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The Interplay of Foreign Direct Investment, Trade, Economic Growth, and Technology

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Abstract

Due to the advent of globalisation in the past two decades, foreign direct investment became an essential activity around the world. The motivation for FDI activities could be identified as the following: resource seeking, market seeking, knowledge seeking, and efficiency seeking. FDI undertaken for these different motivations could influence trade, technology, economy, labour division, and natural resources in both the home and the host country. This thesis is a macroeconomic study investigating the causality of foreign direct investment, international trade, local R&D activities, and economic growth. The research is based on 30 OECD countries from 1981 to 2015, which uses data collected from official annual time series data. It includes OECD Statistics, UNCTAD Statistics and the Global Innovation Index. This thesis makes use of a variety of econometric methods to analyse empirical study, comprising of the VAR model and pooling data analysis methods. To interpreting the causality in each country, six country profile factors added to the analysis of whether different country profile factors would alter the causality. The country profile factors include FDI regulatory restriction, institutions, market sophistication, product market regulation, knowledge input, and knowledge and technology output.

The major findings were the patterns in each relationship based on the ranking level of the country profile factors of each country. According to the regression result, a bi-direction continually exists if the country either has a pure high-ranking level of all the country profile factors or if they have a pure low ranking level thereof. Otherwise, in the case of a country with a mixed level of country profile factors, a single direction flows to other variables from FDI (such as economic growth, R&D, and international trade), often displayed in these three relationships.

Declaration

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Yutong Li

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Chapter 1 Introduction

1.1 Motivations

Since the inception of the liberalisation of foreign investment regulation, the relationship between international equity markets and intermedia goods between countries improved, which reflected globalisation. Upon the conclusion of World War II in 1945, a significant change prompted improved relations between trade and investment. Countries began to use their abundant resources, such as natural resources, human resources, transport resources, and market resources to attract investment (or conduct investment) from (or into) other countries. Developing countries, in particular, have a more positive attitude towards welcoming inward investment from developed countries, thereby introducing potential beneficial impacts on their domestic economy. In the 1980s, another outcome of globalisation was the international labour division, which was carried out in different countries and promoted tertiary production. Therefore globalisation was associated with growth in trade and foreign investment. Subsequently, it stimulates the movement of labour in both short-term (such as managers' movement) and long-term (such as economic migration).

The motivation of globalisation in foreign direct investment is classified into three categories: resource seeking, market seeking, and efficiency seeking. More recently, resource-seeking was divided into seeking natural resources such as agriculture product, mineral, crude and seeking of knowledge, for example, the latest technology and scientists of R&D. (Dunning & Lundan, 2008). Market-seeking refers to established subsidiary plants in foreign countries to serve the local overseas market. Thus, in early stages, the market seeking resource of a firm employs their essential skills with lower versions into the host country, and the market seeking subsidiary carries out R&D of their own, which could potentially improve the home country product's competition in the foreign country. Resource-seeking FDI based on natural resources associated with MNEs in foods, mineral, human capital, and the resource-based industries. In the 1980s, it was increasingly recognise that foreign direct investment could also be a part of knowledge generated in the foreign market. Therefore, knowledge seeking has been separated from resource seeking.

Knowledge seeking FDI entails that the company may separate their headquarters and R&D activities. For example, the headquarters may be in one market, but they serve knowledge generated from another market. Moreover, efficiency-seeking FDI was associated with the production of multiple component goods. For instance, in the automobile industry, the elements may be present from different countries, since the firm would prefer to maximise efficiency in different stages and the production of these stages could be located in different countries.

The structure of this chapter is as follows:

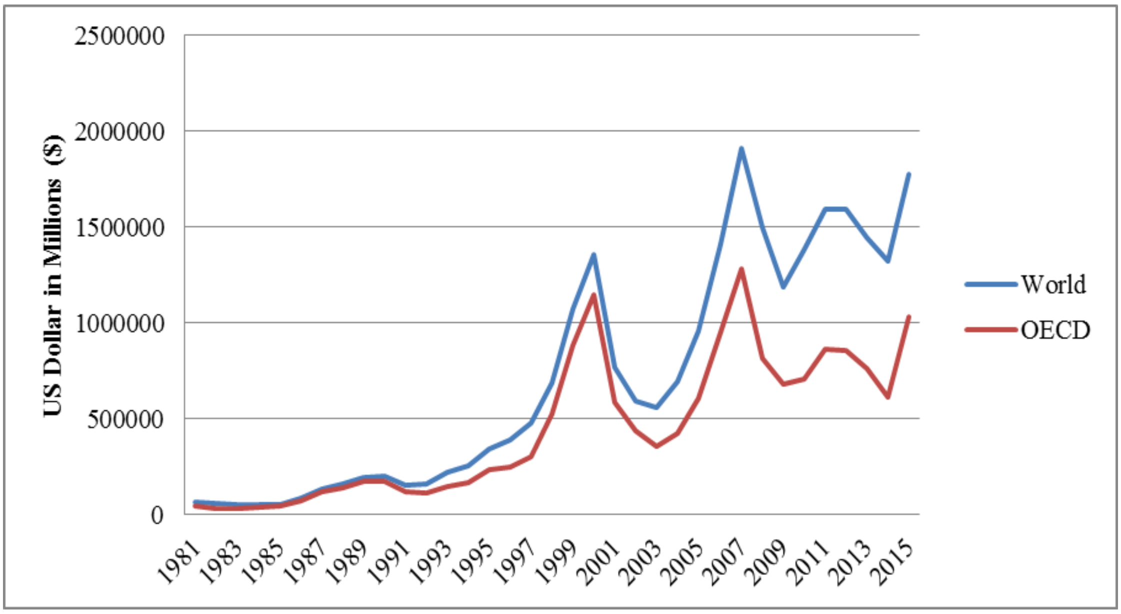
- Section 1.2 will fill the gap of the current research
- Section 1.3 will present research questions of the thesis
- Section 1.4 will discuss the value added in this thesis
- Section 1.5 will indicate the structure of the remaining chapters of the thesis

1.2 Gap of Recent Research

The trend of international trade and foreign direct investment increased during globalisation, about the official statistics on national economies. In particular, a rising number of countries created time series data for both flow and stock of FDI, which could compared to a cross-country dataset. Since the 1980s, a large number of national statistics data was annually cumulated.

