors must deal fairly and transparently with smallholders and their labour forces.

7. *Responsible Development of New Plantings*: before establishing new plantations or expanding existing ones, a social and environmental impact assessment must be provided.
8. *Commitment to Continual Improvement in Key Areas of Activity*: growers and processors should implement action plans that allow demonstrable continuous improvement in key operations.

Despite RSPO's worthy goals, in 2016, only 21% of the total global production was estimated to be RSPO compliant: in Indonesia, the RSPO certified area is only 1.8 million hectares in a planted area of more than 11 million hectares (RSPO 2016).

5 Vegetable Oil Prices Relationship

Within the existent economic literature, the approachess used to study price relationships follow different conceptual frameworks (Bakhat and Würzburg 2013). In this study, we applied time series models to estimate the dynamic relationships between vegetable oil prices (Myers 1992; Balbás et al. 2005; Taylor 2008; Anderson 2011; Asari et al. 2011; Bentivoglio et al. 2014, 2016; Chatfield 2016).

Different characteristics are relevant to implement a time series model: the presence of stochastic trend (unit roots) and cointegration. Firstly, unit root tests are tools for discriminating between non-stationary (presence of stochastic trend) and stationary (presence of deterministic trend) time series. Secondly, cointegration tests are useful to test if time series tend to move together over time (cointegration). In this study, we applied the standard augmented Dickey–Fuller test (1979) (ADF) to determine whether vegetable oil price series are stationary or not. The ADF test is one of the best-known and most widely used unit root tests (Im et al. 2003; Saghaian 2010; Fedorová 2016). This tests considers as null hypothesis H_0 that the series is not stationary (or contains a unit root) against the stationary alternative corresponding to the alternative hypotheses H_1 (or does not contains a unit root). Furthermore, the Johansen test (1988) for cointegration was then used to determinate whether the series are cointegrated. The Johansen procedure is based on

two steps. In the first, the optimal lag length for the model is determined by investigating the performance of Akaike (AIC) (1973), Hannan and Quinn (HQ) (1979) and Schwarz (SC) (1978) information criteria (IC). In the second step, given the optimal lag length, the cointegration rank is obtained through the trace test and the Maximum-Eigenvalue test. For both test statistics, the initial Johansen test is a test of the null hypothesis of no cointegration against the alternative of cointegration.

All the analyses were carried out using the statistical software Rats32s (Regression Analysis of Time Series).

Data is based on monthly prices from November 1998 to February 2017. This amounts to a total of 220 observations. In detail the study has utilised the monthly prices (€/tonnes) of oil from rapeseed, palm, sunflower and soybean which were collected from the Index Mundi database. The indexed price series used in the analysis are presented in Fig. 5, with the base period price consisting of the year 1998.

The volatility of vegetable oils price (Fig. 5) is significantly high in recent years.

Generally, sunflower oil has the highest price in the market.

To investigate the time series properties of the variables, we started with presenting the four price series for stationarity. In order to examine

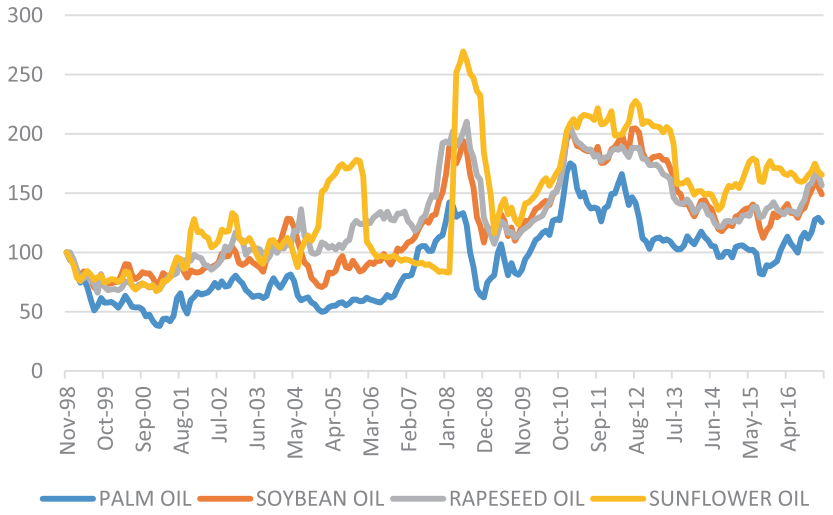

Fig. 5 Vegetable oils indexed prices (1998 = 100) (*Source* Authors' elaboration on Index Mundi data 2017d)

Table 3 ADF unit root test for prices of vegetable oils

Prices series	*Test statistic*	*1%*
Palm oil	−1.599	−2.58
Soybean oil	−2.066	−2.58
Rapeseed oil	−1.053	−2.58
Sunflower oil	−1.616	−2.58

Table 4 Johansen cointegration test for vegetable oil prices

p-r	*R*	*Eigen-value*	*Trace*	*Trace**	*Frac95*	*P-value*	*P-value**
4	0	0.103	72.763	71.059	53.945	0.000	0.001
3	1	0.057	34.994	34.110	35.070	0.051	0.064
2	2	0.034	14.542	14.158	20.164	0.260	0.285
1	3	0.007	2.480	2.378	9.142	0.685	0.704

*Denotes the critical values

the stationarity status for each series, the ADF test has been conducted. As shown in Table 3, the ADF test failed to reject the null hypothesis of unit root, suggesting that all the variables are non-stationarity at the 1% significance level.

Based on the unit root test results, we examined whether there are cointegration vectors among the four prices series. In general, the price series are cointegrated if they move together in the long-run. According to the Engle and Granger approach (1987), a linear combination of two or more non-stationarity series, which share the same order of integration, may be stationarity. If a stationarity linear combination exist, the series are said to be cointegrated and a long-run equilibrium relationship exists.

As a test for the presence of cointegration among the prices series, the Johansen cointegration test is performed. Moreover, in order to apply Johansen's method, it is useful to know the optimal lag length. We determined the optimum lag length using the Hannan Quinn information criterion (HQ) and Schwarz criterion (SC). Given the optimal lag length, the cointegration rank is obtained through the trace test and the Maximum-Eigenvalue test.

Both information criteria suggested an optimal lag order of 2. Table 4 shows the results of the Johansen cointegration test.

The value of trace is smaller than 5% critical value when r (cointegration rank) is 1. This implies that a single cointegration relationship exists between the prices.

6 Concluding Remarks

Palm oil production has had an extraordinary evolution since 2000, especially in Southeast Asian countries. EU imports have recorded a positive trend from 2000 tonnes in 2000 to 6000 tonnes in 2016, thereby tripling the quantity placed on the market.

Palm oil can be used in the production of biofuels and food (bakery sweets in general and fried foods). This is because palm oil, from a technological point of view, has a high smoke point for its saturated fatty acid content, which is much more salutary than the performance of conventional oils produced and used in Europe (corn, sunflower and peanut oil).

As is well known, the profitability of palm oil is related to its lower market price due to it having the cheapest production costs, compared to the other EU oils.

The controversy which palm oil has been the subject of in recent media campaigns is linked not so much to its technical, health and nutritional characteristics but to the environmental sustainability aspects of the production process. Market forces have stimulated its production and trade, with a shift in the use of land in tropical countries, and particularly in Southeast Asia, causing the so-called direct and indirect land use changeover—land use change (LUC) and indirect land use change (ILUC) (Rasetti et al. 2014).

According to the European Commission, biofuels produced from European raw materials do not seem to have negative consequences on the environment. European Commission documents (COM 2017/57) reveal the risks of indirect change in land use, highlighting that palm oil cultivation over the past 20 years has been the cause of 20% of global deforestation and that in 2014, 46% of the entire imported product in Europe was used for transport. This was an increase of more than 34% in comparison to 2010 and which today requires about one million hectares of tropical soils to sustain (European Parliament 2016).

For this reason, with the adoption of the ILUC Directive (EU Directive 2015/1513), the EU has limited the contribution of these biofuels to 10% of the renewable energy target in the transport sector, with stringent constraints on the production of biodiesel from foreign biomass. The document calls on the European Commission to phase out the use of this raw material as a component of biodiesel “no later” than 2020.

From the standpoint of the environment, the issue of land use change and deforestation, on the other hand, leads to concerns about environmental protection strategies that need to be actively pursued to safeguard against the exploitation and monopolisation of land at the expense of biodiversity and soil protection, food security and the protection of local populations. It is clear that a strategy such as a world-class sustainability certification requirement (Finco et al. 2012), if shared between the business world and governments, could be the first simple strategy to be implemented.

To conclude in macroeconomic terms, our results highlighted that the price trends of selected vegetable oils, are related to their variations. This allows the advancing of some hypotheses. On the supply side, the production costs (decisively in favour of palm oil) and the environmental constraints are affecting the vegetable oil market. On the demand side, the number and price, on the one hand of substitute products, and on the other hand, the complementary good and consumer taste and preference, influence consumer behaviour. Consumer income and its distribution and, in both cases, public policies (in favour of consumers and/or producers) affect the various choices to be made. Public action should, therefore consider these variables. A single policy may not be sufficient to steer the market in the right direction, especially in the logic of market globalisation.

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CHAPTER 7

Does Knowledge Interaction with Universities Enhance Firms' Innovative Capabilities?

Evidence from the Food-Processing Industry in Thailand

Phakpoom Tippakoon

Abstract The government of Thailand has recently placed university–industry interactions at the centre of innovation policy. However, to what extent firms' knowledge interactions with universities are conducive to the enhancement of their innovative capabilities is still less known. This study examines the issue, taking the Thai food-processing industry as a case study. The study shows that food-processing firms do not consider universities as their primary knowledge source. Informal interaction is the most popular mode that firms use to source knowledge from universities, while long-term and institutionalised collaborations are less common. The effect of knowledge interactions on firms' innovation is rather limited. It is only the informal interaction that has a positive

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impact on firms' product innovation, while other modes of interaction do not lead to innovative outcomes.

Keywords Knowledge interaction · University–industry linkage · Food-processing industry

1 Introduction

Universities have been praised as a vital source of firms' innovation (Mansfield 1991; Cassiman et al. 2008). In the triple helix model (Leydesdorff and Etzkowitz 1998) and the innovation system approach (Edquist 2010), universities are placed as a critical knowledge actor whose functions regarding knowledge production and knowledge diffusion are crucial for the success of the national and regional systems of innovation. Knowledge from universities is found to be an integral part of firms' innovation process (Mansfield 1991; Tödtling et al. 2009). By establishing a relationship with universities, firms can gain access to cutting-edge technologies (Balconi and Laboranti 2006; D'Este and Patel 2007) and high-skilled labour force (Gunasekara 2006).

Though the evidence on universities' role in promoting innovation is abundant, some issues have been less examined. First, the previous studies tend to focus on the high-tech industries, paying scant attention to the traditional sectors, where technologies are standardised, and the innovation effect of university–firm interaction can be less pronounced (Freel 2003). As Belderbos et al. (2016) has argued, the traditional sectors tend to be dominated by small firms with low technological capabilities, leading to cognitive and institutional gaps between firms and universities and preventing the innovative outcome of university–firm interactions. Second, firms have various options to source knowledge from universities, and each option may have different effects on their innovation (Perkman and Walsh 2007). However, the previous studies pay little attention to examine the innovative outcome of different modes of university–firm interactions.

This study aims to examine whether firms' interaction with universities enhances their product and process innovations. I adopt the modes of interaction identified by Perkman and Walsh (2007) to show how firms' innovations are affected by each interaction mode (see Sect. 3.2). The food-processing industry in Thailand is taken as a case study to

see whether firms in the traditional sector can improve their innovation performance by interacting with and sourcing knowledge from universities.

In this chapter, Sect. 2 overviews the characteristics of university–industry linkages in Thailand based on the previous studies. Section 3 provides empirical evidence on the innovation effects of firms' interaction with universities based on the author's research on knowledge interactions in the Thai food-processing industry. Section 4 concludes the chapter.

2 Overview of University–Industry Linkages (UILs) in Thailand

Thai universities have recently been expected to foster industrial innovations. Following the Triple Helix model of government-university-industry relations (Leydesdorff and Etzkowitz 1998), the Thai government has introduced various policy initiatives to encourage university–firm interactions and to promote the commercialisation of universities' knowledge (Doner et al. 2013; STI 2015a).

The government has changed the institutional settings and organisational practices and set up technology transfer infrastructures all over the country. Public universities have been autotomised to unlock them from an institutional structure of the inefficient bureaucratic system. Government's subsidies for public universities have been reduced, forcing them to more actively generate income from their knowledge and technologies (Doner et al. 2013). University professors and research staffs are allowed to do a secondment to the private firms for a specified period and can use the outputs from their social service activities for the advancement of their academic career path (STI 2015a). Knowledge transfer facilities, such as science parks, technology transfer offices (TTO), and centres of excellence have been established in major public universities all over the country with financial support from the government (Doner et al. 2013).

Despite some progress in institutional adjustment and infrastructure development, the outcomes are still far below the expectation. Previous studies have listed various problems and barriers preventing effective university–industry linkage as shown in Table 1. These problems and obstacles are related to institutional, social, and cognitive gaps between

Table 1 Summary of key findings from the previous studies on UILs in Thailand

Studies	*Key findings*
Schiller (2006)	• A wide cognitive gap between private firms and universities exist: – Firms, especially local SMEs, have low technological and absorptive capacity – Universities focus on advanced basic sciences and pay less attention to applied research responding to industrial demands • Generally, UIL mode focuses mainly on consulting services and informal contacts. Long-term research collaboration is rare • Mutual distrust between firms and universities prevents effective collaboration
Brimble and Doner (2007)	• Factors hampering UILs include: – National industrial development strategies combining the protection of domestic market and export of resource-based and low-wage manufactured products – Poor incentive system for university staffs to develop a close relationship with the private sector – No political will and clear policy agenda in promoting effective UILs • Yet, limited success stories are found in agro-industry, automotive, textile/apparel, and microelectronics (hard disk drive)
Intarakumnerd and Schiller (2009)	• In general, UILs in Thailand are weak. Firms do not regard universities as an important source of their knowledge, and perceive that technical supports provided by universities are poor and do not meet their needs • Factors limiting the process of UILs are: (1) low R&D capabilities of firms and thus low demand for UILs; (2) academic capabilities of Thai universities in general are not sufficient to meet technical demands from the industries, especially the high-tech ones; (3) concentration of economic activities around Bangkok, leaving limited room for universities in the periphery to establish linkages with the industry
Schiller and Brimble (2009)	• Factors limiting the development of effective UILs are: (1) capability gap—low technological and absorptive (R&D) capacities limit industrial demand for UILs (2) credibility gap—rigid bureaucratic system, inflexible recruitment procedures, and autonomy of university researchers limit long-term collaboration with industrial partners (3) lack of consistent policies for UILs

(continued)

Table 1 (continued)

Studies	*Key findings*
Sugandhavanija et al. (2010)	• This research explains why there is a limited number of university–industry joint research for photovoltaic technology transfer (UIJRPTT) in Thailand • It is found that UIJRPTT is limited by several factors, mainly (1) lacks of technological knowledge, absorptive and management capacities, and motivation on the side of firms; (2) difficulties in negotiating, managing, and maintaining a collaboration; and (3) lack of communication channels and cultural differences between partners
Doner et al. (2013)	• Factors explaining the weaknesses of Thailand's UILs include: (1) macroeconomic policies focusing on extensive growth, rather than increasing long-term technological and innovative capabilities; (2) investment policies targeting FDI that utilise low-wage labour; (3) technological capability enhancement strategy focuses on process improvement, but not on product innovation; and (4) overlapping and unclear missions between S&T promotion-related agencies
Pittayasophon and Intarakumnerd (2015)	• A continuing progress of university–industry collaboration depends on firms' technological capability, successful trust-building activities by the two partners and intermediaries, and mutual interest • Failures of collaboration happen when the two parties have no interest in continuing collaboration, government withdraw supports at the early stage, and firms have no capabilities to maintain operations
Pittayasophon and Intarakumnerd (2017)	• Modes of university–industry collaboration largely depend on university type • In general, Thai universities link with the private sector through education and training activities, except well-established public universities with high R&D capabilities that also focus on R&D collaboration • Large public universities tend to collaborate with large firms having high technological (R&D) capabilities, while consultation and academic services are used for collaborating with SMEs

Source Author's review

universities and private firms as well as country's industrial development strategies. In general, UILs in Thailand are weak, focusing on short-term informal interaction and consulting services and lacking long-term perspective and institutionalised collaboration. Only a few best practices of UILs are noted (Brimble and Doner 2007; Liefner and Schiller 2008).

In the view of private firms, universities are not their relevant source of knowledge, compared to other knowledge sources. The survey of innovative firms in 2003 by the National Science and Technology Development Agency (NSTDA) reveals that universities rank the 13th place out of 16 knowledge sources for firms' innovation (Intarakumnerd and Schiller 2009, p. 559). Similarly, a survey in 2015 conducted by the National Science, Technology, and Innovation Policy Office (STI) also shows that out of 18 sources of firms' knowledge and information, universities rank the 10th place (STI 2015b). Though the position has improved from the previous survey, universities are still far from being a relevant source of firms' knowledge.

In the Thai food-processing industry, studies about university–industry interaction are rare. It is found generally that this industry consists mainly of micro and small enterprises[1] with low technological and absorptive capacities (Saigosoom 2012). Only a few large firms and multinational corporations possess the capabilities to carry out R&D and innovation-related activities (Suwannaporn and Speece 1998). As a result, an effective university–industry interaction is somewhat limited and only likely to happen in the collaboration between top universities and few large firms (Intarakumnerd et al. 2015).

Table 2 presents the data on Thai food-processing industry's R&D. Business expenditure on R&D (BERD) in 2014 was €110.76 million, accounting for 11.9% of total BERD in Thailand (€931.24 million). On average, Thai food-processing firms invest about €0.13 annually on R&D. This amount is rather small, compared to such industries as office machinery (€6.52 million), petrochemicals (€0.41 million), and electrical appliances (€0.21 million), papers (€0.41 million) and apparels (€0.19 million) (STI 2015b). Of the whole industry, only 11.9% of firms invest in R&D. On average, each R&D investing firm employs

[1] In the Thai food-processing industry, small firms (firms employing not more than 50 workers) account for about 97.5% of firms in this sector (National Statistical Office 2012).