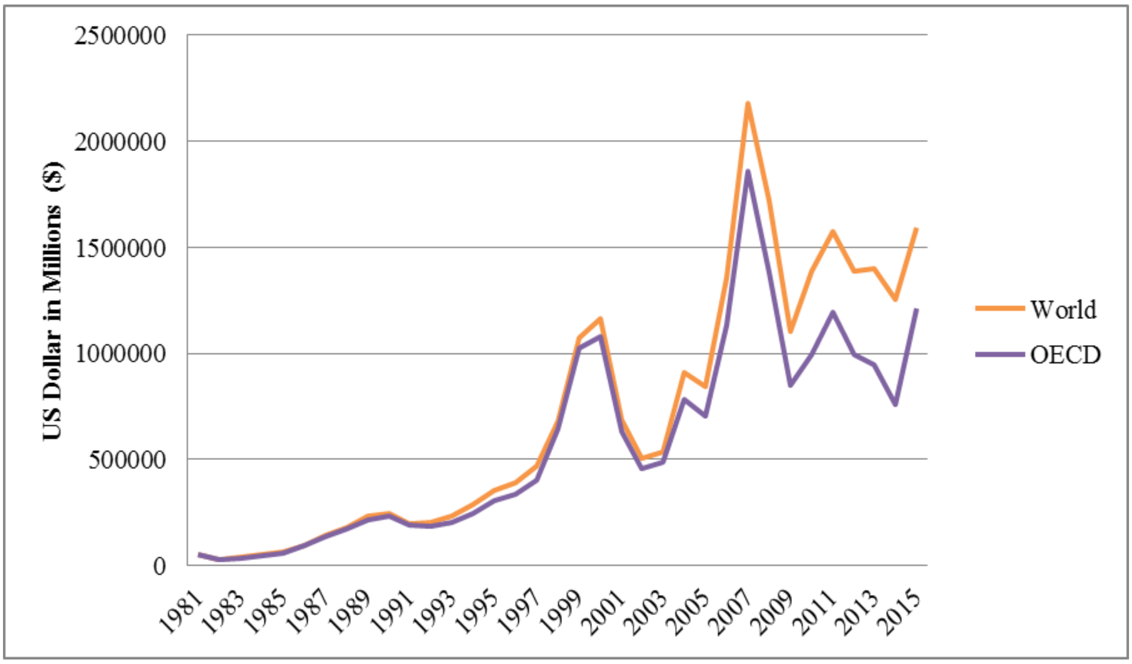
For example, (See Figure 1.1 and Figure 1.2), the total FDI inward flow was 1.7 trillion US dollars by the end of 2016; especially with regards to the OECD, the total inward FDI flows arrived at 1.1 trillion US dollars, occupying 64% of the world. Furthermore, the outward FDI flows, in total OECD, received over $1 million and occupied 73% of the total world FDI outward flows. The inward and outward position of FDI occupied 73% and 77% of the total world FDI position respectively. According to the Figures, a narrow gap exists between total world FDI flows and total OECD FDI flows. Notably, the amount of FDI flows in the world, and the OECD overlapped from 1981 to 1991. All of these phenomena display that the OECD countries have made a significant contribution to the total volume of FDI flows in the world.

Figure 1. 1 FDI Inward Flows in the World and OECD, 1981-2015



Source: UNCTAD, Statistics, 2016

Figure 1. 2 FDI Outward Flows in the World and OECD, 1981-2015



Source: UNCTAD, Statistics, 2016

However, the FDI has increasingly been used in the case study, for instance, individual companies, individual industries or individual country. Therefore, the aggregate statistics of FDI would not examine enough, based on the expectations of international business scholars. Most of the recent empirical studies use panel data and grouping of the countries for a general result of the relationship between FDI and international trade, which may omit the characteristics of different countries. The FDI flow data is a time series data implying that its modifications rely on the changes in time. Thus, the bias in time series data should be considered. Some scholars argue that using panel data could potentially omit the time trend bias in the econometric test.

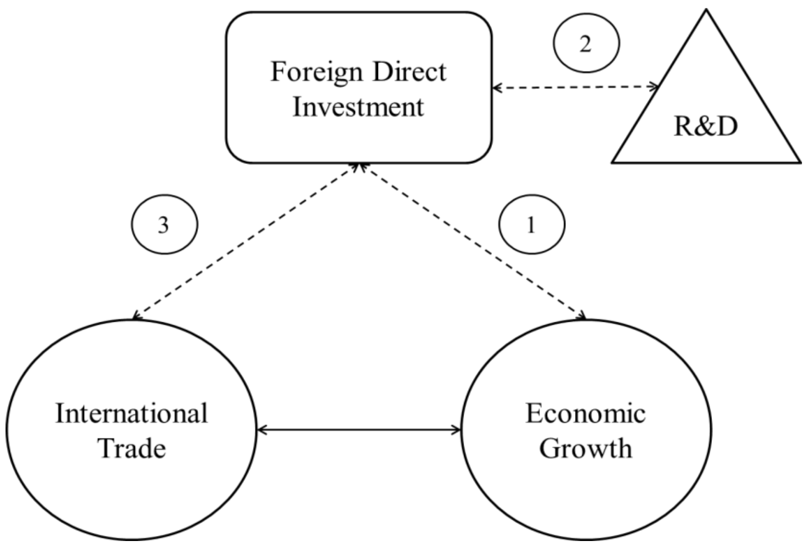
However, it also depends on the purpose of the research. This means that if the researchers generally wanted to know about the inter-relations between FDI and trade, they could use panel data. On the contrary, the time series data is a better choice for understanding the changing impact of FDI flows on trade and economic growth.

Therefore, the purpose of this thesis is to investigate some essential hypotheses driven from international business literature and to examine several causalities from aggregate statistic data. In particular, the thesis investigates the behaviour of international trade and foreign direct investment, alongside examining whether the country characteristics can attract resource seeking, market seeking, knowledge seeking, and efficiency seeking FDI in separate proportions.

1.3 Statement of Research Questions

Three research questions are addressig in this thesis. Figure 1.3 displays four relationships: foreign direct investment, trade, economic growth and R&D. Dash lines indicate the causalities that will measured in the thesis. The statements of three research questions are displayed below with the explanation:

Figure 1. 3 Research Questions with Three Causalities



1) What is the relationship between foreign direct investment and economic growth?

Regarding international business, the causality of foreign direct investment and economic growth is a standing issue. Since market seeking is one of the primary motivations for MNEs to conduct investment in foreign countries, it could promote significant growth in the host economy. At the same time, several new jobs exist between the host and home countries, which could transfer a good amount of skilled foreign investors into the labour force. Moreover, when foreign products introduced into the host country market, they will compete with the local products. As a result, it recommended that the local producers update their technology of goods to keep their ownership advantages. If not, the local consumers could benefit from cheap or higher quality goods through a subsidiary.

Another reason behind observing the relationship between FDI and economic growth is that no direct way could identify this causality even in the GDP equation. Although both the investment and the net export influence economic growth of a country, the investment factor in the GDP equation does not solely include FDI, but also additional portfolio investment into the investment factors. Therefore, the direct relationship between FDI and economic growth was not fully observed. This research question looks at how FDI flows out of this equation and merges with the international trade, along with finding out how they work together to impact economic growth in one country. The regression result and country profile discussion will discussed in Chapter 6.

2) What is the relationship between foreign direct investment and local R&D activity?

The main focus of this research question measures whether R&D is a crucial aspect of the influence on FDI flows in a country. Hymer (1976) was one of the first scholars to identify an active link between foreign direct investment and R&D intensity. He argues that the knowledge in a firm could be a source of monopolistic advantages, which could generate huge profits through foreign direct investment overseas. This suggestion gives a clear hypothesis: that of a country having developed technology or a powerful R&D department, which would mean that they could attract more foreign investment into their country. This is because they have advantages compared to other countries. On the contrary, a country with developed technology, like the United States, could also invest in other countries. Such countries generally have a minor advantage in innovation, but they may have abundant natural resources or human capital resources. As a result, a mutual partner relationship exists between the United States and other countries. Consequently, one direction of outward flow can potentially develop into bi-directional FDI flows between countries. This empirical study can find in Chapter 7 of this thesis, in addition to country profile analysis and regression result.