Table 2 Business R&D in Thailand's food-processing industry, 2014

R&D related indicators	
Food processing business R&D expenditure (Total, in million euro)	€110.76
Food processing business R&D expenditure (per firm, in million euro)	€0.13
Share of food processing R&D in total business R&D expenditure	11.89%
Firm's R&D intensity (R&D expenditure/sales)	0.23%
Total R&D personnel in food industry (Full-time equivalent: FTE) (persons)	4648
Share of R&D personnel in food industry in total business R&D personnel (persons)	11.90%
Average R&D personnel per firm (FTE)	5.48

Source National Science Technology and Innovation Policy Office's Report on Thailand Business R&D and Innovation Survey 2015 (STI 2015b)

about 5.48 R&D personnel. It is worth noting that, in some cases, firms invest in R&D by outsourcing simple R&D processes in the forms of product testing, technical problem-solving services, and market research. These firms lack internal R&D facilities and R&D personnel (Tippakoon 2017). The intensity of Thai food business R&D is also small, accounting for only 0.23% of firm's revenue, which is far below the R&D intensity in office machinery (0.83%), non-metallic (0.44%), and chemical (0.39%) industries (STI 2015b).

3 Empirical Evidence from the Thai Food-Processing Firms

3.1 Data

The data to be used for the analysis in this section comes from the author's administered postal survey conducted during January–March 2016. The sample of 3200 firms was randomly drawn from the list of 8985 food manufacturing establishments registered to the Department of Industrial Works (DIW).[2] This sample covers six food-processing subsectors including (1) processing and preserving of meat, (2) processing

[2]The firm in this study is the single-establishment firm registered with the DIW. While the majority of these firms are independent firms, some of them are subsidiaries of a holding company.

and preserving of fish, (3) processing and preserving of fruit and vegetables, (4) manufacture of vegetable and animal oils and fats, (5) dairy products, and (6) other food products.

The questionnaires were sent to sample firms with a cover letter requesting the owner or senior manager of the firm to provide answers. There were 299 firms returned the questionnaires, accounting for a response rate of 9.3%. However, after screening and removing cases with incomplete data, there are 206 cases remained, making up a net return rate of 6.4%.[3]

3.2 Variables and Estimation Method

3.2.1 Dependent Variables

The dependent variables in this study are the product and process innovations of a firm. First, product innovation is measured by the number of new products that the firm had developed in the past three years (2013–2015). The question for this variable is: how many new products had your firm developed during the past three years (2013–2015)? Note that "new product" in this study is the product that is "new" to the firm, but not necessarily new to the industry or to the world.

Secondly, process innovation is a binary dummy variable indicating whether or not the firm had introduced process innovation during the past three years (2013–2015). This variable is derived from the following yes-or-no questions: (1) had your firm introduced new or more efficient machines, tools, and equipment during the past three years?; and (2) had your firm introduced new or more efficient production methods or techniques? The firm is considered to have had introduced process innovation if its answer is "yes" for both questions.

3.2.2 Independent Variables

The focus of this study is on food-processing firms' knowledge interaction with universities via various modes of interaction. I adapt, as key independent variables, the modes of university–firm interaction defined

[3]The Little's Missing Completely at Random (MCAR) test is not significant (sig. = 0.757). Thus, we cannot reject the null hypothesis that the distribution of missing values is completely at random, indicating that removing cases with missing data should not significantly impact the reliability of analysis.

by Perkman and Walsh (2007).[4] There are seven interaction modes including (1) informal interaction, (2) use of universities' publications, (3) use of universities' intellectual property (IP), (4) human resource transfer, (5) use of university's' research services, (6) sharing of research infrastructure, and (7) research collaboration. The sample firms were asked to rate, from 0 (not at all) to 10 (most often) how often they had interacted and sourced knowledge from the universities via each of these modes during the past three years (2013–2015). Therefore, this question defines knowledge interaction that firms have had with universities. The rating score for each mode was transformed into a binary dummy variable indicating whether or not firms use the interaction mode (1 = yes, 0 = no).[5] Thus, seven binary dummy variables are representing seven modes of interaction.

To account for other relevant factors that may influence firms' innovation, I use a firm's size, age, export, and investment in research and development (R&D) as control variables. Firm size is measured by the number of full-time employees (natural log). Age is also in a logarithm form. Export and investment in R&D are both binary dummy variables indicating whether or not a firm exports its products (or invests in R&D).

3.2.3 Estimation Method

To examine the relationship between product innovation and a set of independent variables, I apply the Negative Binomial Regression (NBR). The NBR is widely used to analyse a discrete count dependent variable

[4] Perkman and Walsh (2007) categorise the modes of university-industry linkages into three levels based on the extent of the relationship between the two partners. At the low level of relationship (i.e. transfer level), modes of interaction are an informal interaction (e.g. attending seminars/conferences or using personal social networks), usage of scientific publication, and commercialisation of university's intellectual properties. At the medium level (i.e. mobility level), modes of interaction include human resource transfer (e.g. secondment of university staffs to the industry and postgraduate internship) and academic entrepreneurship (e.g. spin-out of university graduates or staffs). At the high level of relationship (i.e. relationship level), firms may source knowledge from universities by using universities' services, sharing research infrastructures and forming collaborative research projects

[5] The reason for transforming the rating scale into binary dummy variables is for reducing the bivariate correlation between each pair of interaction modes and thus avoiding the heterogeneity problem in the regression model. Bivariate correlations between pairs of rating scale variables range between 0.603 and 0.876, with three pairs presenting the correlation

with characteristics of non-positive integers and a significant proportion of zeros (Long 1997). The variable product innovation in this study (i.e. the number of new products a firm had introduced) has such characteristics.[6] Therefore, applying the NBR should be appropriate.[7] To analyse the factors explaining process innovation, I use the Binary Logistic Regression (BLR) which is a widely used method for analysing the binary dependent variable (Field 2009), as is the variable "process innovation" in this study.

3.3 Results and Discussion

Before presenting the regression results, it is essential to look at some relevant characteristics of university–firm interaction in the sample. First, universities do not seem to be a primary source of knowledge for product development or process improvement in the view of food-processing firms. The sample firms were asked to rate (in Likert-scale from 0 to 10) the importance of knowledge sources for their product development and production process improvement (see Table 3). Most important sources of knowledge are industrial actors, such as customers, suppliers, and business service providers. Universities are ranked in the 11th and 12th places out of 15 knowledge sources.

Second, the most popular mode is the informal interaction, as 73.2% of the sample firms use this mode. Conversely, the modes that reflect research partnership such as the sharing of research infrastructure and collaborative research are less common (Fig. 1). This information indicates that university–industry linkages in the food-processing sector are

higher than 0.80. After variables were transformed into dummy variables, the correlations fall between 0.414 and 0.778, with only one pair presenting the correlation higher than 0.750.

[6]The number of new products in the sample is positive integers ranging from zero to 45. 56.3% of the sample firms did not have new products at all. The percentage share decreases with the increase in the number of new products. There are only 2% of firms that developed 15 products or more during 2013–2015.

[7]Moreover, the NBR is said to be more robust than an alternative method—Poisson Regression (PR)—when the data is characterised by the variance larger than the mean which is likely to observe in practice due to the unobserved heterogeneity in the sample (Long 1997).

Table 3 The importance of knowledge actors for product development and process improvement

Rank	*Knowledge sources*	*Degree of importance*
1	Customers in the cluster	4.40
2	Suppliers in the cluster	4.33
3	Business service providers in the cluster	3.82
4	Suppliers located elsewhere in Thailand	3.76
5	Customers located elsewhere in Thailand	3.66
6	Local government and other governmental agencies in the cluster	3.61
7	Competitors located elsewhere in Thailand	3.59
8	Competitors in the cluster	3.55
9	Business service providers located elsewhere in Thailand	3.48
10	Governmental agencies located elsewhere in Thailand	3.40
11	Universities located elsewhere in Thailand	3.08
12	Universities in the cluster	2.87
13	Competitors located in other countries	2.75
14	Suppliers located in other countries	2.59
15	Customers located in other countries	2.48

Note Cluster refers to a geographical boundary with the radius of 150 kilometers from a focal firm
Source Author's survey ($n=206$)

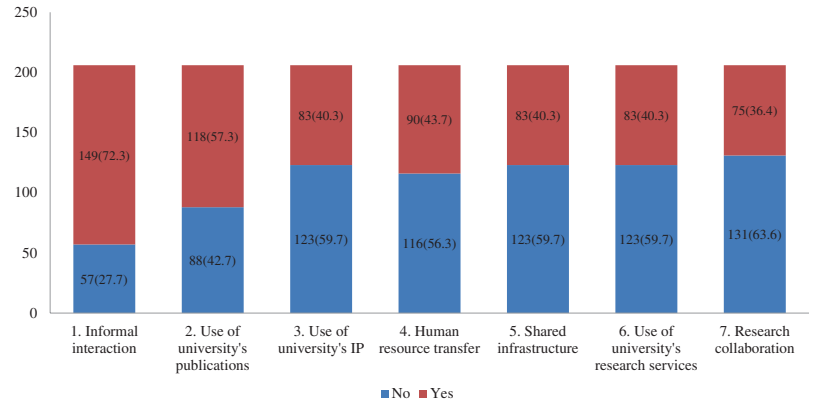

Fig. 1 Number and percent of firms by modes of interaction with universities (*Note* Percent is shown in parenthesis. *Source* Author's survey ($n=206$))

informal and ad hoc, lacking long-term partnership and institutionalised collaboration.

Third, Table 4 shows the differences in the number of new products (product innovation) and process innovation. Overall, firms that interact with universities tend to develop new products more than those that do not interact. Regarding process innovation, firms interacting with universities are more likely than non-interacting firms to introduce process innovation. Later, we shall see whether or not such differences are statistically significant in a more deliberated regression analysis.

Finally, Table 5 shows the average number of new products and the number of firms introducing process innovation with respect to firms' size, age, export, and investment in R&D. Larger firms are more likely to develop new products and introduce process innovation than smaller firms.

Table 4 Product and process innovation by modes of university–firm interaction

Mode of interaction	*# New products (average)*	*Process innovation*	
		No	*Yes*
1. Informal interaction			
No	0.67	21	36
Yes	2.54	41	108
2. Use of university's publications			
No	1.81	33	55
Yes	2.18	29	89
3. Use of university's IP			
No	1.73	43	80
Yes	2.45	19	64
4. Human resource transfer			
No	1.43	43	73
Yes	2.78	19	71
5. Shared infrastructure			
No	1.66	46	77
Yes	2.55	16	67
6. Use of university's research services			
No	1.54	42	81
Yes	2.73	20	63
7. Research collaboration			
No	1.50	47	84
Yes	2.93	15	60

Source Author's survey ($n = 206$)

Table 5 Product and process innovation by firm's size, age, and export, and R&D

		# New products (Average)	*Process innovation*	
			No	*Yes*
Size	Small (1 < employees < 49)	0.94	51	76
	Medium (50 < employees < 199)	2.74	9	48
	Large (200 or more)	7.00	2	18
Age	Young (not older than 24 years)	2.03	42	106
	Old (25 years or more)	2.00	20	38
Export	No export	3.30	42	84
	Export	1.21	20	60
R&D	No investment in R&D	0.86	53	97
	Investment in R&D	5.12	9	47

Source Author's survey ($n = 206$)

As one might expect, the introduction of new products or processes requires the availability of resources that small enterprises often do not have. Younger and older firms do not seem to be significantly different in the development of new products and the introduction of process innovation. Exporting firms perform markedly better than non-exporting firms regarding product innovation, but not in the case of process innovation. Firms investing in R&D tend to develop more new products than non-investing firms, while the difference is less clear regarding the introduction of process innovation.

Regression results are presented in Table 6. Each regression contains two model specifications: the first one includes only control variables, and the second one consists of all variables. Regarding the NBR results, it is found that most of the food-processing firms' interactions with universities do not yield a significant effect on their ability to develop new products. Firms that successfully develop new products tend to rely on "informal interaction" (e.g. attending conferences and meetings, informal and direct personal contacts, etc.), as shown by a positive coefficient of variable informal interaction with a robust statistical significance ($p < 0.01$).

Using universities' publications has a significantly negative effect on new product development ($p < 0.01$). This finding contradicts the argument that using codified knowledge (e.g. universities' scientific publications) can serve as an effective means to improve the innovative

Table 6 Regression results

	Negative binomial		*Binary logistic*	
	Spec. 1	*Spec. 2*	*Spec. 1*	*Spec. 2*
Intercept	−0.204(.496)	−0.382(.535)	0.281(.843)	0.258(.901)
Size (log)	0.281(.077)[a]	0.285(.080)[a]	0.495(.149)[a]	0.507(.159)[a]
Age (log)	−0.354(.167)[b]	−0.441(.177)[b]	−0.414(.262)	−0.451(.280)
Export (Dummy)	0.256(.217)	0.289(.230)	−0.122(.378)	−0.165(.412)
Investment in R&D (Dummy)	1.281(.233)[a]	1.205(.258)[a]	0.483(.476)	0.574(.542)
Informal interaction (Dummy)		1.049(.313)[a]		−0.322(.479)
Use of universities' publications (Dummy)		−1.093(.345)[a]		0.518(.528)
Use of universities' IP (Dummy)		0.423(.321)		0.186(.533)
Human resource transfer (Dummy)		0.330(.340)		−0.113(.578)
Use of university's research services (Dummy)		−0.272(.351)		1.006(.613)
Sharing of research infrastructure (Dummy)		0.007(.352)		−1.385(.679)[b]
Research collaboration (Dummy)		−0.027(.328)		0.535(.671)
Log Likelihood	−335.742	−326.529		
Likelihood Ratio Chi-Square (df)	118.47(4)[a]	136.90(11)[a]		
Chi-Square (df)			22.55(4)[a]	30.40(11)[a]
Nagelkerke R-Square			0.147	0.194
n	206	206	206	206

Note (1) Standard errors are in parentheses; (2) superscripts a and b denote a statistical significance level at $p<0.01$ and $p<0.05$, respectively
Source Author's calculation

capability of firms in the low-tech industries where technologies tend to be mature and standardised (Freitas et al. 2013; Robertson and Smith 2008). However, it is possible that when firms' absorptive capacity is limited, their attempts to absorb advanced scientific knowledge can be

unsuccessful. This is likely to happen in the Thai food-processing sector where firms' ability to utilise advanced basic scientific knowledge is limited.

The binary logistic regression gives slightly different results. Almost all modes of interaction, except the sharing of research infrastructure, are not statistically significant to explain firms' process innovation. This result indicates that food-processing firms do not depend on universities for improving production methods or acquiring more advanced production technologies. When firms share their research infrastructure with universities, it even undermines their likelihood to introduce process innovation, as denoted by a negative and significant coefficient ($p < 0.05$) of this variable. This negative effect may occur when the costs of operating shared research infrastructures (e.g. laboratory or equipment) outweigh the benefits that firms can gain from using them. Note that only firm size is positive and statistically significant in BLR models, revealing that large firms with more resources are in a better position, compared to small firms, to access to more advanced production technologies.

In general, the effects of control variables (i.e. Size, Age, Export, and Investment in R&D) seem to be consistent with what is found in Table 5.

4 Conclusion

This study examines the relationship between university–firm knowledge interaction and its effect on firms' innovative capability (i.e. the ability to introduce product and process innovations). The Thai food-processing industry is taken as a case study to see whether a traditional industrial sector dominated by small firms with limited technological capabilities will benefit from interacting with universities through various modes of interaction. The key results reveal that, in general, interactions with universities do not improve firms' abilities to introduce product and process innovations. Informal interaction seems to be the most effective mode, while the modes of interaction at the higher levels of relationship such as human resource transfer and research collaboration have no significant impact. Theoretically, it can be argued that when firms' technological capacity is limited and cognitive distance between firms and universities is large, coordinating knowledge transfer activities through formal and direct collaborative mechanisms can be costly (Belderbos et al. 2016). In this sense, it may be more effective and less costly for small

food-processing firms to source universities' knowledge and expertise via informal interactions.

The finding also shows that firms' internal capabilities, especially firms' resources and R&D investment, are more vital to the enhancement of their innovative capabilities than universities' knowledge. As shown, the Thai food-processing industry is dominated by small firms with limited R&D and technological capabilities, which may prevent them from accessing, assimilating, and utilising universities' knowledge that are relevant for innovations.

These findings raise some concerns about the role of universities in the context of innovation systems. As the Thai government has put the triple helix model of university-industry-government at the centre of technology and innovation development agenda, the finding in this study implies that it is inevitable to adjust the functions and services provided by Thai universities to be more responsive to industry demands. Not less important is appropriate policies and programs designed specifically to enhance the absorptive capabilities of firms in the traditional and low-tech sectors.

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PART III

Firms and Societies in Asia Facing New Challenges

CHAPTER 8

The Great East Japan Earthquake's Effects on Electric Power Companies' Financial Situation

Sophie Nivoix and Serge Rey

Abstract Beyond its dramatic human and social consequences, the Fukushima disaster revealed the vulnerability of the Japanese electricity sector. This may have resulted in higher volatility in stock market prices, which has had an impact on asset management strategies. Another essential aspect to investigate is the impact on the financial situation of the firms. Indeed, if the deterioration in financial ratios is too large, the entire investment strategy in the sector can be questioned. We analyse 9 different financial ratios calculated for the 10 firms in the sector over the 2007–2016 period. Our results show that most ratios have severely been deteriorated by the shock, especially those reporting corporate returns, like ROE, ROA and net income/sales. Considering the risk level, we show that the catastrophe impacted the cash policy of the firms,

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with higher cash levels after 2011. Moreover, there is a long-term mean reverting process since in most cases it has happened more than 3 years after the earthquake. This means that the shock has had long run consequences for both corporate and market finance indicators, as well as for the risk-return equilibrium of the whole sector. Among the firms, it is no surprise that TEPCO suffered the most serious consequences for its financial situation.