3) What is the relationship between foreign direct investment and international trade?

This research question observes whether this relationship is either displayed in ‘complements’ or ‘substitute’ in the OECD country. This research question is a famous and unsolved issue in the international business sector. Scholars performed much pioneering work on this causality and used different quality and quantity methods to explain this relationship in either a micro or a macro manner. Nonetheless, this issue continued to have a hazy outcome in the previous studies. According to the early theories of international business, scholars persist in the substitutability in international trade. Subsequently, the firms could export high technology either from the home country or by producing abroad to serve the market, which means they ignore the locations of third world countries. Thus, investment in the foreign market is an expensive investment to the home country.

From a resource seeking view, some firms in rich countries might focus on seeking resources like raw materials, oil, and food, overseas. The purpose of this is to secure having enough resources to create products in future, which is known as a strategic reserve. Therefore, for instance, the foreign investor would transfer their facilities to the resource-rich country, depending on securing the future supply of strategies input on their domestic business. In this situation, international trade and foreign investment complemented each other because investment undertook the future trade. With the progress of globalisation, the distinguishing between pure substitution and pure complementarity has become more prominent. Therefore, the third question will focus on the pattern of FDI flows and trade, to identify whether complementarity and substitutability could co-exist in the relationship between two countries. This empirical study can find in Chapter 8 with the regression result and country profile analysis.

1.4 Value Added in the Thesis

This thesis has five main aspects of contribution with regards to recent empirical studies. Firstly, the thesis focuses on 30 (out of 35) OECD countries, in which previous studies only considered 11 countries. This provides a country by country with in-depth analysis. Therefore, different patterns of FDI could be identified in each country to get a more explicit investment pattern for other countries in further research. Secondly, an extended panel of 35 years (from 1981 to 2015) for each country (previous studies only cover 23 years or 30 years) used. Thus, in the thesis, we also measure whether the FDI flows of previous years influence the current FDI flows. Compared to previous empirical studies, such as Turkcan, Duman, and Yetkiner (2008), Pain and Wakelin (1998), Barrell and Pain (1997), Luiz and De Mello (1999), and Pradhan, Arvin, Bahmani, and Bennett (2017), the thesis uses more recent data along with the analysis of the interplay between FDI (inward and outward flow), trade, economic growth, and technology for every single country.

The thesis also makes use of more recent data, which analyses the pattern of FDI. This could treat as a guideline for future research. For instance, latest data of three decades could perform similar research compared with the recent result, thereby being able to discover the changes in FDI patterns in 30 years.

This thesis points out that country profile is one of the significant factors to determine the pattern of FDI flows. Therefore, the third contribution of the thesis is the creation of country profiles. Six factors considered in the thesis to help interpret the regression result of each country, including institution, market sophistication, product market regulation, knowledge input, and knowledge and technology output. Based on these factors, the 30 OECD countries could classified into four categories: high, upper average, lower average, and low. This classification could help policymakers or investors understand the investment environment of these countries.

At the same time, investors could also understand the status of FDI patterns in these countries. For example, the relationship between FDI and economic growth and the regression result suggests that the country with a low profile (like Mexico), tends to attract more FDI inward flows to encourage economic growth. In this case, foreign investors may prefer to engage in FDI because of the potential market in such countries. However, countries with a low country profile lack a significant relationship between FDI inward flows and economic growth, like Greece and Poland.

Another example is with regards to a country with a high-profile , where most may not attract more inbound foreign direct investment when their economy develops.

The forth contribution is at the macro-level approach adopted in the thesis. According to Dunning's (2008) view, three groups of scholars put forward FDI theories from different perspectives. The first group of scholars, Kojima (1978), and Markusen (1985), analyse the macro-level of FDI patterns and focused on location variables. The second group of scholars were more focused at the industry or the sector level, with more interest in the behaviour of individual business. For example, Buckley and Casson (1976) put forward the internalisation theory. The third group of scholars focus further on the monopolistic advantage. For example, Hymer (1960) was one of the first scholars to argue that the knowledge of a firm could be treated as a monopolistic advantage towards other firms. The thesis adapts a micro-level theory to explain differences at the country level. For instance, when a country has the latest technology, it attracts more foreign investment into their country. Therefore, this thesis considers the characteristic of an individual country and tries to explain why country engages in FDI.

The final contribution of the thesis is that the results may help develop the pattern of FDI and international trade. Dunning (2002) revisited the investment development path (IDP), and discussed it to analyse the relationship between FDI. He stressed that economic growth should be compared between two aspects: microeconomic (firms- and sector-level) and macroeconomic (country-level). The empirical studies in this thesis are on the macro–level, with country profile having proved a J-curve of investment development in a country at a certain level.

1.5 Structure of the Thesis

The structure of the whole thesis sets up with this chapter being a part of the introduction section. This is followed by chapter 2 and chapter 3 discussing the theoretical and empirical background of the thesis. Data description and analysis are discussed in chapter 4. The methodology and econometric analysis are a part of chapter 5. Chapter 6, 7 and 8 include three empirical studies and the discussion of the regression result. Chapter 9 focuses on the main findings and conclusion of this thesis.

Chapter 2 Theoretical Background

2.1 Introduction

In the 1960s, a watershed was present in the foreign direct investment (FDI) theory when Hymer put forward a new micro-level theory of the multinational enterprise (MNE). This watershed makes a distinction between the macro-level theory of FDI (pre-1960) and micro-level theory of FDI (Hymer's theory). Prior to 1960, the macro-level theory of foreign direct investment suggested that the industries in capital-intensive countries will invest in capital-poor countries, which means multinational enterprise constantly make capital transactions from the abundant capital country (such as developed countries) to the low capital country (such as developing countries). Hymer (1960) criticised macro-level theory for being too general not considering the details of when multinational enterprises carry on the foreign direct investment. Thus, Hymer pays more attention to the firm-specific rather than country-specific. Furthermore, in 1958, Dunning analysed Anglo-American investment partnership and found that the macro-level investment theory cannot explain the motivation of investment at firm level.