Keywords Japan · Electric power industry · Risk · Return · Volatility · Earthquake

1 Introduction

Japanese economic growth has always been highly dependent from energy imports (around 94% of it nowadays). With no oil, coal or gas resources, the country decided to develop the nuclear energy sector after the second world war. The first commercial nuclear power plant began its production in 1966, and the Japanese government has been considering nuclear energy as a national strategic priority since 1973.[1] Developing the country without domestic energy primary resources has always been a major challenge for the country, and overcoming the limits of energy supply to stimulate the economy has been even more difficult since 2011. In March 2011, nuclear activities were stopped after the Fukushima catastrophe, but in 2015 two reactors operated again and several others were considered as safe enough to resume their production (7 are operating since mid-2017 and 12 more were expected to restart in 2018). The main reactors produced about 25% of Japan's electricity in 2017[2] and this figure is expected to be steady for the next decade. The economic and human development challenges are even more dramatic in that Japanese population is ageing, China is soaring, and the distrust of nuclear activities is growing.

Unfortunately, the nuclear plants are located on the seashore as they need much water to be cooled, and thus they are threatened by tsunami and earthquakes. Several years after the dramatic earthquake, tsunami and nuclear disaster of Fukushima, this chapter intends to analyse

[1] *Source* http://world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power.aspx.

[2] *Source* Japan Electric Association (JEA) 日本電気協会 (Nihondenki kyōkai).

the long-term consequences of this event on the Japanese electric power industry. Indeed, it questions the possibility of Japan to overcome the industrial and financial limits of energy dependence. The challenges are related to both the financial impact of the accident on this sector and to the market valuation of the companies. Indeed, a lasting negative impact of the disaster on the financial results of the companies in the electricity sector would be likely to compromise their investment capacities and consequently the entire energy policy of Japan.

Therefore, seven years after the Fukushima catastrophe it is useful to investigate if this industry did recover, as it is the basis of the energy policy of the country. Our most interesting results show that the main return and risk indicators of the firms have been impaired for more than 3 years. The corporate and stock market situations were both impacted upon, even if the market valuations exhibited the most dramatic declines. Indeed, indicators such as the ROE, ROA, net income/sales, gearing and stock volatilities experienced the most significant changes. We detected both a risk learning process considering cash management and a long-term mean reverting process for the main financial indicators.

The remaining of this chapter is organised as follows. The first section explains the theoretical context of this research. The following section presents the methodology and data used in the empirical part. The third section details the consequences of Fukushima on the key performance indicators (KPI) of corporate finance in the industry and the last section discusses the duration of the shock period. A final section concludes the analysis.

2 Theoretical Context

Some authors have analysed the impact of major unexpected shocks on international stock markets, and they have concluded that the recover usually occurred in the following days after the event (Brounen and Derwall 2010). Considering the case of earthquakes and hurricanes, Cummins et al. (2000) found that insurance companies can hedge effectively against risk and that individual firms are more diversified than firms that are members of groups. In the same way, Worthington and Valadkhani (2004) pointed out that in Australia the stock indexes were more affected by earthquakes, bushfires and cyclones than by severe storms and floods. Considering the impact of a major earthquake on a specific sector, Shelor et al. (1990) examined the effects of the 1989 earthquake in California.

They concluded that the stock returns were significantly negative for real estate-related firms operating in the San Francisco area, but non-significant for companies in other areas. Meanwhile, it is worth to mention that stock volatility and idiosyncratic risk depend together on many other factors in the long run (Campbell et al. 2001), and that the speed adjustment of prices may vary with the kind of new information (Fama et al. 1969). Using a very large panel of firms in the US, Dessaint and Matray (2016) noticed that in the case of hurricanes, managers tend to overstate the probability of an environmental disaster when they observe such an event fairly close to their plants. Meanwhile, the hurricane risk can be seen as constant, year after year, whereas the earthquake probability may vary according to the location of previous earthquakes.

As for the March 2011 earthquake, McDonald and Bacon (2015) studied the automobile industry, as several plants or subcontractors were located close to the tsunami destructive path. Their results indicated that the impact of the event was significant on the returns rates of the firms, which is consistent with the efficient market hypothesis. Indeed, any positive (negative) major unexpected event is expected to have a positive (negative) impact on stock returns. The shock on stock prices is over as soon as all the new information has been integrated by the market, but the volatility can stay high as the shock may create uncertainty about the occurrence of other new events of the same kind. Considering the electric companies, outside TEPCO which runs the Fukushima plant, the impact of the accident was real, financially if not physically. Indeed, the possibility of another earthquake or tsunami is a persistent long-term threat, and on 30 March 2011 the Japanese government decided to increase the safety measures and procedures for all nuclear plants, in all Japanese regions. Considering the legal concerns, it is worth to mention that the Nuclear Regulation Authority (NRA)[3] has been created in 2012, in order to renew the nuclear activity regulation after Fukushima. This agency is under the supervision of the Ministry of Environment, whereas the former Nuclear and Industrial Safety Agency (NISA)[4] was affiliated to the Ministry of Economy (METI). As this Ministry also promoted the civil nuclear activities, there was an obvious potential conflict of interests between its activities.

[3] 原子力 規制 委員会, Genshiryoku kisei iinkai.

[4] 原子力 安全 保安院, Genshiryoku anzen hoan-in.

In this chapter, we investigate the impact of the Fukushima catastrophe on each of the Japanese electric power producers, looking at their main financial stock market indicators since 2007. Some studies have already analysed the impact of the 2011 earthquake on TEPCO shares, and evidenced volatility breaks (Jaussaud et al. 2015; Nivoix and Rey 2017), while Nivoix and Rey (2018) investigated switching regimes in the relationship between Nikkei and TEPCO stock returns over the 1985–2016 period to compare the earthquake–tsunami shock with other shocks that have impacted the Japanese economy. But to our knowledge, such a comprehensive sector analysis has never been done before, as it is related to a specific market shock in one country, to a particular geographical area and mostly to one industrial sector. We focus on both corporate finance and market finance parameters, such as the risk and return indicators, in order to assess the extent to which the earthquake did impact all the electric industry, and for how long.

3 Methodology

This study is event-based, as the Fukushima accident has been a major shock for the entire electric industry in March 2011. Meanwhile, despite Kothari and Warner (2004) recommendation, we did not need to use much statistical tests to show clear differences between the firms of this sector, as we did not analyse a sample of firms but the whole industry. Our financial and stock market data come from the International Factset database. The time span is long enough (2007–2016) to show both short-term and long run changes among corporate and market indicators.

The empirical analysis includes the major financial return and risk indicators for all the firms of the electric sector in Japan, which are: Chubu Electric Power, Chugoku Electric Power, Hokkaido Electric Power, Hokuriku Electric Power, Kansai Electric Power, Kyushu Electric Power, Okinawa Electric Power, Shikoku Electric Power, Tokyo Electric Power and Tohoku Electric Power. As shown in Fig. 1, TEPCO is the leader of the electric power market (with 31% of sales in year 2016), and has always been so in the previous years, as its operating area includes the Tokyo region. Even if each company operates in a specific area of the country, the weight of this leading firm means that the

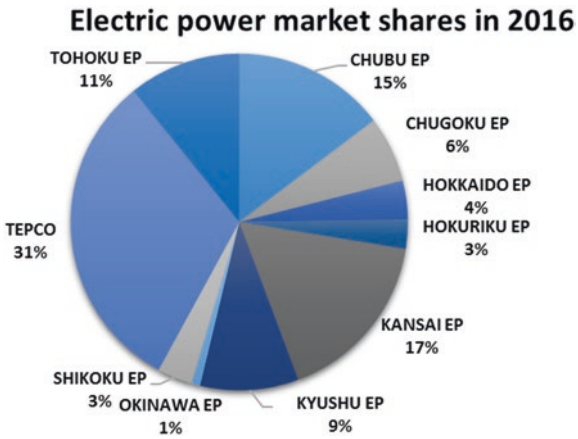

Fig. 1 Market shares in the Japanese electric power industry in 2016 (*Source* Ministry of Trade, Economy and Industry (http://www.emsc.meti.go.jp/english))

environmental, financial and industrial shock of 2011 was not a single company issue, but that it impacted upon the whole industry. The second operator is Kansai Electric Power (operating in the Osaka region) with a 17% market share and the third is Chubu Electric Power, also called Chuden (operating in the Nagoya Aichi region), with a 15% market share. The smallest operator is Okinawa Electric Power with barely a 1% market share.

We studied all the usual indicators used in corporate finance, related to income statement and balance sheet. Table 1 presents the most significant correlations between them over the 2007–2016 period for the ten companies. The sales did not vary much despite the Fukushima earthquake and accident, as the electric operators do not produce only nuclear electricity and import primary energy sources. Besides, the net income levels were directly impacted upon by the catastrophe, as well as the ROE and net income/sales, which are highly negatively correlated. Considering the financing means, the equity level explains the high positive correlation between ROE and the gearing (i.e. long-term debts/equity), and the long-term debt causes the high negative correlation between the gearing and the total debt/total assets ratio.

Table 1 Correlation matrix

	ROE[a]	*ROA*[b]	*Net income/ Sales*	*Gearing*[c]	*Total debts/ Total assets*	*Sales*
ROE	1.00					
ROA	0.39	1.00				
Net income/ Sales	−0.89	−0.67	1.00			
Gearing	0.60	0.33	−0.48	1.00		
Total debts/ Total assets	−0.46	−0.17	0.41	−0.76	1.00	
Sales	−0.31	−0.33	0.37	−0.56	0.59	1.00

[a]Return on equity = net income/equity
[b]Return on assets = operating result/total assets
[c]Gearing = long-term debts/equity

4 Changes in Corporate Finance KPI

It is interesting to analyse the variations of the main financial ratios among the electric industry firms in 2011 and after. Firstly, we focus on the main return indicators; secondly, we investigate how deep and long-lasting the changes in risk have been.

4.1 Consequences of the Fukushima Earthquake on the Returns of the Sector

We focus on corporate returns with the three commonly used ratios: return on equity (ROE, i.e. net income/total equity), return on assets (ROA, i.e. operating profit/total assets) and net income/sales. As shown by Fig. 2, the ROE values of all firms have been widely impacted upon by the accident for at least 3 years. The ROE of several of these firms was extremely low, i.e. below −20%, in 2012 and 2013. Obviously, TEPCO experienced the largest changes. After the huge extraordinary losses in 2011, its dramatically low equity has been increased in 2012 by 1401 billion yens, given by the state-financed compensation fund that was set up after the catastrophe. Without this bailout opportunity, the company would have been bankrupt and the failure of the industry leader would have raised major electricity supply problems. In 2016, the ROE values were positive for all companies, for the first time since the accident.

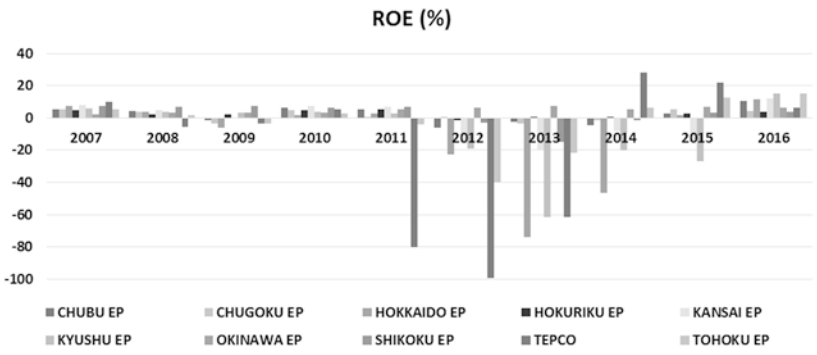

Fig. 2 Return on equity of the Japanese electric industry firms (*Source* Companies' financial reports)

As for the ROA, there are the same kind of spillover effects from TEPCO to the whole industry, except Okinawa Electric Power, which is a minor operator. The recovery was slightly quicker than for the ROE, as only two firms exhibited (small) negative ROA results in 2015. This difference with ROE can be explained by both the numerator (operating profit), which depends only on the operating activity of the firms, and by the denominator (total assets) which is less sensitive then equity to net income changes.

Focusing now only on the income statement, the net income/sales indicates the profitability of the companies. Our results indicate that except for Okinawa Electric Power, all companies experienced a negative net income in 2012 and 2013, because of both the mandatory financial contribution from all firms to the compensation corporation and the new security regulation for nuclear power plants. Some firms suffered losses also in 2014 or 2015, but unsurprisingly TEPCO was the most impacted firm in 2011 and it recovered in 2014 thanks to the governmental help. Meanwhile, this ratio indicates that the profitability level of this highly regulated industry is fairly low in the long run (around 3%), compared to other industrial profit levels.

As the compensation scheme set up in 2012 includes TEPCO, the Japanese government, backing both the virtually bankrupt TEPCO (through equity funding) and the compensation fund (through bond warranty), and the other electric power operators, all the companies were impaired in 2012 by extraordinary expenses. Meanwhile, the whole

sector may wonder about the global impact of the accident in the long run, as there are two ways to analyse the compensation process. The first one is optimistic and straightforward: among the 2016 estimated disbursed 6000 billion yens (compared to the 1700 billion forecasted in 2011), including 1300 to dismantle the reactors, more than 5000 have been paid by TEPCO to the 2.4 million claimants. Meanwhile, in 2018, the estimates of the TEPCO Integrated Report for 2017 reached 9700 billion yens overall. The second viewpoint is rather pessimistic, as the compensation process has been based on a distinction between "deserving" victims of the nuclear catastrophe and "undeserving" victims of the earthquake and tsunami (Feldman 2016, p. 153). Besides, the compensation process is slow and insufficient considering the financial, health and psychological losses. The dissatisfaction of the victims can be perceived through the numerous litigations against TEPCO.

4.2 Change in Risk or Risk Learning?

Besides return, it is worth to measure the corporate risk level of the industry with several indicators, in order to check if there has been a structural change in risk or if the firms learned about risk after the events. We computed the main corporate risk ratios, and then analysed the corporate risk-return equilibrium. We found that all the firms of this industry did increase their cash level after the Fukushima accident, despite the unchanged probability of a similar disaster in their area (particularly for Okinawa and Hokkaido). The average value of Cash and short-term investments/Total assets was only 1.7% in 2007 vs. 6.1% in 2016, and it was 2.2% over the 2007–2010 period vs. 5.6% over the 2011–2016 period. This confirms the conclusions of Dessaint and Matray (2016) about hurricanes, as they pointed out the irrational decision of firms to increase their cash level by more than 1% for a two-year period after a hurricane. The difference is that in Japan the increase in the cash level is more persistent given that several minor or medium earthquakes did happen since March 2011. There has been no other catastrophe in a nuclear plant, but the decontamination work is still in progress as well as the compensation for victims. Moreover, responsibility sharing between the government and the nuclear operator is a major issue. As pointed out by Osaka (2012, p. 433), "*under Japanese law, a nuclear operator bears strict, channeling, and unlimited liability for nuclear damage unless the damage is caused by a grave natural disaster of an exceptional character*".

But seeing that in Japan an earthquake cannot been considered as unforeseeable,[5] TEPCO had to include the possibility of such an event in the design of its plants. This means that the firm has to compensate the consequences of the catastrophe if the nuclear accident is identified as the legally sufficient cause of it. As for the Japanese government, it is also partly responsible and "*liable for the damages if it failed to exercise its regulatory power*" (Osaka 2012, p. 433) over TEPCO. This is all the more noticeable that TEPCO experienced scandals in 2007 and 2008 about falsified security inspection reports. Such a situation could also happen in other firms of this industry, as they are operating under the same regulations.

As for the risk of liquidity shock, Holmström and Tirole (2000) indicate that firms use cash as an insurance against such risk in case of limited access to external financing. In the case of the Japanese electric industry, as all firms are listed, we can consider that external financing is always available through the stock market, despite the increase of investors' risk-aversion immediately after the earthquake. Thus, the potential lack of liquidity cannot explain the high increase of cash ratio. As a consequence, these cash results seem to indicate not only that the risk changed the cash policy of the firms, but that they learned that after Fukushima their risk exposure would remain higher in the long run.

After this short-term analysis, it is useful to study the long-term financing means of the firms, with two ratios.

The first one is the gearing (long-term debts/equity), which indicates the relative weight of debt compared to equity in the long-term financing. In case of losses, the book value of equity decreases and thus the gearing increases. This was the case after 2011 for all firms, as the already fairly high gearings (close to 2), climbed to 3 or even more for some firms. Usually, the situation of any firm is considered as very risk when the gearing is above 3. So, we can conclude that most of the electric operators either had too much debt or had not enough equity. The second ratio is the total debt ratio (total debt/total assets) and it can help to clarify this alternative.

The total debt level in the liabilities part of the balance sheet of the firms did not increase in the same way as the gearing did. Indeed, the average value per firm or for the whole industry (close to 0.55, with few

[5] Even if during the last three decades, major earthquakes have occurred in areas that had been denoted "less risky" (Stein et al. 2011).

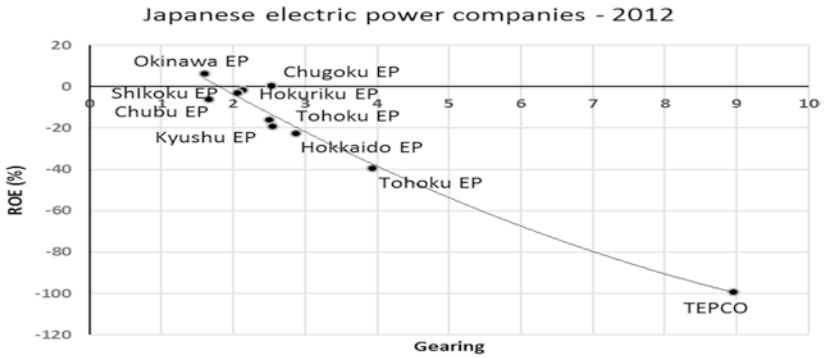

Fig. 3 Corporate risk-return equilibrium of the Japanese electric industry firms in 2012 (*Source* Companies' financial reports and authors' calculations)

differences between firms) did not change much after 2011, and there has been a mean reverting effect as soon as 2014 for most companies. This signals that the gearing increase was caused by insufficient equity rather than by excessive debts. Considering TEPCO, the debt level was not higher than the industry average as the payments to the victims are being done with the financial flows received from the compensation fund. The compensation plan will end in 2022 while most of the long-term debts of the firm have maturities up to 2040.

As the gearing increase is associated with a higher risk level, we can look more precisely at the relationship between the gearing and the ROE. Table 1 indicated that the correlation between the two variables was 0.60, but the detailed situation is given by Fig. 3 for 2012 and Fig. 2 for 2016.

The evolution between 2012 and 2016 is very clear, particularly for TEPCO. In 2012, this firm was an outlier, considering both its extremely high gearing (close to 9, which would mean a bankruptcy for most firms) and its uncommonly low ROE (close to −100%, meaning a total destruction of the book value of equity, and again a bankruptcy of the firm). The other companies, except Tohoku which operates in the area of the 2011 earthquake, exhibited gearings below 3 and ROE between −25% and 10%. Thus, even without TEPCO, this industry did not experience a good risk-return equilibrium just one year after the earthquake.

As for the situation in 2016, the main evolution is that TEPCO has a far better gearing (2.3 and below the industry average) with a positive ROEs (over 6%) and slightly below the industry average. As a matter of fact, all firms exhibit positive ROE and 4 of them have a value above 10%. The risk-return equilibrium of the industry has obviously improved and no firm seems in danger.

Over the whole period, we can thus conclude that even if the kind of risk and the risk level did not change, the behaviour of companies evolved towards a more cautious cash management strategy. It can be considered as risk learning, with an overshooting process during the year of the catastrophe. The next section will show that this was also partly the case for investors.

5 Long-Term Impact on Stock Valuations

5.1 The Market Risk-Return Equilibrium

In order to understand the influence of corporate finance factors on market valuation of shares, we tested several multivariate linear and nonlinear regressions with annual stock returns as the dependent variable and corporate finance indicators as independent variables. The best fitting was given by the multivariate linear regression of the previously analysed indicators on the annual stock returns. These returns are significantly positively associated with ROE and sales, and positively associated with the gearing level. In the same way, ROA, net income/sales and total debt ratio do not seem to influence the market valuation of the firms. This indicates that stock prices were highly influenced by the expected activity and by the ROE of the firms, and we can notice that in the long run this ratio was the most unstable of all.

In order to assess the market reaction to the 2011 catastrophe, we computed the yearly stock returns and standard deviations of prices. As mentioned above, the ROE of the sector was fairly poor before 2011. This confirms the relationship between ROE and stock prices. The market returns were different between firms, with an already low value for TEPCO, while the range of variation of the standard deviation was fairly narrow, indicating a similar perception of risk level by the investors.

Considering the year of the accident, two major changes can be mentioned (Fig. 4). Firstly, unsurprisingly TEPCO was an outlier, considering both its particularly low return (the stock fell by about 90% in a

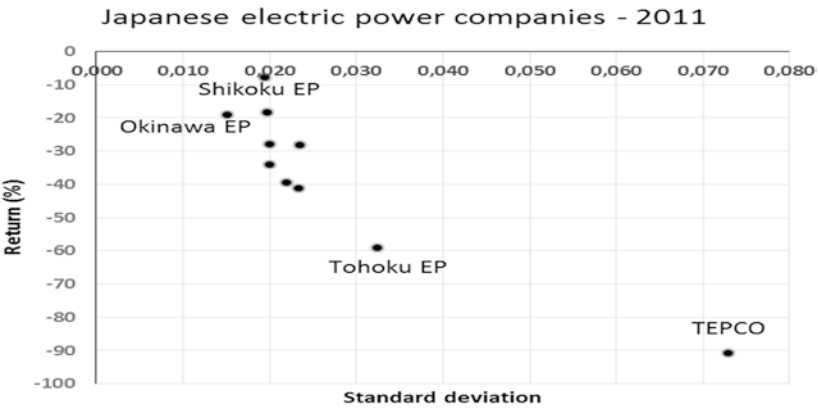

Fig. 4 Stock returns and stock price standard deviations of the Japanese electric industry firms in 2011 (*Source* Companies' financial reports and authors' calculations)

few weeks) and its high standard deviation (seven times its previous year value). Secondly, there has been a major increase in the standard deviation of returns of all firms, as their values doubled (and even more for Tohoku Electric power, operating in the earthquake area). Moreover, the price drops were large for all companies, even those located far from the tsunami area. This shows that investors not only feared other accidents in the short run, but also that they anticipated long-term negative consequences for this industry.

This shows a regional spillover process, as the firms located in the neighborhood of the damaged area (in Tohoku) could be indirectly affected by the earthquake, its aftershocks (smaller earthquakes occurring after a large one), or in the case of Fukushima by radioactive pollution and a ban on nuclear activities.

The 2016 situation is far better for all firms. The firms' returns, except for Okinawa Electric Power, are still negative but to a smaller extent than in 2011. The risk perception is more moderate, even if the standard deviation values remain higher than in 2010 for all firms. Thus, we can conclude that the sector experienced an improvement in its market risk and return, although we cannot see a full mean reverting process.

5.2 Discussion About the Duration of the Shock Period

Whereas the real probability of earthquakes did not change since 2011 throughout Japan, the shock of Fukushima has had consequences in several ways. A few months after the accident, some new costly security measures have been implemented in all nuclear plants, such as higher protection walls or deeper security check procedures. For TEPCO the compensation and decontamination costs are obviously a huge impairment. Meanwhile, after the shock period the perceived risk remained fairly high as shown by the financial indicators, whereas the activity main features were about the same as before 2011. We can thus wonder when the key indicators did or will revert to their pre-shock values. Tables 2 and 3 compare the average values of the indicators before and after Fukushima and mentions the time of the reverting effect, if any.

As the salience of the event declines as time goes on, the effect of the shock should decrease. Though, the results show that a mean reverting effect takes place 3 years after the earthquake for the total debt ratio and the Price-to-Book (PBR) ratio. Indeed, these indicators exhibited a moderate change after 2011, each one for specific reasons: the total debt ratio has a long-term momentum because of the weight of long-term debts, and the PBR was impacted by both the price drops (increase) and the net income declines (recoveries).

Considering the ratios that were largely impacted by the event, *i.e.* ROE, ROA, Net income/Sales and Dividend yield, the mean reversion appeared in 2015 or 2016 only, as they are more sensitive to real post-event income and activity.

As for the three remaining indicators (gearing, Price/Sales and Cash ratio), the shock was deeper and longer, and because of a momentum effect there was still no mean reversion process in 2016. It may take place later, but the psychological impact of the event will probably last for several years more. Considering the long-term effect of the increase of risk perception, Dessaint and Matray (2016) mentioned that the firm response to the shock was temporary, *i.e.* that the cash ratio experienced a mean reversion after two years when the salience of the event was low again. Obviously, in the electric power industry the large increase of the cash ratio did not vanish two years after the event and is still here after three more years.

Thus, we can wonder if there was a real change in the risk incurred by nuclear operators or if there was a process of risk learning. As the date

Table 2 Average annual stock returns and volatilities in the electric power industry

	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
Return	−15.74	2.28	−22.26	−6.52	−36.53	−12.13	40.82	−1.16	20.49	−13.44
Volatility	3.87	5.23	3.43	2.32	6.70	7.31	7.21	4.76	4.84	5.28

Table 3 Average values of the main ratios before and after Fukushima

	Average 2007–2010	*Average 2011–2016*	*Shock impact*	*Mean reverting year*
ROE (%)	3.37	−7.28	very large	2016
ROA (%)	2.57	1.06	large	2015
Net income/Sales (%)	2.41	−1.67	large	2016
Gearing (=LT debt/Equity)	2.02	3.23	large	beyond 2016
Total debt/Total assets (%)	53.7	57.8	moderate	2014
Dividend yield (%)	2.26	1.80	large	2016
Price-to-Book ratio	1.23	0.96	moderate	2014
Price/Sales	0.81	0.42	large	beyond 2016
Cash & Short-term investments/Total assets (%)	2.19	5.56	large	beyond 2016

and proximity of an earthquake cannot help to predict where and when the next earthquake will happen, we can say that the geological risk itself did not change. Meanwhile, as the probability of higher security costs or ban on nuclear activity rises after each major nuclear accident, the risk increase can be explained by legal and financial reasons. As for the risk learning, we can mention that before a major catastrophe it is difficult to assess the global costs of an earthquake, a tsunami or a nuclear accident. Thus, some firms may tend to underestimate such costs until the event happens, either to themselves or to another company of the same industry. Here again, the consequences are numerous, considering the potential depreciations in the income statement, the investment in security equipments, and the losses related to any activity break.

Besides, the risk assessment may be influenced by an understatement of the earthquake risk when no one has occurred for a long time, and an overvaluation of its probability when one happened recently. This salience or memory effect can be related to the prospect theory of Kahneman and Tversky (1979), according to which low probability events are under or overweighted. Such a bias may also be influenced by the "availability heuristic" as these authors call it (Tversky and Kahneman

1973), meaning that the true probabilities of rare and unique events cannot be assessed. As a consequence, people use subjective probabilities for low probability events, as well as they do for very high utility or high disutility events. Clearly, this is the case for earthquakes, as they are rare and generated huge losses, i.e. large disutility.

6 Conclusion

Seven years after the Fukushima catastrophe, it was worth analysing the electric industry financial characteristics and changes. This in-depth investigation of the Japanese electric power companies pointed out several interesting patterns.

The results indicate that the return ratios have been impaired for at least 5 years after the earthquake, and more particularly the ROE, ROA and net income/sales. The risk assessment was also impacted by the catastrophe, for both short-and long-term financing ways. Indeed, the companies' behaviour in cash management has been more cautious after 2011, and this could be related to a risk learning process. As for the gearing level, it remained fairly high in 2016 despite an improvement on average since 2012. As a consequence, the risk-return equilibrium for corporate indicators was far better in 2016 than in 2012.

Considering the market indicators, the results show that investors have not been very trustful in this sector during the last 10 years. Despite an obvious increase in stock volatilities after Fukushima, the stock returns were already poor before 2011. Obviously, even if it is State-backed since 2012, TEPCO experienced the worse situation of all firms for almost all indicators, as it is directly concerned by the compensation plan to victims until 2022.

Finally, the duration of the financial impacts of the accident on the sector has ranged from 3 to more than 5 years, as some of the financial indicators, such as the gearing or price-to-sales ratio, did not experience a mean reverting process.

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CHAPTER 9

Impact of the Trump Administration on the Economies of the Greater China Region

Bernadette Andreosso-O'Callaghan and Lucía Morales

Abstract The new economic policies initiated by the 45th US president Donald Trump, and their impact on the economies of the "the Greater China Region" (Hong Kong, Taiwan and Mainland China) are examined in this chapter. The impact is assessed at both the stock exchange and other non-financial markets levels. For the stock markets, the chosen research period runs from January 2014 to June 2017, and the Economic Policy Uncertainty Index in the United States is used as a proxy to measure political uncertainty in the main world economy. The results show that the stock markets in the "Greater China Region" did not react to the uncertainty generated by the US election in November 2016, but an examination of the move towards assertive trade US protectionist policies suggest a more detrimental impact on the GCR.

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Keywords Greater China Region · Protectionism · US administration · Stock markets · Economic policy uncertainty

1 Introduction

Since the oil shocks of the 1970s and their severe impact on the western economies, researchers have identified political risk and/or political uncertainty as a significant factor that can fundamentally disturb the performance of countries (Root 1973; Suleman 2012; Benacek et al. 2014). Early explanations in the field suggest that political events can cause stock market volatility as well as a significant loss of wealth (Root 1973; Brewer 1981; Simon 1982; Clark 1997; Clark and Tunaru 2003). The magnitude of the loss can spill over to the rest of the economy by the generation of economic uncertainty (Clark and Tunaru 2005). Recent political events such as the election of Trump as the 45th president of the United States signify important changes to the world economy, through the gradual implementation of protectionist policies. During his Presidential campaign, Trump made serious allegations against China as "stealing" millions of jobs from the US economy because of Chinese unfair trade policies, an opaque industrial policy and other restrictive policy practices. In particular, analysts have argued that the introduction of protectionist measures by the US administration would be justified given the misappropriation of US technology by Chinese firms and authorities.[1] The US withdrawal from some free trade treaties that had reached quasi-final negotiation stage (such as the TTIP and TPP) have also raised concerns about a looming and more general US protectionist wave.[2] Whether the Greater China Region (GCR) will be a clear winner or loser from these political developments in the USA forms the main motivation of this chapter, which is structured around the following objective: to identify the main challenges and opportunities that the new US

[1]This is all connected with the very issue of "market economy status" that has been denied to China by both the USA and the EU in the Spring of 2017.

[2]The Trans-Atlantic Trade and Investment Partnership (TTIP) with the EU was suspended by the US Administration in the end of 2017 and the Trans-Pacific Partnership (TPP) was finally signed in March 2018 without the USA.

Administration are bringing to the different markets (including the stock markets) of the GCR.[3]

In order to help address the objective outlined above, the analysis in this chapter examines first whether the financial markets of Hong Kong, Taiwan and Mainland China reacted in a similar or different fashion to Trump's election (Sect. 3). The analysis is supported by the use of the Economic Policy Uncertainty Index (EPU) for the US, with the aim of measuring market instability over the period and implications for the selected stock markets. The second part of the analysis looks at the potential impact of the new US Administration in terms of trade policy (Sect. 4). Since China and the "Greater China Region" (GCR) have been benefiting from globalisation, the study of how the "Greater China Region" might be impacted upon by an increase of market uncertainty triggered by recent political events originating in the world most developed economy is of key interest. Before that, a brief overview of China's opening in an unprecedented wave of globalisation and its increasing dependency on the Western economies, in particular on the USA, is discussed. Some conclusive remarks will be suggested in a conclusion.

2 The "Greater China Region" and China's Rise in the Context of an Unprecedented Wave of Globalisation

The rapid economic ascendency of China has implied that the balance of regional economic power has been shifting, prompting thereby some developed economies to deploy protectionist policies (Tanaka 2017). China has undergone rapid economic growth over the past three decades, with the country's GDP overtaking that of Japan in 2010. At the beginning of the economic reforms (1979), Chinese GDP amounted to 178$ billion and per capita income stood at 183$ whereas in 2015, China's GDP had climbed to 11,199.15$ billion—the second highest in the world—with a per capita income of 8123$ (World Bank 2016). Moreover, when the European Union is broken down into its many country components, China has become the world leader in terms of merchandise exports since 2009 (WTO 2017).

Much has been written about the importance of the open door policy and of trade as *sine qua non* conditions for growth in modern China

[3] Macau is not included as part of this study, because it does not have a stock market.

(see for example Yueh 2013). In line with the Akamatsu model, structural change has been an important feature of modern economic development in the GCR in general and lately in China in particular, and much of this structural change has been stimulated by trade liberalisation. In particular, China's trade structure has evolved from being characterised by labour-intensive and low VA industries to being led by higher VA and capital and technology-intensive exports (Caporale et al. 2015). According to recent figures (Atlas 2017) more than half of Chinese exports in 2015 were classified into the broad category of "electronics", whereas more than half of the export earnings in 1990 were drawn from the garments and textiles sector. The abundance of the labour factor connected with substantial wage differentials explain Chinese trade specialisation since the start of the economic reforms; over time, Chinese trade specialisation has moved into technology-based,—although still relatively labour–intensive—, industrial activities (such as the assembly stage in the computer industry, the latter being classified as "high-tech").

With respect to growth and to structural change, Taiwan is considered as being the region's lead "goose", following in the footsteps of Japan (Chow 2018). As documented by Chow (2018), Taiwan's import-substitution industrial strategy in the 1950s gave way subsequently to an export-promotion strategy, allowing the country to move gradually from sun-set and labour-intensive industries to technology-intensive industries. With its sector specialisation industrial targeting strategy, its developmental state model, the lifting of the Martial Law in 1987, and the liberalisation of the capital account, the country progressed towards a FDI-growth model from the late 1980s. In that vein, Taiwan has been a sizeable direct investor in China and importer from same (through the building-up of regional value chains) leading to what Chow (2018, p. 103) describes as being a "triangular interdependence among the US, Taiwan and China", or even a "unique de facto economic integration in East-Asia" with a heavy reliance on the external market for final consumption goods (Chow 2018, p. 104). Vibrant economic growth in the region implied that "China replaced the USA as Taiwan's largest export destination in 2004" (Chow 2018, p. 103). The FDI-trade nexus meant that by 2015, only 0.5% of all Taiwanese ICT products were manufactured in Taiwan (92.8% in China) whereas this share was 14.5% in 2001 (against 34.7% in China) (Chow 2018).

Inspired by economic policies that had prevailed in adjacent countries, China owes much of its economic development model to the

over-reliance on foreign demand (Li et al. 2012) with an export contribution being more significant in China than in any other country of the region (Tingvall and Ljungwall 2012). The reliance on foreign demand has been such that Cui et al. (2009) estimated that a 10% decline in the export volume leads to a decline of 2.5% in GDP growth, on average. It should be noted that in their model, the authors use a provincial-level panel dataset focusing on the demand-side. According to other sources (Li et al. 2010), the Chinese dependence on foreign trade (measured by the foreign trade/GDP ratio) has increased from 12.01% in 1981 to 46.87 and 69.37% in 2000 and 2008 respectively. The trade-growth relationship is also substantiated by studies using econometric methods showing that when considering export expansion and economic growth in China, cointegration applies; this means that there is a long run relationship and also a bi-directional causality between the two variables (as found for example by Kumari and Malhotra 2014). Other gravity-based models show that the trade volume is positively affected by compliance to WTO standards and negatively affected by geographical distance. According to Caporale et al. (2015), bilateral exports increase with an increase in the country size, FDI and membership to the WTO while it decreases with distance and with the effect of the Global Financial Crisis (GFC).