Therefore, this chapter will discuss the details of FDI theory from pre-1960s until the late 20th century in the following sections:

- Section 2.2 focuses on Dunning' work about the Anglo-American investment partnership
- Section 2.3 discusses Hymer's theory
- Section 2.4 consists of the Eclectic Paradigm
- Section 2.5 includes the Investment Development Path
- Section 2.6 briefly introduces Vernon's Life-cycle Model
- Section 2.7 comprises of the conclusion

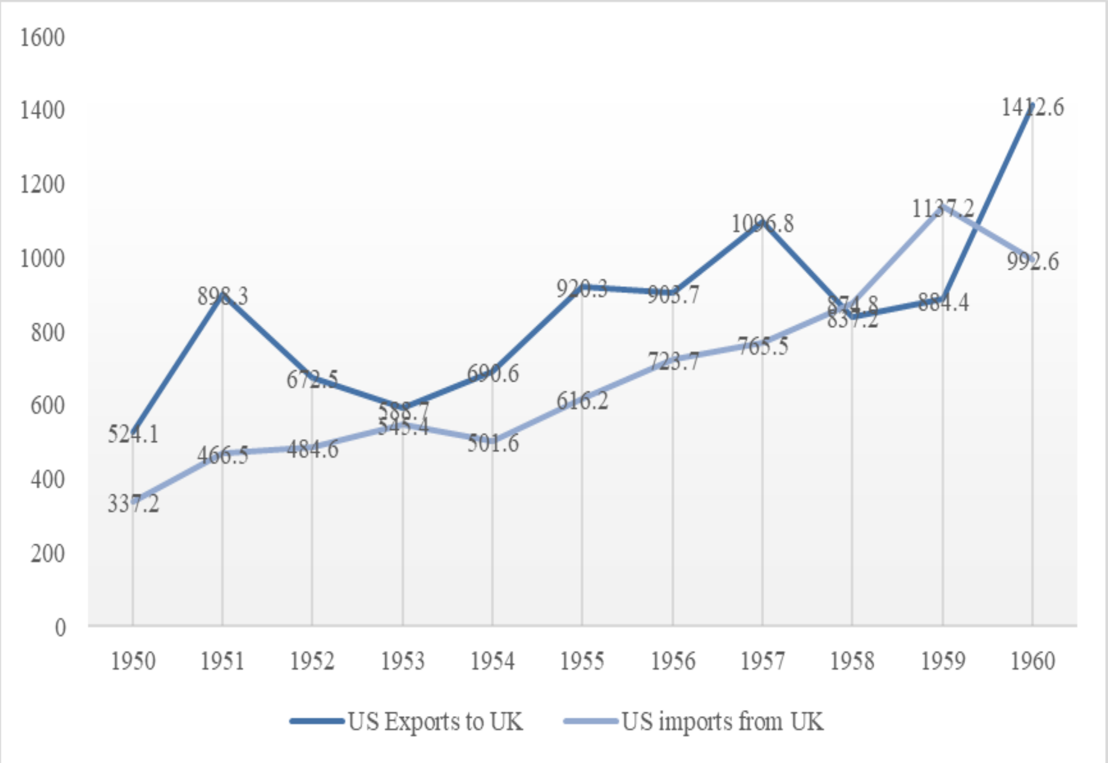
2.2 Anglo-American Investment Development

In terms of the foreign direct investment theory, appreciation is due for the first fundamental study to Dunning’s work in 1958. In this work, Dunning visited 245 U.S.-affiliated companies and got responses from 205 firms, including 306 manufacturing units. The purpose of his study was to evaluate the contribution of American-controlled firms of the British economy in industrial development and economic welfare.

In this study, Dunning mentioned that Anglo-American investment partnership had experienced four stages, including the formative years (from 1870 to 1914), consolidation and stead expansion (from 1919 to 1929), the U.S. firms’ influx into British market (since 1930), and the growth of American investment in 1940. The reason behind a strong link of partnership between Britain and America was due to having more ownership advantages compared to other countries in the same period.

For example, Britain’s industrial manufacturing is part of the external trade and the BoP area. Figure 2.1 gives information about the foreign trade between the United States and the United Kingdom from 1950 to 1960. At the beginning of 1950s, the exports of the United States were $524.1 million, which almost tripled to $1,412.6 million in 1960. Similarly, the imports from United Kingdom also tripled increasing by the end of 1960. These figures also proved that the United Kingdom had the closest economic ties with the United States.

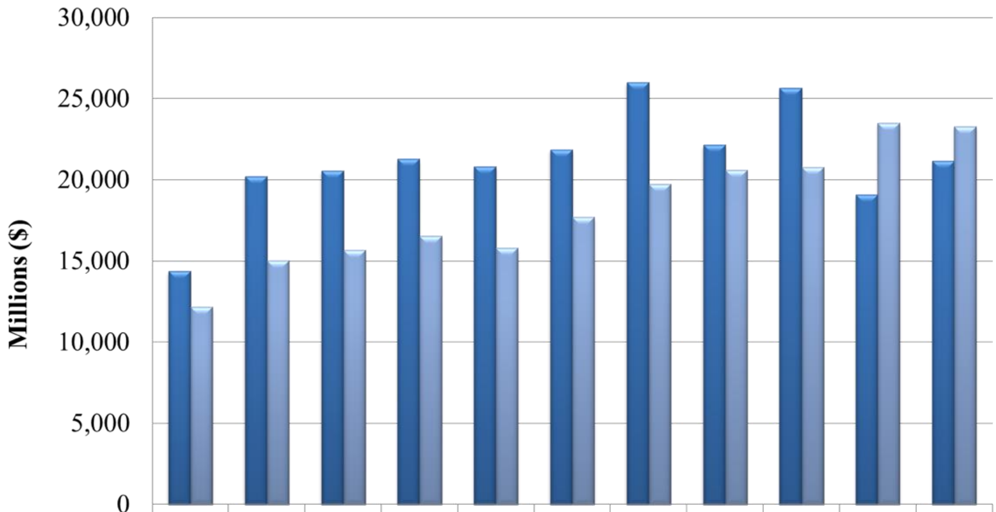
Figure 2. 1 Foreign Trades between the United States and the United Kingdom, from 1950 to 1960 (USD, Millions)



Source: U.S. Department of Commerce

Therefore, the investment of the United States in Britain included the profitability of investment, maintenance export, comparative costs, and new knowledge passed back. For example, the FDI outflow of the United States in 1950 is $14,415 million and reached the peak in 1956, at around $26,038 million (See Figure 2.2). At the same time, the inward FDI in the United States also had a stable increase from $12,196 million in 1950 to $23,303 million in 1960. These Figures indicate that the United States not only expanded the foreign market, but also attracted investment to develop its own economy. Dunning, in his research, also mentioned that some new knowledge was passed back to the United States. Especially in terms of a smaller manufacturing plant in the UK, the new processes and products could be tested with less capital expenditure than the requirement of their American subsidiaries. Therefore, the new knowledge in these small manufacturing will be passed back to the United States. (Dunning, 1958).

Figure 2. 2 Outwards and Inwards FDI in the United States, 1950-1960



	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Outward FDI	14,415	20,254	20,595	21,305	20,848	21,878	26,038	22,175	25,685	19,092	21,198
Inward FDI	12,196	15,026	15,700	16,570	15,813	17,710	19,774	20,625	20,786	23,538	23,303

Source: U.S. Department of Commerce

Thus, in this empirical study, the importance of the ownership advantage is expressed, which could attract investment and acquire knowledge abroad to improve economic growth. For instance, the United Kingdom has good industrial locations and skilled workers that could attract inward investment flow from the United States. Since close economic ties exist around the world, the competition becomes more serious in comparison to previous decades. Therefore, the ownership advantage became more and more significant not only at the industry level, but also at the production, firm and country level.

2.3 Hymer's Theory

According to the inadequacies of the macro-level theory of FDI, Hymer (1960), put forward a theory of MNEs, called the monopolistic advantage theory. Moreover, his supervisor, Kindleberger (1969), supplemented and developed this theory, which is also known as H-K Tradition theory.

Hymer believes that the reason behind multinational enterprises conducting foreign direct investment in the host country is due to incomplete markets. Hymer points out four factors that lead the market to possess dearth, including product market imperfection, production factor market imperfection, economies of scale, and government policies. Firstly, some facts may lead to the imperfections of the product market, such as: trademarks, commodity-specific, and the price-fixing cartel. Secondly, the difference in particular management skills of firms and technology being protected by the patent system may cause imperfection in the production factor market. Thirdly, it is hard to make economies of scale in imperfectly competitive markets. Therefore, economies of scale may easily lead to market imperfection. Finally, the government of one country constantly formulates some policies to protect domestic markets, such as tariffs, interest rates, and exchange rates. These four factors result in market imperfection. Thus, Hymer supports that monopolistic advantage can help multinational enterprises deal with market imperfect in the foreign countries.

Hymer puts forth two major ideas in his monopolistic advantage theory. First, the firms seeking fora massive amount of sources to get a competitive advantage in the global market is the primary motivation that turns firms into MNEs. For example, different firms will continue operating in the same industry. Thus, when a firm possess competitive advantages of the product, it will naturally find the means to maximise this benefit. Therefore, international expansion is the best way for firms to keep their competitive benefits and obtain some returns. Secondly, the competitive structure may lead some industries to become more international. Therefore, the companies could get economies of scale advantage. Moreover, the multinational enterprise has a compensatory effect to offset the advantage of local enterprises and eliminate market barriers in the host country.

Hymer analysed the monopolistic benefit of the United States multinational enterprise in the 1960s, and summarised several points to prove that the United States has more competitive advantages to invest in foreign countries than others. Firstly, MNEs of the United States have horizontal and vertical integration advantages. The former advantage gives multinational enterprises the ability to control prices, and the following advantage helps MNEs externally obtain economies of scale. Secondly, multinational enterprises possess a market advantage in the United States, and they can obtain certain advantages, such as: patents, trademarks, and the skills of marketing. Thirdly, multinational enterprises of the United States have sufficient capital, advanced technology and global business strategy. Thus, this gives MNEs a competitive advantage in production and management skills.

Fourthly, foreign direct investment in the United States focuses on developing investment in countries, which, because of these countries, has several cheap labours, abundant resources, and a broad market. Thus, MNEs in the developing countries can get labour, material resources and market advantages to reduce the marginal costs of investment. Finally, the government of the United States always formulates some restrictions (like a tariff, interest rate and exchange rate) to protect multinational enterprises from bringing profits of foreign countries.

One of the pros of Hymer’s monopolistic advantage theory is to break international capital flows of the FDI theory (the macro-level theory). It also highlights intellectual property, and technological advantages indicate the essential role of multinational enterprises. Additionally, monopolistic advantage pioneered a new area of foreign direct investment research, making FDI an independent discipline. This theory explains that MNEs create horizontal integration advantage to maintain a monopoly advantage in the competitive market. Moreover, this theory also discusses that MNEs make vertical integration advantage and transfer labour-intensive industries to the developing countries, thereby allowing the MNEs to maintain a monopoly status.

On the contrary, Hymer’s monopolistic advantage theory also has some disadvantages. For example, this theory cannot explain the industries and geographic distribution of foreign direct investment flows. Consequently, this theory lacks the guidance for FDI in developing countries, because it focuses on FDI in the United States. Lastly, this theory cannot explain the increasing number of multinational enterprises in developing countries. Therefore, foreign direct investment also gained significance in these countries during the late 1960s. Moreover, this theory ignores the dynamic function in foreign direct investment (like time series and location factors). As a result, some scholars have explored pioneering theories of foreign direct investment after Hymer’s monopolistic advantage theory.

It is clear that Hymer’s monopolistic advantage theory makes foreign direct investment a research objective in a new research field. This theory uses multinational enterprises in the United States as a case study to find four facts for demonstrating inadequacies at the macro-level theory. Moreover, Hymer supports two suggestions to complete the FDI theory including the fact that the firms will become MNEs due to the possession of competitive advantage sources. Therefore, the competitive structure may lead some industries to become more international for firms to get economies of scale advantage. Furthermore, Hymer’s theory has a disadvantage, which, due to his theory, focuses on the United States in the 1960s along with lack of guidance for the developing countries. Therefore, some scholars began to research FDI theories after Hymer’s theory most of whom put forward several useful theories and completed the FDI theory further.

In his dissertation, Hymer discussed the theory of direct investment and explained two types of imperfection: structural market failure and interest rate, which may lead the MNEs to conduct direct investment outside its national boundaries. In terms of the structural market imperfection, Hymer mentioned barriers, like asymmetric information, unstable exchange rate, and costs, between countries. (Hymer, 1960). These barriers could encourage firms to move their capital from a high cost country to a lower cost country. Hymer introduced the transaction costs to analyse the further mobility of barriers, the differential between borrower's interest rate and lender's interest rates. He believed that the size of transaction costs depends on the degree of development in a country. The high-developed capital market, and the transaction costs will generally be low, while being higher on the poorly developed markets. (Hymer, 1960). Subsequently, Buckley and Casson developed the internalisation theory based on structural market failure in 1976 (See Section 2.4.3).

The second imperfection is the interest rate, which exists because often no transaction costs take place between two firms if the direct day-to-day finance is undertaken. However, according to direct investment as an international operation, the transaction costs will spread between borrowing and lending rates, which the entrepreneurs should consider. One of the most important missions for entrepreneurs is balancing the control and financing for international operation. If a country has low-interest rates, it may attract more foreign investors to enter the market for extra profits.

The aforementioned two imperfections of the market explained capital movement and its influence on the decisions made by investors. Owning and controlling of subsidiaries is vital for entrepreneurs rather than resorting to licensing. Therefore, internalisation is one of the methods to reduce transaction costs and decrease the effect of market failure, and to maximise profit in the multinational enterprises.

2.4 Eclectic Paradigm Theory

The Eclectic Paradigm Theory, based on the comprehensive theory, was developed by Dunning in 1977. This theory is a mix of three different theories: (O-L-I) of foreign direct investment and to explain how multinational enterprises make a business decision.

2.4.1 Ownership Advantage

'O' stands for ownership advantage, which addresses the question, 'why do firms invest overseas?' (Dunning, 1973). Dunning (1988) has identified three types of ownership-specific advantages:

> '(i) Those that stem from the exclusively privileged possession of or access to particular income-generating assets; (ii) Those that are generally enjoyed by a branch plant compared with a de novo firm; (iii) Those that are a consequence of geographical diversification or multi-nationality per se.'