In the case of China, the thirst for foreign knowledge and for industrial modernisation meant that the absorption of large amounts of foreign capital during the two decades following Deng Xiao Ping's economic reforms became key industrial policy objectives. Given the export orientation of many of these foreign firms, (foreign) capital accumulation has thus played a fundamental role in explaining China's economic modern development, prompting one to highlight the importance of the investment-led growth effect. For example, the study by Herrerias and Orts (2010) uses cointegration methods and finds that exports as well as investment had an important impact on productivity and growth in China over the period 1964 and 2004. Their results are consistent with the existence of an investment-led growth effect and they mirror the key phenomenon of export-driven foreign firms. This issue mirrors the important incidence of China as a key country in the constitution of Asian and global systems of production by many multinational companies, taking the shape of "fragmented production" networks. For example, iPhones are assembled in China with components sourced in different countries. Since the supply chain of many manufacturers is dis-

tributed across different countries and regions in line with their country-specific advantages, this is likely to imply statistically that Chinese exports encompass a high import content.[4] According to the OECD (2018), the overall import content of Chinese exports was 29.4% in 2014, placing China well above the USA, Japan and Hong Kong but below Taiwan and South Korea. An analysis based on input-output methods estimated that some 11 high-tech Chinese industries such as electronic computers, telecomm equipment, instruments and other measuring equipment had a share of foreign VA above 50% in 2002 (Koopman et al. 2008). In these industries, foreign-invested firms have been playing a key role all along. According to these authors, processing exports represented more than two-thirds of Chinese exports in 2002, leading one to nuance the relative specialisation of China in the technology-intensive sectors. Also, what these calculations imply is that when talking about export-led growth, one needs to focus on net exports (i.e. X-M). When net exports alone are taken into consideration, they account at best for one-third of the increase in income in China for a given year in the period preceding the GFC (Akyiiz 2011). Evidence on the contribution of the different macroeconomic variables to China's economic growth between 2000 and the GFC shows the key role of gross (fixed) capital formation and the more marginal role played by net exports over the period (Prasad 2010, p. 15). It also shows how the 2008 GFC has put the traditional growth model of China into question: exports fell dramatically and even though other sources of growth allowed the country to stay afloat, a transition from an export-led growth to a more balanced model was made imperative (Fabre 2013). Consequently, after years of double digit growth, the 2008 GFC has gradually given way to a new growth model geared towards annual growth rates of around 6.5%. The setback from the GFC shows that China had greatly been benefitting from globalisation and in particular from favourable trade policies developed under the auspices of the WTO. Although it is still debatable whether the GFC is an important economic critical juncture for China and for the world economy—in terms of the trade-off between free trade and protectionism—, what is clearer is that protectionist trends were perceptible *before* the GFC (Andreosso-O'Callaghan and Uprasen 2009).

[4]The import content of exports is defined by the OECD (2018) as the share of imported inputs in the overall exports of a country. This statistical indicator measures therefore the foreign VA share of gross exports.

WTO statistical evidence shows that trade restrictive measures have increased dramatically since the advent of the GFC particularly from the part of developing and emerging countries. In the case of China, the incomplete move of the country towards a market economy since its accession to the WTO has meant that its import regime is still characterised by numerous protective measures.[5] State intervention in the market is paramount through incentives to (State-Owned and State-Controlled) exporting firms, through controls on FDI inflows and on foreign goods entering the Chinese market. This *mercantilist* policy has culminated with the emergence of the Chinese firm abroad to the extent that Chinese FDI outflows now surpass inflows of FDI (WIR 2017). Consequently, the relative success of the Chinese economy has created many unprecedented challenges to both the EU and the US economies.

Whereas in EU institutions circles, Parliamentary debate since the Spring of 2018 has been delineating a new EU regulation related to the screening of Chinese inward direct investment into the EU in order to prevent foreign (and Chinese) investment to threaten EU national security,[6] the response by the new US Administration has tended to be more confrontational. The plan to introduce tariff barriers (of 25%), targeting specifically China (and also Germany), should significantly affect Chinese exports, given that around 20% of Chinese total exports are bound to the US economy. China's strong commitment to export activities makes the country quite susceptible to the potential upsurge in protectionism measures that are being sought by major advanced economies. Because Chinas' capital account is still only partially liberalised, US protectionism might provoke a shock of greater amplitude than that of the GFC. The remaining analysis starts by examining the impact of the new US Administration on the performance of the main stock markets in *the "Greater China Region"*; this offers an initial view on how China and the region are reacting to global uncertainty.

[5] Note that when China joined the WTO in 2001, it accepted to be treated as a non-market economy in anti-dumping procedures until 2016; this implied that its prices and costs were assumed to be artificially set and were therefore not used by the investigating authority in alleged cases of dumping. The reference prices used were instead those of an analogue country (Japan or the USA) where prices are much higher. When its status came up for debate at WTO level in 2016, both the EU and USA denied China its much aftersought market economy status (MES). The EU's refusal is based on, *inter alia*, the degree of government influence over the allocation of resources.

[6] See for example the position of German industrialists on this issue in BDI (2017).

3 Stock Market Reactions to Political Events and Policy Uncertainty

This section starts with a discussion on the relevance of political uncertainty in the case of the financial markets.

3.1 Literature Review on the Financial Impact of Political Events and of Political Uncertainty

EPU refers to a non-zero probability of changes in the existing economic policies that determine the rule of the game for economic agents (Baker et al. 2012, 2016). EPU can impact upon economic and financial agents in different manners: (i) firms may change or delay investment decisions depending on the levels of employment, consumption and savings. (ii) Production costs might be affected and investment patterns can change depending on the economic cycle. (iii) Risks in financial markets can be enhanced as inflation rates, interest rates and expected risk premiums will vary depending on EPU. Since the 1970s oil shocks, the interest by researchers on the impact of political events has increased (Bloom 2009; Benacek et al. 2014). A lot of the research has focused on the analysis of market performance over the last two or three decades (Li and Peng 2017; Antonakakis et al. 2013; Brogaard and Detzel 2015; Kang and Ratti 2015; Liu and Zhang 2015). The literature shows that EPU does confound market participants and policy makers, in terms of financial risk. Li and Peng (2017) show that the absolute changes in the US EPU index have a negative impact on the co-movement of the domestic market. Another recent study looking at policy uncertainty and implications for the US stock market volatility by Arouri et al. (2016) shows that an increase in policy uncertainty reduces in a significant manner stock returns and that the effects become stronger and persistent during times of extreme market volatility.

Furthermore, emerging markets,—and particularly those markets characterised by a less liberal approach in their economic and/or political regimes—, are commonly associated with greater levels of uncertainty (Benacek et al. 2014; Bin 2015). Political uncertainty is associated with a significant reduction in foreign direct investment as the market is not considered safe, with potential failures in terms of law compliance and transparency of operations (Chan and Wei 1996).

Two types of political events need to be distinguished here: political news (or announcements) and the actual implementation of new policies. A rich literature has focused on the analysis of political news and the way financial markets react to them. In particular, stock markets seem to be more responsive to new information regarding political decisions rather than information that looks into implications and spillover effects of domestic and foreign policy. According to Tan and Gannon (2002), stock market prices are expected to increase if the news lead to an upward revision of investor's expectations and they follow a downward trend if the opposite occurs. Fong and Koh (2002) looked at the Hong Kong stock market and at how political risk has induced a regime shift in stock market volatility.

In the case of developed economies, the studies seem to offer a different view regarding the magnitude and implications that political uncertainty might bring to stock markets performance. For example, Dopke and Pierdzioch (2006) looked at the performance of the German stock exchange and they found a poor relationship between political changes and stock market performance (in Germany).

The literature review shows that most of the research in the field seems to be looking at the impact on internal/domestic political events with little attention given to external and global shocks in the context of developing and emerging economies. As a result, a research gap has been identified in the area.

3.2 The Greater China Region

The stock markets of Mainland China, Taiwan and Hong Kong are considered as being different regarding their levels of sophistication, political freedom, and the level of centralisation in terms of their political and economic approach. Mainland China is characterised by a rigid and centralised model with heavy controls exercised on its economic system, whereas Taiwan enjoys the highest level of political freedom of all three sub-markets.

In Hong Kong, the relatively non-interventionist economic policies, encompassing the freedom of capital movements and a well-developed regulatory and legal environment, have contributed to the development and consolidation of Hong Kong as a regional and international financial centre. Hong Kong stock exchange plays a major role in raising capital for Chinese-state-owned enterprises. Hong Kong has been based on a

free market economy with strong ties to international trade and finance, characteristics that left its economy significantly exposed to the 2008 global economic crisis. It can be argued that its heavy reliance on foreign trade and investment is enhancing its vulnerability in the global context.

In its first phase of economic development (1960s–1980s), Taiwan's move to an export-oriented approach created trade surpluses (in the 1970s, except during 1974–1975) and allowed increasing foreign exchange reserves and a partial liberalisation of the capital account in the 1980s. Consequently, Mainland China has become Taiwan's main economic partner, rendering Taiwan susceptible to shocks originating in China. This entails that Taiwan is more sensitive to regional issues rather than to global and international events. In the international context, Taiwan economic relations with the United States keep improving, as the US is Taiwan's second-largest trading partner and its main source of foreign direct investment (Rosier et al. 2016).

3.3 Quantifying the Impact of the New US Administration on the GCR Stock Market Returns

In order to assess the reaction to the new US Administration on the GCR stock exchanges, the methodology consists in identifying abnormal mean returns and at looking at the potential shift in returns volatility. This is done by using multivariate regression techniques as well as a GARCH framework.[7] The multivariate regression model identifies a system of portfolio return equations for event announcements with risk and political events being factored into the pricing process (as the Trump election in our case). The idea is to measure how the GCR stock exchange returns are affected by this specific political event.

Then the methodology proceeds by examining the effects that the new US Administration will have on volatility performance in the corresponding GCR stock index returns.

The findings show that: (i) market returns over the period of study (January 2014–June 2017) are positive for all cases with Mainland China exhibiting the best performance; this is followed by the S&P500, while the stock markets in Hong Kong and Taiwan follow the overall performance of the FTSE100; (ii) the Shanghai stock market is the most

[7]For more on this, the interested reader can refer to our recent empirical work (see Morales and Andreosso-O'Callaghan 2018).

volatile over the period; (iii) the overall results indicate that the Trump's election did not lead to a significant increase in market uncertainty in the GCR. Other results of this work also show that the Hong Kong and Taiwan stock markets are more affected by the occurrence of negative news whereas in the case of Mainland China, stock market volatility in Shanghai seems to be more affected by positive news rather than by negative news. Again, the core research findings indicate that Trump's election does not generate significant levels of volatility in the GCR.

The outcomes for the GCR seem to align with the study of Dopke and Pierdzioch (2006) which looks at the German stock market, where political changes showed a poor relationship with stock market performance. The results are not surprising as over the years China has managed to remain quite isolated to global shocks.

However, the research findings suggest that the GCR stock markets might be waiting for specific actions (policies) to be taken by the US administration that show if they aim to harm China's interests. Hence the next section.

4 Impact of the New US Administration on the GCR Real Economy—A New Wave of Protectionism

The analysis so far tends to highlight the fact that the economic interdependence between China, the GCR economies and the USA is very strong with regard to trade (in goods) rather than with regard to financial flows. A political event in the USA—such as the election of a controversial President—has had a marginal impact on financial market volatility in the GCR, but adverse trade policies might go less unnoticed in the GCR, particularly in China, given the still prominent role played by trade in Chinese economic growth and by the trade-growth nexus. Although much of the global economic growth is explained by trade in particular in emerging countries—as reiterated above—, a note of caution needs to be exercised on the trade-growth relationship. Despite the fact that a majority of (empirical) studies leans towards the net positive effects of trade liberalisation on economic growth, the literature has nevertheless failed to produce a robust conclusion on the matter. For Deraniyagala and Fine (2001), the positive impact of free trade policies need to be nuanced, given that: (i) the (positive net) gains arising from free trade are unevenly distributed; (ii) the free trade paradigm may lack

relevance in the case of small developing countries given their small economic weight, in terms of production and trade; (iii) the positive relationship between trade liberalisation and export growth depends on the pattern of production; (iv) the problem of structural adjustment costs is overlooked by the theory; (v) NTBs are notoriously difficult to measure (problem of services). Finally, the authors stress the fact that most studies on trade liberalisation are *ex-ante* studies, and that studies providing an *ex-post* assessment of the effects of trade liberalisation are rare.

The rise of NTBs, in spite of trade liberalisation, has been highlighted as a way to circumvent the lowering or the elimination of tariffs in certain cases. These barriers are still of particular concern and are noticeable in China given China's non-market economy status, and despite the many efforts made by the Chinese government to introduce market principles in its economy since its accession to the WTO in 2001.

Although during the 1980s–1990s period, licences for trading were granted to a bigger number of firms, from around 16 in the period prior to the reforms to over 35,000 in 2001, and the import planning system was dismantled, it was replaced by tariffs and non-tariff barriers in order to prevent a massive number of foreign goods to flood into the Chinese market (Wang 2007). Even though by the end of the 1990s, only 8.45% of the imported products into China were subject to regulations (Wang 2007), WTO disputes involving China and complaints about the difficulty of doing business in China have kept flooding the news.[8] According to European Parliament sources (EP 2016), some 37 WTO cases had been registered involving China as a respondent between the end of 2001 and November 2016; most of these cases were initiated after 2006, and mostly by developed countries. In the same time-period, China had filed only 13 cases as a complainant targeting exclusively the EU and the USA. Paradoxically, China's entry in the WTO has coincided with the implementation of a new wave of protectionism in particular from the part of the EU (Andreosso-O'Callaghan and Uprasen 2009). Using a GTAP-based model for the trade between the EU-25, China and the USA, 17 industries and for the years 2004–2008, the study finds that an increase in trade barriers leads to negative welfare effects for the protectionist countries but that technical progress can mitigate some of these negative effects (Andreosso-O'Callaghan and Uprasen 2009).

[8] See the evidence contained in the annual reports by the EU Chamber of Commerce in China (for example 2011/2012).

This study also shows how structural change is stimulated by protectionism: for China, protectionism leads to a contraction in the production of a number of industries such as electronics and equipment whereas production contraction affects fewer industries in the case of the EU-25. Protectionist policies seem thus to have ultimately a differentiated impact.

In the background of rising protectionist trends visible since at least the GFC, several initiatives by the US Government have placed the protectionist issue at the forefront of public debate in many countries. First, in October 2011 (that is, well before the Presidential election of Trump), the US Senate had passed "The Currency Exchange Oversight Reform Act" (S.1619) which would allow the imposition of tariffs on Chinese imports to the United States. The new Trump Administration is undoubtedly decisive in changing US trade policy. Of key importance is the US Trade Representative (USTR) in determining that the policies and strategies of China related to technical issues such as technology transfer, intellectual property and innovation are "unreasonable or discriminatory and burden or restrict US commerce" (USTR 2018, p. 1). As a result of these allegations, an additional customs duty of 25% on a list of selected products originating from China is proposed.[9] The document refers to a number of opaque and uncompetitive practices used by the Chinese Government in order to obtain cutting-edge technologies and intellectual property from abroad, in particular joint venture requirements (eased nevertheless after China's WTO entry), foreign equity limitations, public procurements, as well as vague rules applied in a non-transparent manner by Chinese government officials. Much has to do with the nature of doing business in China and in particular with the interference of the Chinese Government at different stages of business deals such as for example when it "directs" and/or "unfairly facilitates" the investment in, and/or acquisition of, US assets by Chinese firms in order to acquire much needed knowledge (USTR 2018, p. 4).

Although the "Trump Tariffs" have to be viewed in a much broader light given that they have since been scheduled for other countries,

[9]Defined at the 8-digit level of the Harmonized Tariff Schedule of the United States (HTSUS), the list comprises products such as machines-tools (including those used in the textile industry); selected chemicals and pharmaceuticals products; iron, steel and alumina products; precision instruments and instrument engineering; telecommunications equipment; motor vehicles; and other products such as weapons (see USTR 2018).

including Canada which is part of NAFTA with the USA,[10] the remainder of the discussion deals exclusively with China which, interestingly, was the key targeted country at the beginning of the Trump Administration and which seems to have been diluted since. Perhaps this is due to the fact that, as pointed out by much evidence, a large proportion of the US trade deficit with China comes from the many export-oriented US multinational companies that have moved production to China to take advantage of its low labour costs and of other incentives. As reported by US sources, only 1.9% of China's exports came from foreign-invested enterprises in China in 1986; this share rose to 58% in 2006 (CSR Report for Congress, January 2008). Indeed, of crucial importance in the case of China is the (geographical) fragmentation of the production process and the world-wide constitution of value chains. According to Lovely and Liang (2018), some 60% of Chinese exports to the USA originate from foreign-invested firms and this proportion is larger than for other importing countries. With a high import content of exports, Chinese trade flows follow a triangular pattern: the country imports high-value-added inputs from the USA and from wealthier Asian countries, and it exports processed/assembled goods to western countries for final consumption. In particular, three industries stand out as representing the lion's share of US imports from China: these are the computers and telecommunications, electrical equipment and machinery, which together represented 54% of US imports from China in 2017 (Lovely and Liang 2018). As argued by these two authors, nearly 85% of the products on the proposed tariff list are intermediate inputs and capital equipment products. Also, they note that 80% of the trade in value terms targeted by the US Government concerns industries classified as being patent-intensive in 2012. By crossing the different data, Lovely and Liang (2018) conclude that more than half of US imports, except for chemicals, come from foreign-invested firms where patent activity is high; for example, in the computer and electronic products industry—one of the most patent-intensive industries—, 68% of imports into the USA originate from foreign firms located in China. The share is 65% for nonelectrical machinery. Other shortcomings related to the Trump tariffs in the case of China encompass the fact that US MNEs in search of low cost production operations would relocate their plants into adjacent

[10]North America Free Trade Agreement signed in August 1992 and in force since 1994.

Asian countries such as Vietnam, again in line with the flying geese model, but without a positive impact on the US trade balance.

A much more subtle approach would be to delineate the main vehicles through which (US) technology is misappropriated by Chinese firms and to tax exclusively those Chinese exports. For example, Lovely and Liang (2018) suggest that if joint ventures (JVs) are found to be the main channel of misappropriation of technology, then Chinese exports from JVs should be targeted.

5 Conclusions

The analysis conducted in this chapter shows how the economies of the GCR are linked to the US economy especially through the trade-investment nexus. Some econometric work carried out on the response of the GRC financial markets to the election of Trump shows that the new US presidential administration is not generating significant variations on GCR market returns performance; the impact of EPU in the global context appears to be insignificant. China's stocks markets do not seem to be panicking and overreacting to the election, a result which confirms China's historical behaviour regarding international shocks in so far as the country has managed to remain unscathed from global financial shocks.

A different scenario is supposed to emerge with the implementation of the "Trump tariffs", a list of which has been announced by the US Government in June 2018. The original US administration strategy was to address the many complaints about Chinese opaque business practices, and in particular about the allegations in terms of "forced" technology transfer, reverse engineering, patent violation, industrial espionage, and the subversion of trading rules; all these practices have led, in the eyes of the US Administration, to the phenomenon of "misappropriated technology", which itself has been easily (and perhaps too systematically) connected with the persisting US trade deficit. However, what comes out of this analysis is that the phenomenon of production fragmentation across the Asian region and beyond has meant that a large share of Chinese imports into the USA which are targeted by the Trump tariffs originate from (US) foreign-invested firms in China. This is particularly the case for three technology-based industries such as computers & telecommunications, electrical equipment and machinery, which together represent more than half of US imports from China. The claim of

"misappropriated technology" might be valid, given China's non-compliance with market-based rules, but the US strategy of imposing indiscriminate tariffs to a number of selected products without checking the origin of same seems to be counterproductive. Ultimately, what could happen, with such a policy, is that fringe countries such as Taiwan (and also Canada in the context of NAFTA) might feel the impact of the Trump tariffs well before China itself. The "China problem" seems to have been diluted until at least a new and more refined US trade policy can take shape.

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CHAPTER 10

Microfinance in Southeast Asia: The Case of Vietnam Over the Period 2005–2015

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Abstract Over the last decades, microfinance (MF) in Vietnam has grown significantly contributing to government goals in terms of poverty reduction. As per 2013 records for Vietnam, there were 10.09 million MF clients, and over 130 Microfinance Institutions (MFIs) with 5800 branches at the commune-level (ADB in *Sector assessment: MF development program in Vietnam*, Hanoi, Vietnam, 2014). The reviewed literature points out to the lack of effective analysis on how MF programmes are developed and on how they are aligned with ethical standards that focus their activities on both poverty reduction and the empowerment of women in Vietnam. This study identifies how MF is used to articulate appropriate and effective policies and measures that contribute to the alleviation of poverty in the Southeast Asian region, taking Vietnam as a case study.

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1 Introduction

Vietnam has become one of the highest growing economies in the Southeast Asian region and it is recorded as one of the few countries in the world that has achieved millennium development goals in 2015 with regard to poverty reduction. The country is exhibiting high economic growth with a 6.7% GDP growth rate recorded in 2015 (The World Bank 2016). The country's performance has helped in reducing the number of poor people in a significant manner when compared to previous decades, moving from a staggering 28.9% poor people registered in 2002 to an 11.1%, as per 2012 data (ADB 2013). The availability of MF to the poor has been considered as a key financial instrument that has impacted positively on strengthening socio-economic cohesion in poor countries. The government of Vietnam has been facilitating the application of MF instruments in social–economic policies to develop the nation. Consequently, the case of Vietnam can be considered as a very interesting case study on how MF can be used as a tool that contributes to the alleviation of poverty levels whilst facilitating the role that women play in the wider economic and social spectrum.

In order to gain a better understanding of the role of MF in Vietnam, it is important to contextualise the study. Therefore, the discussions that follow are focused on the analysis of the role of MF in the world, by looking at its history, products, institutions, and simple models of MF. Afterwards, the analysis focuses on the study of MF in Vietnam over the period 2005–2015; this allows to understand how MF has helped the country to evolve and to identify the kind of challenges that lay ahead.

2 Understanding Microfinance

2.1 The Origins of Microfinance

The origins of MF are linked to the existence of a wealthy class that historically provided financial support in an informal manner to the poor at very high-interest rates. The concept of MF can be found around the seventeenth century, with an Irish man—Jonathan Swift—being

considered as the father of MF (Hollis and Sweetman 1998). Later on, a semi-formal microfinance institution (MFI) appeared in Germany during the nineteenth century which was founded by Friedrich Wilhelm Raiffeisen. Raiffeisen designed several MF approaches for the poor in the agricultural sector through savings and borrowing groups. From that time, MF developed and expanded to Europe and America. In the early twentieth century, rural poverty and dependence on moneylenders were identified as a serious social problem in the British Indian colonies. Drawing their inspiration from the successes of German cooperative credit and from the Irish Loan societies, British rulers decided to promote some MF activities to tackle the problem of poverty in India. The legacy of MF was already established, and it contributed to the development of the Grameen Bank model in post-independent Bangladesh. The Grameen Bank contributed significantly to the introduction of financial services to the poor during the twentieth century.

2.2 Delineating the Extent of Microfinance

According to the Asian Development Bank (ADB) (2000, p. 2), "*MF is the provision of a broad range of financial services such as deposits, loans, payment services, money transfers, and insurance to poor and low-income households and, their micro and small businesses*". The targets of MF tend to be: poor people, low-income households and micro and small enterprises (Skare and Prziklas Druzeta 2016). MF can foster economic growth from a micro to a macro level in those countries where access to financial resources is limited to more affluent individuals (Timberg et al. 2011).

3 "Symbol" Models of Microfinance in the World

3.1 The Case of Bangladesh

The model of the Grameen Bank in Bangladesh is considered as a success model of MF for the poor. This model was designed by professor Yunus, Noble Peace Prize winner in 2006. The Grameen Bank system was established in all the rural areas of Bangladesh, with every village having a credit team, and each team a team leader. The mechanisms of the credit team are as follows: (i) if people want to borrow money, they must be a member of the credit team. (ii) The credit team holds weekly meetings and monitors the activities of the members who borrow money, in order

to control the use of capital as well as the work of the borrowers. Most clients have only a few assets or nothing at all. In this regard, to get a loan, a person in the family has to be a full member of a credit team with others in the same situation. The members have to follow mechanisms of the credit team in terms of duties and benefits. With regard to the duties, the members attend a number of weekly meetings on sharing and getting information including business practices, the payment ability of borrowers and the procedures in using the loans. If a member faces a difficult situation with regard to his/her repayment ability, other members in the team have to help that member by covering the repayment, and this ensures on time repayments for the team as a whole. Professor Yunus founded the model of the Grameen Bank in the village of Jobra in Bangladesh in 1976, and the model was expanded in 1983 throughout the country with a special bank and a special law to serve the poor. Based on the annual report of the Grameen Bank (2011), there are 8.5 million clients availing of the Grameen Bank facilities with 97% of these being female clients. Moreover, 95% of the total equity of the Grameen Bank was owned by borrowers, whilst the government owned only 5%. This model demonstrates both a feasible financing arrangement and stable operations for the poor people, and this is considered as an important factor that helps to build and develop social justice.

3.2 The Case of India

India is the second largest populated country in the world, and it also has the highest proportion of poor people (The World Bank 2009). In recent years, the Indian government has considered carefully both the development of MF and how it can contribute to the goals of poverty reduction (Blaxall 2004; Holvoet 2005). The self-help group (SHG) is a simple model of MF in India that includes from 10 to 20 members in a group where the majority of members are women. The SHG's organisation operates in a similar way as the Grameen Bank model. However, there are some differences that should be considered; for example, the SHG helps its members in applying for financial resources from commercial banks, NGOs, and governmental subsidiaries. The SHGs provide not only financial services but also they support health services such as vaccination, birth-control information as well as the creation of job opportunities. Most of the SHG have connections with socio-economic organisations and NGOs that could help the poor to easily access resources and business technologies.

3.3 The Case of Indonesia

There are several differences between MF facilities in Indonesia when compared to the cases of Bangladesh and India. Bank Rakyat Indonesia (BRI) is a commercial bank that belongs to the government and that was established in 1959. BRI is located on the biggest island of Indonesia—Java—which holds the largest population in the country. Most clients of BRI are family businesses, small businesses, production households, and businessmen in the local market and involved in retail trade. Based on governmental support, BRI offers different levels of interest rates by looking at the different types of borrowers and at their economic and social goals. Additionally, BRI focuses on rural markets through low-interest rates made available to the agricultural sector that support poor farmers with the aim of enabling them access to MF resources (Widiarto and Emrouznejad 2015).

3.4 The Potential Impact of Microfinance

MF can be viewed as a potential solution to poverty reduction in many countries in the world, as already illustrated by the cases of BRI in Indonesia, the Grameen Bank in Bangladesh, and SHGs in India (Imai and Azam 2012; Blaxall 2004). MF can support poor people to access different types of services than can range from health, to education, businesses, and so on in the rural context. The poor can use flexible borrowings to do business or to provide services that would create an income based on their borrowing. Moreover, MF can create stable businesses and reduce the risk of external impacts on small enterprises. MF offers opportunities for the poor to access financial services easily, to help contribute to the creation of jobs, and to boost wealth amongst the poor. As a result, governments can ease up on their social welfare burden, and use resources to support the development of appropriate social policies that contribute to economic growth and development.

4 Microfinance in Vietnam

Looking at the Vietnamese economy, the origins of MF practices can be found before the 1980s with the availability of informal financial services amongst relatives and families. Since 1980, semi-formal MF experiences have been operating in Vietnam through cooperation programmes,

society, and economic links between the government of Vietnam and international organisations. Since 2010, MF operations started to be regulated by the government and the role of Vietnam State Bank in governing MF Is has been clarified by the introduction of the Law of Credit Institutions.

4.1 Microfinance Institutions

In Vietnam, there are three kinds of providers of MF, including formal organisations, semi-formal organisations, and informal organisations (Ha-Hoang et al. 2013; Nghiem et al. 2006, 2007; Vo and Tran 2013). Formal MF organisations include: the Vietnam Bank for Social Policies (VBSP), the Vietnam Bank for Agriculture, and Rural Development (VBARD), the Vietnam Cooperative Bank (CB)/Vietnam People's Credit Funds (PCFs), several commercial banks and three licensed MFIs, namely TYM,[1] M7-MFI,[2] and Thanh Hoa MFI.[3] The VBSP was established in 2002 by the government of Vietnam with a governing body that includes many different ministries of the cabinet. The duty of VBSP focuses on lending to the poor people and to students in Vietnam. The VBSP leads in providing microcredit in the Vietnamese MF market. Besides, the VBARD is also a big provider of microcredit with a full network in every district of Vietnam. On the other hand, the establishment of the Vietnam CB is based on a network of PCFs from 2013; the PCFs were established in 1993 by State Bank of Vietnam, which has a wide network in 53 provinces in Vietnam. Other MF organisations occupy a small ratio of the MF market in Vietnam that developed on aid funds from NGOs, and social organisations licensing by the State Bank of Vietnam.

Semi-formal MF organisations include non-licensed MF organisations through donor aids, NGOs, and development projects. Besides, labour, and political organisations in Vietnam played important roles in MF such as Vietnam Women's Union (VWU), Vietnam Farmer's Union (VFU), Vietnam Veteran Association (VVA), and Ho Chi Minh Communist

[1] Tao Yeu May (TYM) or Tin Thuong is a limited liability MFI managed by the Vietnam Women's Union.

[2] M7-MFI—M7 is a limited liability MFI that transfers social funds in Vietnam.

[3] Thanh Hoa MFI—Thanh Hoa is a limited liability MFI in Thanh Hoa province of Vietnam.

Youth Union[4] (HCYU). VWU has a significant role in MF development for poor women by promoting gender equality. VWU has networks in all Vietnam's communes and they can reach the poor in local areas. VWU has been creating bridges between formal MFIs and the poor through financial functions with a social support focused on the empowerment of women (ADB 2014; WB 2015).

Informal MF organisations consider a group of people in local communities such as rotating savings and credit associations (ROSCA). ROSCA is an annuity shared by subscribers to a loan or common fund; the shares increase as subscribers die until the last survivor enjoys the whole generated income. Additionally, there are private financial services that are not managed by any organisation or government and they are negotiated by group members or individuals such as moneylenders, traders, relations, and pawn shops (Nguyen-Kim 2014; WB 2015).

4.2 Microfinance Services

The development of MF in Vietnam has been spanning over 30 years, and it is characterised by four basic types of microfinancial services, such as microcredits, microsavings, microinsurance, and non-financial services. The government of Vietnam has made efforts to support the access of the poor to microcredit in many ways, as it considers that this is one of the methods that contributes to economic growth and poverty reduction.

4.2.1 Microcredit

Vietnam has experienced significant growth in microcredit products, and there are assistance services and connections from social organisations and semi-formal MF organisations such as VWU, Vietnam Forestry University (VFU), and NGOs.

Based on Table 1, it can be seen that Vietnam Bank for Social Policies (VBSP) accounts for over 50% of all customers and that it has an outstanding balance in the total formal microcredit market in Vietnam. On the other hand, MFIs account for a small fraction of the market. However, there was a significant growth over the period, which

[4]The Ho Chi Minh Communist Youth Union (Vietnamese: Đoàn Thanh niên Cộng sản Hồ Chí Minh) is the largest social-political organisation representing the Vietnamese youth. The union is led by the *Communist Party of Vietnam*.

Table 1 Characteristics of microfinance institution leaders in Vietnam

	VBSP	*VBARD*	*CB/PCFs*	*Formal MFIs*
Model	*Policy bank*	*Commercial bank*	*Financial cooperative*	*Limited liability company —non-bank Cis*
Purpose	Non-profit—for policy missions required by the Government	Profit	Mutual benefit amongst members	Self-sustainability and social missions
Main funding sources	State budget	Savings mobilization from public	Savings mobilization from public and members	Savings mobilization from public and members; external funds from donors
Lending products	Programmes designed by the Government to specific beneficiaries	Based on customers' demands and credit institution law	Lending to members only. Basing on members' demands and credit institution law	Basing on members' demands and credit institution law
Lending methods	Credit and savings group	Individual; pilot group lending in some places	Individual	Joint-liability group lending
Main market segment	The policy beneficiaries (the poor and disadvantaged groups)	High and medium-income householders, micro-enterprises, small and medium-sized enterprises, big enterprises, focusing on rural/suburban areas	Medium to low-income householders, microenterprises, small and medium sized enterprises	Low-income and near-poor households
Coverage	Transaction points in all communes of 64 provinces	2300 branches and transaction offices in all 64 provinces Branches in all districts	1045 PCFs in 1.0% communes of 60 out of 64 provinces, PCF transferred into CB in 2013 with 25 branches	Not many, mainly in disadvantaged and suburban areas

Sources ADB (2010b, 2014), WB (2015)

highlights the effectiveness of real MF. Based on the VBSP's records, 95% of the borrowers are female in some provinces of Vietnam.

4.2.2 Types of Microsavings

There are two main types of microsavings: compulsory deposits from the households involved in these savings schemes and voluntary deposits (WB 2015). Most of the microsavings are based on compulsory deposits which are a requirement to join MF operations through teams or group savings (ADB 2010a, 2014).

The VBSP plays an important role as the bank for the poor with a higher number of depositors that show effectiveness in terms of goals of operations. The microsavings operated within this bank are not unattractive to customers as interest rates offered by MFIs are always lower than those available in a commercial bank.

4.2.3 Microinsurance

Over the past ten years, the government of Vietnam has been making significant efforts to develop the insurance industry for Vietnamese people, such as health insurance and agriculture insurance for the poor. However, the number of microinsurance services available is still underdeveloped.

4.2.4 Non-financial Services

Non-financial services play an important role for the sustainability of poverty reduction objectives, such as education, health and social services. Several non-financial services are organised by social organisations through gender training by the VWU, breeding and cropping by VFU, and training start-up businesses by Ho Chi Minh Communist Youth Union (HCYU) (Nguyen-Kim 2014; WB 2015). Particularly, VWU provides microcredits and information on birth control, and gender equality law for female clients.

4.3 The Role of the Government in Microfinance

The government of Vietnam has been playing an important role in MF operations by controlling interest rates caps so as to support the access to credit facilities (Fig. 1).

Figure 2 shows that the trend of interest rates linked to microcredit decreased over the period 2004–2011 in Southeast Asian countries,

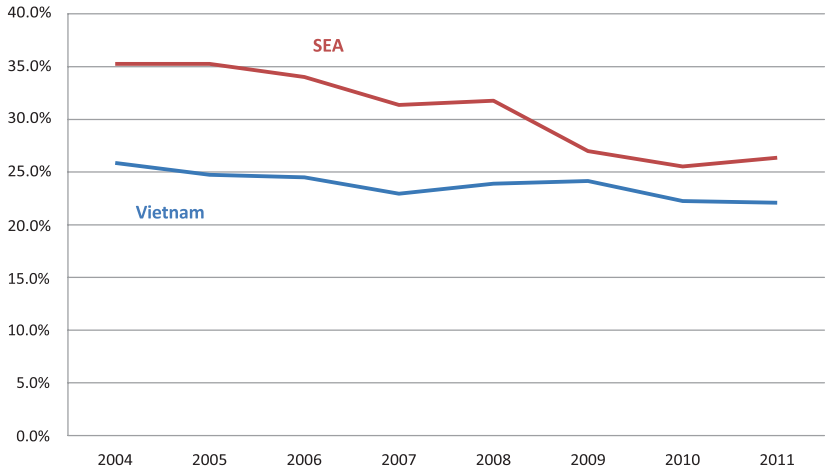

Fig. 1 Interest rates on microcredits in Vietnam and Southeast Asia (*Source* The World Bank 2015)

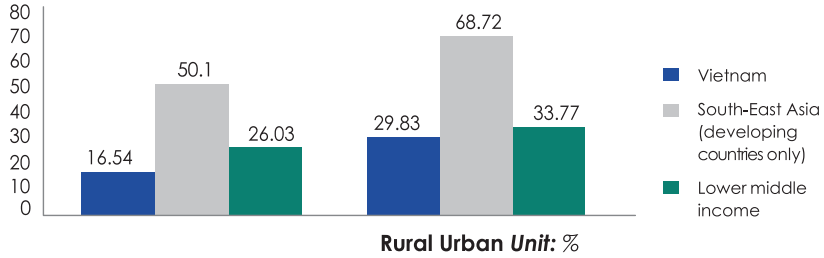

Fig. 2 Percentage of customers having an account in formal financial institutions (urban/rural areas in %) (*Source* Demirguc-Kunt and Klapper 2012)

a decrease that can be considered as a positive evolution of MF for the goal of poverty reduction. As a result, the poor have been able to access microcredit loans with low-interest rates as can be seen in Fig. 1.