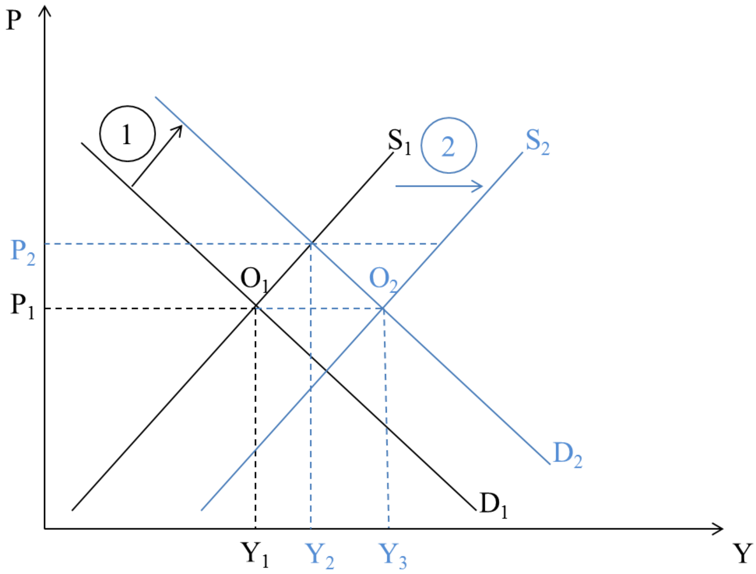
Dunning believes that if a multinational enterprise conducts FDI into other countries, they should have these ownership-specific advantages. However, it does not mean that the MNEs will undertake FDI with ownership advantages. It means that ownership advantage is a necessity, but not a sufficient condition. For example, if a multinational enterprise only has ownership advantage (without location and internalisation advantage), the best way for this MNE is the export of domestic production. There are two factors to help understand the ownership advantages in multinational enterprises:

1) MNEs cannot exist in the perfect competition market.

Firstly, assuming a perfect competition market, there are two countries (Country A and Country B). They use the same technology to produce the same product. Thus, they spend the same materials, set the same price to sell products, and gain the same profit. Therefore, the supply equals demand in the industry equilibrium at point O_1 in both Country A and Country B (See Figure 2.4). Then, we could say the firms in Country A are identical to those in Country B, and none of these firms has an ownership advantage at this stage.

Now, assume there is something happened and make demand curve has an increase (shift to the right) in Country B. The demand curve will start progress 1, and the following result is the price has increased from P_1 to P_2. At this stage, because there is a supernormal profit in short-run, which will attract new firms to enter the market. Therefore, supply curve will also shift to the right and until making a new balance between supply and demand. (See progress 2). The point O_2 is the new equilibrium in Country B at the original price. In long-run, the firms in Country A usually may not like to become new entrants and move into Country B. Because there is no supernormal profit and the subsidiaries in Country B cannot get profits. Moreover, if the firms in Country A want to enter into Country B, then they will face losses in the foreign market as they will incur costs of doing business abroad putting them at a disadvantage relative to domestic firms. Thus, we say that MNEs cannot exist in the perfect competition market.

Figure 2. 3 Movement Supply and Demand Curve in the Perfect Market



2) MNEs would like to exist in the concentrated market.

Assuming a specific country has a monopolistic market, a few but large companies with high profit will exist. This market has a high barrier to entry, according to less-friendly competition environment, which means it could essentially be immune to the newest firms entering the market. This is based on these monopolistic companies having ownership advantages compared to other weak or local companies. For example, some companies have unique technology, which could be copied and used during production. Consequently, they have spent a lot of money on technology research or R&D research, but can freely use these technologies for a new product.

Moreover, the company could even attract more investment or conduct investment into other companies abroad. If a company has high technology, it will help explore the new market in the foreign country. Therefore, the company has substantial competitive factors in crashing the local companies, which could also promote the company as a multinational enterprise. Following are more details of how R&D works in the product life-cycle, discussed in section 2.5 (Vernon's Theory in 1966).

2.4.2 Location Advantage

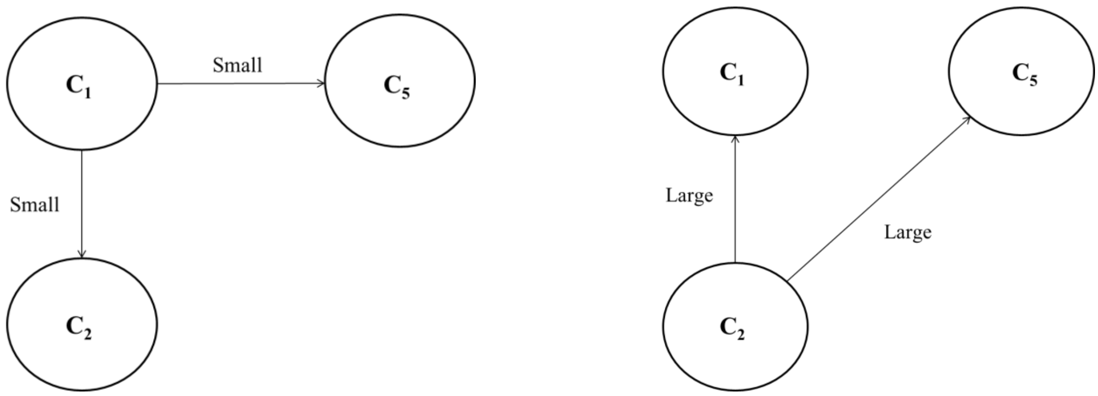
'L' in this theory indicates location advantage, which explains the question, 'where do firms locate their foreign operation?' (Dunning, 1973). Dunning points out that the reason for the location choice may be promoted by market failure, similar to government intervention of the imposition of trade barriers and the transaction of particular goods or services. Therefore, if the host country has several advantages in the level of economic development, market scale, labour force, infrastructure and resource endowment than the countries of origin, then the host country has great possibility of receiving much more FDI. In 1978, Kojima put forward the theory of comparative advantage to explain behaviours and rules of foreign direct investment and the effect on international trade. Kojima used two cases (Japanese trade pattern and the United States trade pattern) to explain this relationship.

In the first instance, Kojima (1978) argues that when the home country wishes to conduct FDI in the host country, they should start from comparatively disadvantaged industries in the countries of origin, but with potential that can be comparatively advantaged in the host country. Figure 2.5 shows the pattern of trade in Japan (before and after FDI). C_1 has a comparative ownership advantage (like technology, marketing expertise, management skill), but has a low location advantage (high cost of labour) than C_2. In this case, Kojima assumed that C_1 indicates the home country (Japan); C_2 indicates the host countries (Hong Kong or least developed countries); C_5 indicates other countries. For example, if the same industry exists in both Japan and Hong Kong, but Hong Kong has a lack of high technology after Japan conducts the FDI into Hong Kong, the Hong Kong industry considers missing complementary factors and becomes a more efficient emergency industry. Therefore, when Japan brings FDI into Hong Kong, Japan will import the same product, which may have a high cost if they were to produce it.

In the second case, Kojima uses trade pattern of the United States to explain a contradictory situation. Figure 2.6 gives information about trade in the United States without FDI and commerce with FDI. C_3 indicates the home country (the United States); C_4 indicates the host countries (European, which has a less competitive advantage than the United States); C_5 indicates other countries. In this case, the United States (C_3) has a monopoly advantage, and they export a lot of comparative advantage products into the European countries. When the United States builds some subsidiaries in the European countries and made a monopoly of industry, it may reduce the export to European countries. Therefore, there is no trade between the United States and European countries anymore.