The interest rate cap in Vietnam has followed a downward trend; this trend aligns with countries in the Southeast Asian region that have introduced government controls and subsidies. In terms of the short-term goals, the government of Vietnam is making good progress in

the development of policies that support the poor in accessing financial resources. They want to control MFIs with specific targets on poverty reduction (Timberg et al. 2011). However, the MF system in Vietnam is based on a state-owned approach sustained by governmental subsidies, an approach that is not a viable long-term strategy in terms of the sustainability of MF development.

4.4 Microfinance Trends

Responsible finance is identified as the main trend for MF in the context of Vietnam. According to the International Finance Corporation (IFC), responsible MF can aid attain long-term benefits by balancing carefully the relationship between providers and clients. In this regard, three elements should be considered when looking at developing responsible MF:

1. Strong customer protection regulations adapted to the need of low-income clients;
2. Industry standards and providers that integrate responsible finance into their system;
3. Well-informed clients who are capable of making the right financial decisions.

The government of Vietnam should seek to introduce policies that seek to balance the relationship between providers and clients of MF, eliminating governmental subsidies, and diversifying MF resources through the development of sustainable policies. The main goal is to ensure that responsible MF services are offered in Vietnam, and that they are enshrined in a long-term strategy with a focus on socio-economic development. The government of Vietnam has to make more efforts in improving the legal framework of MF in creating attractive policies to lure private investors into the MF sector. At this moment in time, most of the MFIs depend on subsidies given by the government of Vietnam, and this represents an important constraint in terms of sustainable development.

5 Lessons from Microfinance in Vietnam

The government of Vietnam considers MF as a useful tool in its poverty reduction strategy. The VBSP is considered as a simple MF bank based on the scale of operation and the number of poor clients by the

government of Vietnam's support policies (WB 2015). The number of poor people able to access MF programmes has increased significantly over the last two decades (Duy et al. 2012; Vo and Tran 2013) with MF operations contributing to job creation for the poor and helping to diversify the sources of income in households (Nghiem et al. 2012; Phan et al. 2014). These organisations have provided appropriate loans with reasonable interest rates for the poor through evaluations of the specific circumstances of each applicant (ADB 2014; Phan et al. 2014).

5.1 Empowerment of Women

Women play very important roles in Vietnamese families, as they not only take care of all the household work such as cooking, cleaning, children, and elderly people, but they also contribute to the generation of income for their families. However, in the traditional Vietnamese family, men are always the ones who make relevant decisions, as is the case in Asian culture in general. Furthermore, women tend to face situations of domestic violence within their families which are largely unreported. In current decades, Vietnam has been considered as a nation that is making a strong commitment and effort regarding gender equality through the introduction of MF tools. This is partly because there is cooperation between MFIs and social unions and this cooperation has contributed significantly towards the reduction of poverty for female clients. VWU is considered as quite effective in dealing with the organisation and assistance to the poor and empowerment of women in Vietnamese families.

5.2 The Challenges of Microfinance

Besides the successes of microcredit in Vietnam, there are still a number of challenges that need to be considered. A significant number of Vietnamese people do not hold an account in formal financial institutions compared to other countries in Southeast Asia. As a result, Vietnamese people have a habit of using cash in most of their transactions. Figure 2 shows that only around 16.54% of Vietnamese people living in rural areas hold an account in formal financial institutions. Some 73% of Vietnam's population live in rural areas and most of the poor living in rural areas face a number of challenges before they can improve their level of access to MF. For example, the poor in Vietnam still face

significant difficulties when accessing full MF services by not having an account in the banks (Fig. 2).

6 Conclusion

Based on the history of the MF sector, the government of Vietnam has learned useful lessons from simple MF models used in other countries, such as the Grameen Bank in Bangladesh, self-help groups (SHGs) in India, and Bank Rakyat Indonesia (BRI) in Indonesia. MF has developed over a short-period of time in Vietnam, but a brief review of MF in the country already points to a successful situation in terms of poverty reduction and gender equality. There are three main aspects that can be highlighted in the case of Vietnam:

- First, MF is playing an important role in the government of Vietnam's social–economic development strategy. There are strong relationships between financial providers and social organisations that promote MF for the poor through governmental subsidies. MF is considered as a useful tool in the government's efforts towards poverty reduction.
- Second, the government of Vietnam has to develop an appropriate legal framework that encourages the development of private MF services though relevant policies. As such, the government needs to decrease subsidies available to MFIs in an effort to create a balance and a sustainable MF environment.
- Finally, the MF sector in Vietnam needs to make efforts to engage with professional operations that help with regard to the diversification of microfinance services. Most of the MF products in Vietnam are currently focused on microcredits, whilst many other services are not at all developed.

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CHAPTER 11

Staffing of French MNCs in Asia: The Roles of Long-Term Expatriates *Versus* Short-Term Assignees

Bruno Amann, Jacques Jaussaud and Johannes Schaaper

Abstract The development of global travel and high-speed communication technologies has considerably changed the way people work across borders. This contribution investigates the roles and functions of short-term assignees compared with long-term expatriates. Face-to-face interviews with 77 expatriated managers in charge of the subsidiaries of 47 French multinational companies (MNCs), located in 11 Asian countries, reveal that French expatriation to Asia is contained but not declining, with no signs of disappearing soon. In specific cases, French MNCs continue to use expatriates extensively. Although the use

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of short-term assignments is increasing, this trend is not systematic in all MNCs. Finally, expatriates have more strategic, long-term oriented roles, whereas short-term assignees complement expatriates by taking over more operational and functional roles. These findings produce some key managerial recommendations for managing and promoting short-term assignments, as well as implications for further research.

Keywords Expatriates · French MNCs
Short-term international assignments · Functions · Roles · Asia

1 Introduction

The development of high-speed travel worldwide, as well as the progress in information and communication technologies, have considerably changed the way people work, especially across national borders. Bonache et al. (2010) list several options available to multinational companies (MNCs) for organising international work, including long-term expatriation, self-initiating expatriation, short-term assignments, commuter assignments, frequent business travelling and virtual work. Collings et al. (2009) call for empirical research into these new forms of international assignments. Tahvanainen et al. (2005) specify that such research is strongly needed at the firm level to determine the motivation and underlying factors that encourage the use of short-term assignments.

We define 'expatriates' here as people who work in another country long enough to establish residency in that country although the assignment will not last for more than a few years (Bonache et al. 2010). Spouses and families typically move with the expatriate to the host country. Expatriates are costly (Latta 1999; Selmer 2003; Wong and Law 1999); not always efficient (Black et al. 1991; Tung 1981) and can even sometimes lead to costly failure (Harris and Brewster 1999). To limit the extensive use of expatriates, MNCs send experts from headquarters or other units of the MNC's network on short-term assignments to their subsidiaries abroad.

According to Tahvanainen et al. (2005), short-term international assignments are longer than a business trip but shorter than the typical expatriate assignment, usually between one and twelve months. A short-term assignee is both less costly and more flexible than traditional long-term expatriates but performs some similar functions. Mayerhofer et al. (2004a, b) use the term 'flexpatriates'.

Collings et al. (2009) suggest that qualitative research can shed light on the factors that underlie specific international human resources management practices and offer a more nuanced understanding of global staffing decisions. To answer this claim, we investigate in this paper recent trends and the rationale behind choosing expatriation and short-term assignments by western MNCs, with French MNCs being taken as a proxy. We conducted face-to-face interviews with 77 expatriated managers in charge of the subsidiaries of 47 French multinational companies located in 11 Asian countries. Our sample spans over large, medium and small MNCs, operating in a variety of industrial and service sectors, with or without production activities in Asia.

In the following section, we review the literature on several interconnected topics: the increasing or decreasing use of expatriates, their roles and functions, the increasing number of short-term assignees and their specific roles and functions. From this review, we generate a set of four complementary research questions. We then detail our qualitative interview methodology and the findings corresponding to the set of research questions. The discussion section offers an overview of the results as a whole as well as suggestions for human resources executives charged with managing and promoting short-term assignments. We conclude by suggesting further research directions.

2 Literature and Research Questions Development

2.1 Increasing or Decreasing Use of Expatriates?

According to Bonache et al. (2010), in the early 2000s, MNC managers frequently confirmed the decline in the use of expatriates, in both developed and developing countries, and their replacement by talented local managers who were carefully selected and trained. Beamish and Inkpen (1998) find that Japanese MNCs reduced expatriation, largely for well-known reasons such as high costs and disappointing results. Kühlmann and Hutchings (2010) reveal that most western MNCs were substituting expatriates with local managers in their subsidiaries in China. However, Bonache et al. (2010) also caution that these conclusions are not always supported by reviews of consultants' reports (admittedly undertaken before the economic crisis of 2008), which consistently indicate an increased use of expatriates.

However, the Global Relocation Trends Survey (2010) concluded that the economic recession had forced MNCs to cut back on their overseas assignments (46% of the surveyed MNCs). The Cartus (2010) survey also confirms the reduced use of long-term assignments between 2007 and 2010 but an increased use of more flexible international assignments. According to Cartus however, MNCs expect to increase all types of international assignments, including the most costly long-term assignments in the coming years, with China becoming the top destination.

Oddou et al. (2000), Mayerhofer et al. (2004a), Welch et al. (2007) indicate that increasingly, employees are rejecting long-term international assignments, often due to familial constraints. This has led to an 'observed trend to reduce the use of expatriates' that requires the increasing use of short-term travelling (Welch et al. 2007, p. 174).

The number of expatriates that MNCs send to their subsidiaries depends on several variables (Harzing 2001). First, the number of expatriates depends on the country of origin of the parent company. For example, Japanese and German MNCs are known for their strong expatriation culture, whereas English and French MNCs are more likely to transfer responsibilities to local managers. Second, the host country of the subsidiary matters: MNCs send more expatriates to developing countries, because in these countries these firms might struggle to find suitably qualified local staff. In addition, expatriates are more commonly found in host countries with high cultural and institutional distances: western MNCs send more expatriates to Latin America, Africa and the Middle and Far East, whereas they send fewer expatriates to western Europe and Canada (Harzing 2001). Third, the size of the subsidiary and the size of the share capital held by its parent both correlate positively with the number of expatriates. Jaussaud and Schaaper (2007) add that the use of expatriates is greater when subsidiaries have production activities.

These academic results lead to a paradoxical situation. We have on the one hand the high costs of expatriation, ongoing recession in western home markets, the difficulty of finding a sufficient number of well-qualified managers willing to live in faraway countries, and a French tradition of localising management positions which would lead French MNCs to reduce expatriation towards Asia. We have on the other hand the need for western (including French) MNCs to compete for new markets in

Asia, with great cultural and institutional differences which would lead French MNCs to send more expatriates.

These contradictory trends call into question the nature of French MNCs' expatriation policies in Asia. We therefore investigate the expatriation policies of 47 French MNCs in Asia. The first research question asks if French MNCs are increasing, stabilising or reducing expatriation for their subsidiaries in Asia.

2.2 Role and Functions of Expatriates

Edström and Galbraith's (1977) list three main motives for sending expatriates to subsidiaries abroad: filling key positions, especially when local employees lack the necessary skills; developing the management competencies of the expatriate assignees, and developing the organisational structure of the subsidiary and the MNC as a whole. The findings of the survey by Bonache et al. (2010) were published between 2000 and 2007. Some of those studies conceive expatriation as a cost-efficient way to control and coordinate international operations, whereas others view expatriation more as a way of transferring knowledge and as an organisational development mechanism. Tungli and Peiperl (2009), identify 10 reasons to fill managerial positions with expatriates, such as, bridging the skill gap, ensuring the international managerial development of assignees, exerting control over subsidiaries and coordinating their activities with headquarters. Moreover, MNCs might also appoint expatriates to set up new operations in a specific country, train local staff, implement worldwide standards, promote a corporate culture and learn about local business practices.

Harzing's (2001) 'Who's in charge' survey shows that MNCs tend to appoint more expatriates to managing director positions than to any other key subsidiary position, although the author observes substantial differences depending on the MNCs' countries of origin and the host countries of subsidiaries. Specifically, French MNCs appoint fewer expatriates as subsidiary managing director than, for example, German or Japanese MNCs (Harzing 2001). Many MNCs also staff the finance function with an expatriate, because this crucial function does not require significant knowledge of local circumstances. In contrast, MNCs tend to employ more host country nationals in functional areas that demand knowledge and understanding of local circumstances, such as

marketing and sales, even in a globalised marketing approach. Harzing (2001) also argues that the personnel function is the most localised, because overseas subsidiaries must comply with local employment regulations and adapt their human resource practices to the cultural background of the subsidiary's employees.

Thus, the second research question of our investigation examines what positions expatriates hold and why they hold them in the French MNCs' Asian subsidiaries.

2.3 The Number of Short-Term Assignees MNCs Send to Their Asian Subsidiaries

Of all forms of international assignments, i.e. expatriates, short-term assignments, commuters, frequent flyers, the use of short-term assignments increased most in the period from 1998 to 2000, and would continue to grow for the next five years (Petrovic et al. 2000). Mayerhofer et al. (2004b, p. 1385) confirm that 'flexpatriate assignments are a growing and important aspect of international business while providing a great deal of flexibility to the organisation in the tasks to be done'. According to Bonache-Pérez and Pla-Barber (2005), short-term assignments may be a viable alternative to the costly training of local staff. Collating data from several studies, Bonache et al. (2010) conclude that short-term assignments are growing at least as fast as, and maybe faster than, standard expatriation.

Therefore, the third research question of our empirical investigation asks if the generally observed trend of short-term assignments is growing, and if so why, in the case of the French MNCs.

2.4 Role and Functions of Short-Term Assignees

To define their roles and functions, Welch et al. (2007) interviewed 10 short-term assignees and determined that their ability to close a deal and solve problems was crucial. Mayerhofer et al. (2004b) find that the main purposes of expatriate assignments are to transfer skills and support management development, whereas short-term assignees aid projects, provide expert knowledge, support technical problem solving, conduct audits, attend meetings and conferences, deliver training courses and undertake negotiations and supervisory activities. Tahvanainen et al. (2005) find three reasons why MNCs send employees abroad on

short-term assignments: (1) skill transfer and problem solving, including project implementation and troubleshooting; (2) managerial control; and (3) managerial development, especially when junior managers go abroad to gain international experience.

These considerations lead to our fourth and final research question: what are the roles and functions that short-term assignees must fulfil? Do they serve operational roles, including problem solving, providing technical assistance, undertaking negotiations, transferring knowledge and training local employees while the more strategic and management control functions, such as CEO, CFO and production management, are allocated primarily to expatriates?

3 Methodology: Data Collection and Analysis

We adopted a qualitative approach through semi-structured in-depth interviews carried out with managers of subsidiaries in 11 Asian countries between 2008 and 2011. Asia provides the focus of our investigation for two main reasons. First, by counterbalancing persistent global economic difficulties, especially in Europe, Asia continues to register strong economic growth rates. Second, the forces of globalisation continue to accelerate, leading to political, institutional, demographic and technological changes in Asia that have reduced the barriers to trade and the costs of doing business there.

We carefully selected 47 French MNCs operating in several countries in Asia. We sought to ensure diversity, in terms of firm size and organisational characteristics (e.g., location, with and without production activities)—variables that often matter in international business—to obtain contrasting, comparative information that could help us understand the phenomenon (Miles and Huberman 1994; Yin 2011).

We chose French MNCs because the author team includes researchers working in French institutions. However, investigating solely French MNCs should not prevent us from generalising our results, as Enright (2005) confirms the similarity between European and North American MNCs in respect of comparable questions. Moreover, Jaussaud and Schaaper (2007) find strong similarities among MNCs from different European countries in China, so that investigating French MNCs might produce results with a reasonable degree of similarity to MNCs from other western nations.

We interviewed high-ranking managers of 47 French MNCs in 11 Asian countries. We aimed for saturation in each country represented in our sample, such that any additional interviews would not offer any new or significant information about our research questions (Symon and Cassel 1998). To that end, we conducted 77 interviews. At the request of most of the interviewees, we do not provide the names of the MNCs, which encouraged respondents to speak freely without asking for permission from their supervisors. MNCs names have been coded from AA, AB, BA, BB, CA, CB to WA, WB and XA. Industries are described in very broad terms for the same reason, from automotive components to pharmaceuticals, from aerospace to software, from luxury goods to heavy industry etc. All the MNCs in our sample are major players in their respective industries.

The interviews were conducted on the basis of a carefully designed semi-structured interview guide. They all lasted between one and two hours and were fully transcribed. We designed a thematic content analysis grid, with one column per visited subsidiary or regional headquarters and one row per question or sub-question from the interview guide and per specific significant topic spontaneously addressed by the respondents. We grouped together the columns related to the same MNC for better analysis (e.g., AA, from which we interviewed expatriates in five different countries). We systematically added various contextual variables drawn from the annual reports of the 47 MNCs to better understand the organisational choices that the MNCs had made. These variables include the number and location of manufacturing units in Asia, the number of employees, globally and in Asia etc. When carrying out our data analysis, we carefully followed the methodological steps strongly recommended by Silverman (2005, pp. 158–164), Miles and Huberman (1994, pp. 50–65) and Yin (2011, p. 188).

4 Results

4.1 French MNCs Limit the Extensive Use of Expatriates in Asia, with Some Exceptions

Our first research question addresses whether French MNCs are increasing, stabilising or decreasing their use of expatriates in their Asian subsidiaries and thus help elucidate contradictory findings in the prior

literature. Our sample comprises three nearly equal parts: one-third of the 47 MNCs send few (i.e., 1 or 2) expatriates to most of their subsidiaries in Asia. Another one-third sends between 3 and 10 expatriates, and the final group sends many expatriates.

We also aim to explain this diversity in expatriation policies. When French MNCs send many expatriates to a country or a subsidiary, most often this is not due to a general policy of strong expatriation but rather to specific circumstances. Some MNCs appoint a high number of expatriates to key countries, especially China (e.g., AA, RA). The Chinese market is of the utmost importance for these MNCs and massive expatriation helps to keep full control of their operations in the dynamic and complex Chinese environment. MNCs also send many expatriates to countries where they must execute large-scale projects (e.g., buildings, infrastructure, subways) within a short time frame. In that case, they do not have enough time to select and train local managers. In addition some MNCs set up regional headquarters and offices, especially in Hong Kong, Singapore or Shanghai, where they pool human resources (Enright 2005). These regional management centres concentrate high numbers of expatriates with regional functions and roles, which diminishes the need for expatriates in subsidiaries in other Asian countries.

Regarding the process of localising technical and management positions in Asia, a thematic analysis of the answers reveals three categories. Respondents from the first group of MNCs explain that for developing business in Asia quickly, including increasing sales, entering new markets and starting up new factories, expatriates are vital (EB, FB, JB, NB, OA, MA, PA, RA), although, key management positions can be localised progressively.

The second group of MNCs try to transfer key subsidiary responsibilities to local managers but this has not fully succeeded. Depending on the educational level of the various Asian countries, they have had difficulty finding the necessary qualified local talent (e.g. AA, BB, DB). In China in particular, the needs are substantial, but educational levels are still insufficient, so localising key positions is challenging.

The third group of MNCs clearly states that they are localising key management positions, though some add that the level of localisation depends on the country in which the subsidiaries operate (e.g. QA). ‘We must first train good local candidates before we can reduce expatriation’, notes LB.

4.2 Expatriates Occupy Strategic Roles in Subsidiary Management

Our second research question asked what positions expatriates held and why. Nearly all our interviewees spontaneously answered that expatriates held the CEO position, and half also mentioned the CFO position. Moreover, MNCs with large Asian factories frequently appoint expatriated production managers to these factories. In contrast to prior research (e.g., Harzing 2001), some MNCs in our sample also appoint expatriate marketing managers to their Asian subsidiaries. However, marketing managers usually do not act solely at the subsidiary or country level but take responsibility for the regional Asian level or a sub-regional level, such as Greater China or the ASEAN nations.

The answers to the question 'Why does your firm appoint expatriates to such positions?' fell into four main categories. First, expatriates play a traditional controlling role, considered broadly as 'control' (CA, PA, EA) or 'protection of the MNC's interests' (GB), including 'monitoring corruption' (JA, OA). Several MNCs managing large networks of subsidiaries in Asia emphasise that this control role is more important in joint ventures than in fully owned subsidiaries (FB, NB, QB, RA).

Second, MNCs appoint expatriates to ensure the transfer of the corporate culture before localising key subsidiary positions (AA, FB, IA, JA, MA). Third, expatriates in Asia can share their technical expertise and competencies. Some MNCs perform complex activities that demand specific technical capabilities that only expatriates have. Fourth, MNCs appoint expatriates to their Asian subsidiaries when they must start factories, execute projects or enter new markets quickly (JB, KA, MA, PA, PB).

Our interviews confirm previous findings that the main functions of expatriates require a high degree of interaction with headquarters, informal networks and specific knowledge of the practices and corporate culture promoted by headquarters. Some interviewees mentioned 'trust granted by the MNC's top management' (LA). Other MNCs confirm that expatriates 'serve as an interface between subsidiaries and the headquarters' (NA, RA), 'have deep understanding of the way of functioning of the headquarters' (SA) and 'have knowledge of the MNC's global strategy' (MB, WB) or of the MNC's 'global products' (QA). Expatriates clearly occupy strategic roles in subsidiary management.

4.3 French MNCs Widely Use Short-Term Assignments in Asia

Except for two cases (KB, PA), all the interviewees confirmed spontaneously that their MNC regularly sent experts on short-term assignments in Asia. However, regarding the frequency of these short-term missions, the sample shows three groups. The first, representing slightly more than one-third of the interviewed MNCs, have sent few short-term assignees to their Asian subsidiaries, between two and four per year (DA, FB, JA, MB, PB, RA, SA, SB, TA, TB and XA). The reasons for such low frequency, include 'we have to reduce costs' (JA, XA), 'the expatriates can cope with the difficulties without help' (DA, RA) or only when 'starting a new factory or project' (SA, SB). The second group, representing almost one-third of the MNCs in our sample, have begun to dispatch short-term assignees on a more regular basis, most often monthly or bimonthly. For the third group only, short-term assignments are frequent, such as once every week (LA) or two weeks (MA, UA), every two days (DB), permanently (LB) or 'hundreds a year' (GB).

Moreover, the additional contextual variables show that large MNCs use slightly more short-term assignments than smaller ones. Furthermore, MNCs resort more to short-term assignees when they have structured the Asia Pacific region into zones and clusters with the creation of regional offices and headquarters.

Most short-term assignees live in the MNC's country of origin. However, large MNCs have created worldwide pools of expertise. For example, DB has dispatched its main functions throughout the world, including research and development, production technology and logistics, so that 'it is necessary to circulate to get informed and to spread competencies'. A business-to-business software provider (LB) explains that its 'key accounts are the same worldwide, so a project manager has to travel worldwide to the sites he has to follow'. Thus, we confirm the findings of Bozkurt and Mohr (2011) that MNCs send experts from different parts of their networks to work together in distant locations.

4.4 French MNCs Assign Operational and Functional Roles to Short-Term Missions

The fourth research question addresses whether the roles and functions of short-term assignees are, as indicated by the literature, operational. When we asked for the goals of short-term missions as an open-ended

question, each interviewee in our sample spontaneously quoted two or three goals, which can be grouped into four categories.

First, experts on short-term assignments provide technical expertise and assistance to subsidiaries (EB, FA, GB, NA, QB) or handle technical problems (AB, BA) that expatriates (QA) or local engineers cannot solve. The comments suggest a variety of expertise needed by subsidiaries, depending on the sector of activity (e.g. construction, telephone equipment, automotive equipment, electrical equipment, pharmaceutical industry), the nature of the technology and the country where the subsidiaries are located (e.g. China, whose economy is very dynamic). MNCs rely on short-term assignments to start up factories (EB, LA, RB, SB, UB) or implement computer software projects (GA, VA).

Second, short-term assignees provide commercial assistance to subsidiaries (BB, GA, GB, JA, QB) and help implement Asian or worldwide marketing strategies (AA, HA, HB, LA, NA, OA, UB). In accordance with Bozkurt and Mohr (2011), short-term experts also help prepare bids for new contracts (BA) and close deals (IB). Third, short-term assignees might conduct audits, whether financial or quality (AA, DA, NB, VA, VB). Finally, short-term assignees train local employees (AA, AB, DA).

Short-term assignees harmonise and diffuse best practices and spread standardised technologies worldwide. Furthermore, for solving technical problems, an expert on a short-term assignment is cheaper than an expatriate, as in most cases, unlike long-term expatriation, short-term assignees do not receive extra pay for their stay abroad, which is considered as part of their job.

Overall, the main roles that MNCs assign to their short-term assignees are operational and functional. This finding is in clear contrast with the strategic and management control roles allocated to expatriate managers.

5 Discussion

5.1 Implications for Human Resources Practice

Taken together, the set of complementary research questions of this study aims at understanding and explaining the alternative and complementary roles and functions of expatriates compared with short-term assignees. We find that expatriates occupy strategic and central roles in subsidiary management, whereas short-term assignees are sent to Asia

for more operational and functional roles. In line with the expectations of Bonache et al. (2010) and Mayerhofer et al. (2004b), we find that short-term assignments are of increasing importance. However, only one-third of MNCs in our sample frequently send short-term missions to Asia. Moreover, our interviews show variety in the use of short-term assignments. These topics provide fruitful research directions. Finally, in accordance with Oddou et al. (2000) and Konopaske et al. (2009), it appears that short-term travellers develop a global mindset that can be leveraged as a leadership development tool. As such, it is an excellent way to prepare short-term assignees for future long-term expatriation.

These obvious advantages lead to the important question of how to promote short-term assignments. Like expatriation assignments, the MNCs in our sample have encountered some difficulty in finding a sufficient number of employees who are willing to travel extensively. Moreover, due to the time differences between France and Asia and the many hours spent in planes and airports, short-term assignees often become fatigued and lose their motivation. Konopaske et al. (2009) show that the presence of children has a negative influence on the willingness to accept frequent travel. They find that this negative influence is stronger for short-term assignments than for long-term expatriation, in which the spouse and children normally settle with the assignee in a foreign country. Taking into account this rather sensitive issue of work–family balance, we note that short-term assignments are better suited for young professionals who are unmarried or still childless, whereas long-term expatriation seems better suited for midcareer managers who have a spouse and younger children.

With the aim of reducing the physical and mental exhaustion of employees, the MNCs in our sample indicated several ways to lessen the need for short-term assignments. Many management issues, such as some kinds of conflict resolution, employee hiring, accounting topics etc., can easily be addressed through videoconferences and by setting up global virtual teams, as Collings et al. (2007) suggest. However, some respondents, in line with Mayrhofer et al. (2008), cautioned against overestimating the effectiveness of virtual assignments because virtual intercultural communication can easily lead to misunderstandings. The difficulty in creating trust in multicultural teams increases when team members only meet rarely or never. Therefore, global virtual work is most suitable to perform routine functions.

When MNCs have a sufficient number of subsidiaries in Asia, they often transfer a part of their management and engineering teams to regional management centres (Enright 2005) or regional headquarters, where they can regionally concentrate technical and management expertise. Technical experts establish themselves as expatriates in Hong Kong, Singapore or Shanghai, from where they travel to subsidiaries in Asia to solve problems. The local engineers of CB, working in China, travel to their regional expertise centre in Singapore, where, with the help of expatriated experts, they find solutions to their problems; this reduces the need for experts to travel to Asian subsidiaries.

A recent trend in Asian subsidiaries is intra-Asian assignments. For example, DA sends Japanese and Korean experts to other Asian subsidiaries on short-term assignments, whereas PA dispatches experts from Hong Kong to subsidiaries in mainland China. Some MNCs note that language barriers and intra-Asian cultural differences (EA, EB, FB) hinder the development of such intra-Asian expertise. However, FB is confident that, although it will take time, intra-Asian cultural obstacles can progressively be overcome.

5.2 Implications for Further Research

The differences we observe empirically between the MNCs in our sample in the use of both long-term expatriates and short-term assignees are remarkable, despite their same home country culture, France, and the same region where the subsidiaries are located, Asia.

When looking at our interviewees' responses in a broader perspective, several groups of variables can explain, at least partially, the observed differences in global staffing policies. The first group of variables is related to the global size of the MNC worldwide and the volume of its activities in Asia. Large and giant MNCs with a strong presence in Asia send more assignees on short-term missions to their Asian subsidiaries, and frequently establish regional headquarters in the area, where they concentrate pools of expatriates and experts. The second group of explanatory variables relates to the sector of activity and the degree of product standardisation *versus* local adaptation. The third group of variables involves the subsidiaries' locations, especially their country's strategic importance for the MNC and its educational level. Finally, the last group of variables involves specific characteristics of MNCs, particularly their corporate culture and experience level in Asia.

6 Conclusion

By investigating the alternative and complementary roles and functions of short-term assignees and long-term expatriates, we have simultaneously answered calls for more research from Bonache et al. (2010) on reasons for MNCs to use expatriates and from Tahvanainen et al. (2005) about the motivation and underlying factors for using short-term assignments.

This research provides both theoretical and managerial contributions. Our theoretical contribution consists of demonstrating that expatriation in Asia by MNCs is contained but not declining. In specific cases, MNCs continue to expatriate to a great extent. From a managerial point of view, MNCs can reduce or contain the costs of expatriation by focusing expatriates on central roles, including control of subsidiaries and ensuring regional coordination, while leaving the more functional and operational roles to experts on short-term assignments.

Finally, our contribution shows the need for further research. Our findings on the respective roles and functions of expatriates and short-term assignees should be confirmed by large quantitative studies that integrate other MNCs' countries of origin and different regional subsidiary locations. The possible variables that we have listed to explain the diversity of expatriation and short-term assignments should also be tested.

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PART IV

Conclusion

CHAPTER 12

Overall Conclusion of the Book

Bernadette Andreosso-O'Callaghan, Jacques Jaussaud and M. Bruna Zolin

Abstract In many Asian countries, the questions of limits to growth and the challenges of overcoming such limits are clearly at work today. Japan is facing quickly an ageing and shrinking population, a situation that South Korea is bound to face in the near future too. China is facing the problem of the exhaustion of its export-led growth model based on low factor prices, as well as the unprecedented problem of environmental degradation. Food supply is still of concern in most Asian countries and, over the long run, climate change is projected to diminish the agricultural productivity growth potential. A paramount issue is thus the environmental constraint and the transition of these countries to energy-saving methods of production. China is shifting quickly to the use of

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electric cars whereas Japan still faces uncertainty in terms of its nuclear energy programme. Some of these challenges can be analysed and tackled at the micro-economic level,—the level of the firm—, whereas other challenges are better apprehended at the nation specific level, while many other still are to be tackled at the international level, particularly as far as international relationships are concerned.

Keywords Economic growth · Asian countries · Environmental degradation · Food security · Energy · International trade Competition

Although Asia has been the world engine of economic growth for several decades since World War II, growth rates have differed sharply among the countries of the region. However, in many Asian countries, the questions of limits to growth and the challenges of overcoming such limits are clearly at work today. Japan is facing the crucial issue of a quickly ageing and shrinking population, a situation that South Korea is bound to face in the near future too. China still enjoys relatively high growth rates, but the country is facing the problem of the exhaustion of its export-led growth model based on low factor prices, as well as the unprecedented problem of environmental degradation. Food supply is still of concern in most Asian countries in spite of huge increases in productivity in the agricultural sector, the main reason being that global demand for food inputs and food products increases at a high speed. Moreover, over the long run, climate change is projected to diminish the agricultural productivity growth potential; this may further worsen the current food security level. A paramount issue is thus the environmental constraint and the transition of these countries to energy-saving methods of production. China is shifting quickly to the use of electric cars whereas Japan still faces uncertainty in terms of its nuclear energy programme.

One should thus underline the diversity of challenges to be overcome in Asia. Some of these challenges can be analysed and tackled at the micro-economic level,—the level of the firm—, whereas other challenges are better apprehended at the nation-specific level, while many other still are to be tackled at the international level, particularly as far as international relationships are concerned. The different chapters of this book have therefore provided many useful insights on some of these challenges.

Part I of the book was devoted to trade issues and international business strategies: Chapter 2 dealt with the European Union's bilateral agreements in East and Southeast Asia as a way to overcome the recent limits of the overall multilateral framework, namely the one shaped by the WTO; Chapter 3 considered the strategies of Chinese MNCs in Europe, focusing on the case of France, as a way of internationalisation of Chinese firms in order to overcome their weaknesses in terms of technology and range of products, and the fierce competition they face on their own national market; Chapter 4 analysed the evolution of the world trade web for the period 1995 through 2013 (with a particular focus on China) questionning again the most influential factors and related characteristics.

Part II of the book was devoted to agriculture, food supply and sustainable development. Chapter 5 focused on the impact of the European Union enlargement on agricultural and food trade in some selected Asian countries; agriculture is a sector where protectionist policies remain high, and trade in agricultural products continues to be a source of friction in the ambit of international trade negotiations (at both the bilateral and multilateral levels). The chapter examined the trade creation and trade diversion effects emanating from the 5th EU enlargement on the agricultural sector on the one hand, and the effect of the enlargement on exports of agricultural products from some selected Asian countries to the EU market on the other hand. Chapter 6 analysed the European vegetable oil market focusing on the palm oil industry, a commodity very much under the scrutiny of public opinion that sees it as an unsustainable production whilst being in the meantime a strategic product for some Southeast Asian Countries. With this purpose in mind, the chapter explored the linkages existing between palm oil and other vegetable oil prices in the European market so as to identify future sustainable different scenarios. Taking the Thai food-processing industry as a case study, Chapter 7 investigated the extent to which firms' knowledge interactions with universities are conducive to the enhancement of their innovative capabilities. The study showed that food-processing firms do not consider universities as their primary knowledge source: informal interaction is the most popular mode that firms use to source knowledge from universities, while long-term and institutionalised collaborations are less common in that country.

Part III of the book investigated and analysed various additional and more specific challenges such as *The Great East Japan Earthquake's*

Effects on Electric Power Companies' Financial Situation (Chapter 8), *The Impact of the Trump Administration on the Economies of the Greater China Region* (Chapter 9), *Microfinance in South-East Asia: The Case of Vietnam Over the Period 2005–2015* (Chapter 10) and the issue of the *Staffing of French MNCs in Asia: The Roles of Long-Term Expatriates Versus Short-Term Assignee* (Chapter 11). The analysis of the Japanese electric power companies' performance after Fukushima in Chapter 8 showed that investors are still reluctant to invest in this industry some 8–10 years after the nuclear upheaval. In Chapter 9, it is argued that the new US Administration has had a differentiated impact on the economies of China, Hong-Kong and Taiwan (GCR), which are intimately linked to the US economy through the trade-investment nexus. Although the announcement of the new US President did not have much of an impact on the GRC financial markets, a different scenario is emerging with the implementation of the "Trump tariffs". The following chapter (Chapter 10) casts an optimistic eye on economic development in a country such as Vietnam by looking at the issue of micro-finance, whereas the last chapter of the book (Chapter 11) discusses the way European MNCs adapt to the new challenges described in the book, by focusing on the issue of staff management in Asia.

Beyond the general and fundamental question raised by Robert Taylor in the introduction of this book, which is whether the countries of Asia with authoritarian social and political traditions will be able to create a conducive environment to further growth and development, we hope that the readers of this book will have found useful insights on the nature and diversity of challenges that Asian nations on the one hand and both Asian firms worldwide and Western firms in Asia on the other hand are currently facing.

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