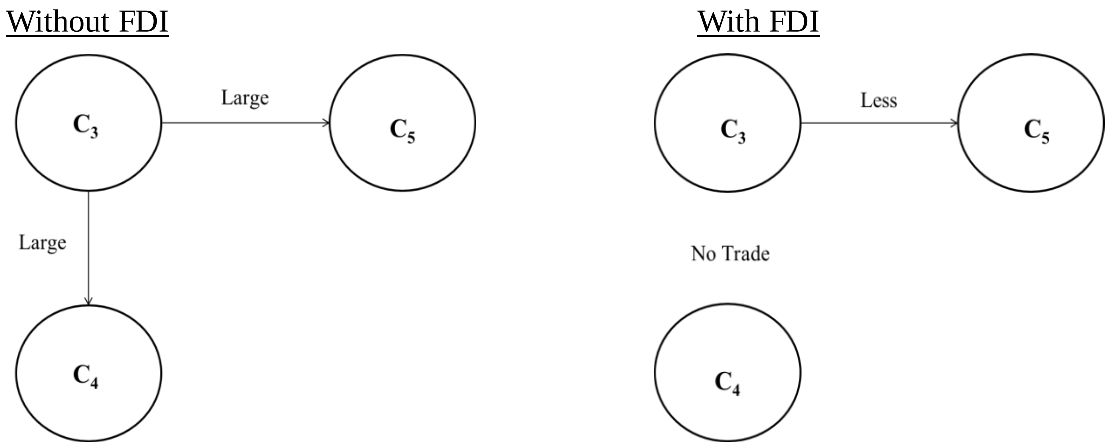
Figure 2. 4 Trade Creating FDI

Before FDI After FDI



Source: PEARCE.R, 2013

Figure 2. 5 Trade Destroying FDI



Source: PEARCE.R, 2013

Summarising Kojima's theory, the first case of FDI in Japan is also called 'trade creating FDI'. This multinational enterprise in Japan focuses on the traditional local industries, which could almost lose their comparative advantages. These industries can easily find a suitable investment location overseas and highly benefit from the returns as compared to domestic investment. At the same time, the host countries not only experience an increase in their revenue income but also promote host countries to buy products from home countries, that is, creating a new trade. On the contrary, the second case is also familiar with 'trade destroying FDI'. Multinational enterprises of the United States have a monopolistic advantage, thereby shifting their production base into host countries by setting up subsidiaries. Therefore, it may reduce the exports from home country, adversely affecting their economic growth, and violate the comparative advantage.

2.4.3 Internalisation Advantage

'I' indicates the internalisation advantage, which stands for the question, 'what determines the amount and composition of international production?' (Dunning, 1973). In 1976, Buckley and Casson put forward the hypothesis that if the benefits of an intermediate good outweigh its cost, then this good will be internalised in a market. They pointed out five types of market imperfection and discussed that market failure gives significant benefits to internalisation[1]. (Buckley and Casson, 1976). In their theory, the internalisation could generate two types of integration: (i) the vertically integrated producer; and (ii) integration of production, marketing and R and D[2]. (Buckley and Casson, 1976).

They believe that R&D is an essential factor to influence the decision of internalisation. This is due to the fact that knowledge is a public good within the firm and market with low transmission costs, which means that it could be easier for the firms to acquire and sort out knowledge through their intelligence system abroad. Therefore, if a country or a firm has a weak intellectual property rights, like patent, copyright, and trademarks, they may lead to the free-rider problem. The fact is that firms prefer to internalise the market in knowledge within the firm rather than licensing their knowledge to a third party or an independent producer. Therefore, Buckley and Casson mentioned that internalisation exists only when firms perceive that the benefits will exceed the costs. (Buckley and Casson, 1976).

Notes:

1. Five types of imperfection and benefits of market failure explained by Buckley, P. and Casson, M. 'The Future of the Multinational Enterprise', Palgrave, (1976), 37-40.

2. A combination of these two types of integration explained by Buckley, P. and Casson, M. 'The Future of the Multinational Enterprise', Palgrave, (1976), 34-35.

In the thesis, one of our empirical studies is based on this theory to measure the causality of foreign direct investment and R&D at the country level (See Chapter 7). The reason behind focusing at the country level is that Buckley and Casson, in their theory, also mentioned that the pattern of FDI flows between developed countries after the World War, could be explained via the internalisation of knowledge.

2.5 Investment Development Path

Dunning's OLI Eclectic Paradigm in the last section explained that there are three factors that could influence the MNEs' investment decision. In 2001, Dunning further explained his opinion at the country level, and showed how these three factors changed during the process of a country development (See Table 2.2).

Table 2. 1 Process of IDP in a Country

	Process of IDP	**The balance of Inward and Outward Investment**
Stage 1	Natural Resource-Based	Litter inward investment; Negligible outward investment
Stage 2	Investment Driven	Increasing inward investment; Limited outward investment
Stage 3	Innovation Driven	Outward investment is increasing faster than inward investment
Stage 4 & Stage 5	Increasing Knowledge and Service Intensity; Knowledge Economy	Substantial inward and outward investment in the country

Source: Multinational Enterprises and the Global Economy, 2002

Table 2.1 shows the pattern of country development and the situation of inward and outward investment in different stages. In the first stage, countries may attract some inward investment based on natural resources, like agricultural, forest, and fishing, with insignificant outward investment, as well low intra-industry in both trade and investment. When the country moved to the second, investment driven stage, it began looking forward to resource seeking and market seeking in other developing countries.

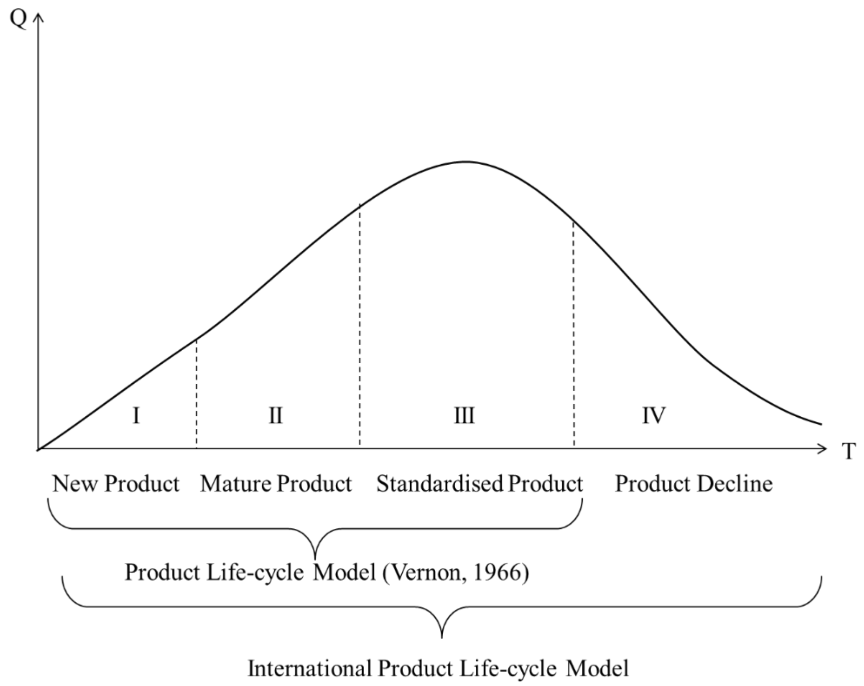
In the third stage, countries move to the innovation-driven, meaning that new ideas, goods, and services appeared. In this period, both inward and outward investment increased in a country, and all kind of investment focused on efficiency seeking. In the last two stages, more knowledge and skilled labour in a country are discussed, which could potentially attract more inward investment. At the same time, an increased efficiency and knowledge seeking investment will become the primary motivations for countries to conduct investment abroad.

In addition, Dunning mentioned that the structure of a country could also have some influence on investment patterns, like formal institutions, informal institutions, corruption, and market size. Therefore, the thesis will use these characteristics of a country to identify each relationship in different groups.

2.6 Vernon's Life-Cycle Model

In 1966, Vernon put forward a product life-cycle model, explaining the progress of a product from create to decline. Vernon observed the firms' behaviour in the United States from 1945 to 1965 and found that the products usually need to process three stages in a life-cycle (See Figure 2.6). These three stages are: a new product, mature product, and standardised product. In modern international trade research, another stage is added: product decline in Vernon's Model.

Figure 2. 6 International Product Life-Cycle Model



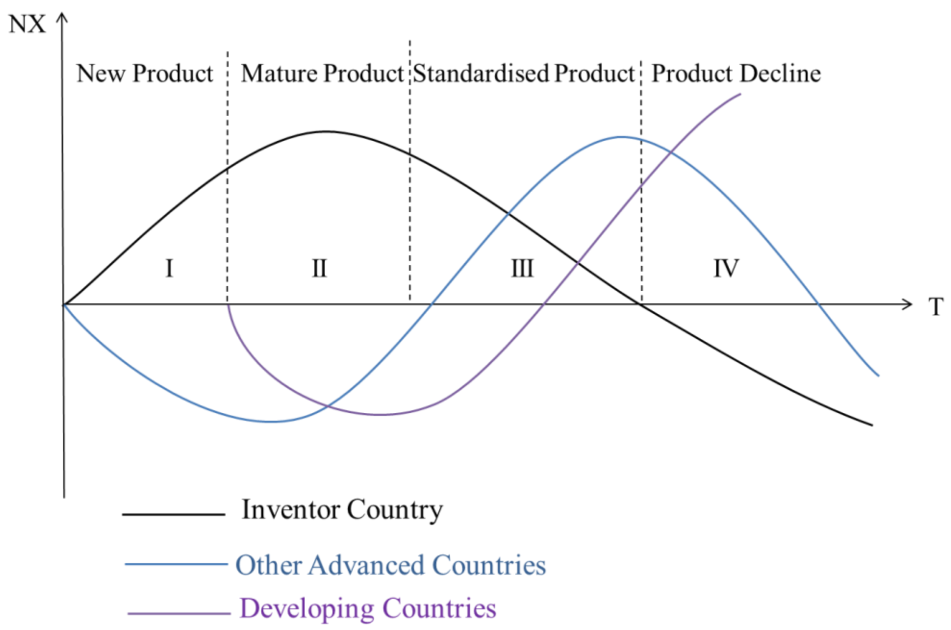
Vernon mentions in his research that the United States had the advantage of new technology over other countries. Therefore, firms in the United States will produce new products at stage I. This is also known as the innovation stage as discussed in the OLI theory in section 2.4. Innovation or R&D is an essential factor for MNEs, which means that multinational enterprises have their ownership advantage and along with high competitive strength in the international market. However, Vernon's research also discussed that the new product always takes precedence in the home country instead of seeking a lower-cost in the foreign country. The main reason is that innovation needs close communication between a research institution and product industry, which could minimise the transaction cost as well. When the new product is stabilised and has developed its characteristics, the firm will consider pushing it into the foreign country, thereby moving the product life-cycle to the stage II (mature product).

During stage II, the motivation of the firms seeks a foreign market. The firms have a mature product with fixed cost, and the purpose of the firms is to find a suitable market to cover the transport cost, tariff, and the produce expenditure. Additionally, the firms could produce mature products in the foreign countries, that have a good number of cheap labours in the foreign market. At the end of this stage, the firms will develop multinational enterprises, since they have ownership advantages and have established (or control), at least one subsidiary company in the foreign country. Standardised product in Vernon's Model is the last stage, in which, Vernon believes that the technology for this product has been widely used around the world. Subsequently, a similar massive product in the market will be close to saturation at some point. Moreover, at this stage, the motivation of MNEs has changed to efficiency-seeking, with the purpose to find a less developed country for reducing expenditure of the product and improving their competitiveness in the global market.

According to Vernon's Life-cycle Model, only three stages of product life exist. Nevertheless, people add the fourth stage: decline of product in the modern international trade research to complete the entire product life-cycle. Stage IV indicates that when the global market tended to saturation, the standardised product moved to the decline stage. It means that the technology of this product gained momentum, posing no challenge for most of the industry for production. Even the developing countries could import or 'copy' to produce a similar product. Therefore, this product will replace the new one with the latest technology, which will be eliminated by the market eventually. By this time, the product reaches the end of its life-cycle following four stages. Therefore, the new product will start a new life-cycle to repeat these stages.

Currently, people use the product life-cycle model to explain the international trade pattern in developed as well as developing countries. Figure 2.7 indicates the changing of net export in four stages in the inventor's country, developed countries, and developing countries. Vernon draws three figures in his research to display the relationship between production and consumption of the product in the different stages. For instance, the United States had a new product, with the production being higher than consumption until the early parts of the third (standardised) stage. Hence, the net export will be positive, until the product is moved into the final stage (see Figure 2.7 black line).

Figure 2. 7 Patterns of International Product Life-cycle



Source: Vernon, 1966; Designed by Prabhakar, 2012

Furthermore, other advanced or developed countries need to import from the inventor's country until the product is as practical as standard goods, and the technology becomes more familiar around the world. Thus, with regards to other developed countries, the net export will be negative in the beginning, with significant growth in the second and third stage (net export transfer to positive), and will decline again during the final stage.

On the contrary, the net export is zero in developing countries at the first stage, since the developing countries are not the inventor country's first preference to be considered as export target. Net export exists in the mature product stage with a negative sign, implying that the developing countries indulge in more import than export. Net export is then regarded as the positive in the third stage, the reason behind which is that developing countries have a cheap labour advantage when compared to other developed countries. In addition to that, since the product eventually reached the standard, some developing countries could use the technology and 'copy' it to develop similar products. These similar products have several characteristics, such as: low cost, low quality, short production cycle, and a vast number of productions. They could export these kinds of products to other countries to get profits in the final stage.

2.7 Conclusions

This chapter reviewed the theoretical background of foreign direct investment at the macro-level (the early FDI research before the 1960s) to micro-level (Hymer's theory, Dunning's OLI theory, Kojima's Location theory, and Vernon's Life-cycle Product theory). These theories give us necessary information about the trend of FDI research in the last six decades. Similarly, they also support the guidance of empirical study analysis. Thus, the following chapter will discuss the previous empirical studies of FDI relative causality. The limitations of the previous studies will also be mentioned in the next Chapter.

Chapter 3 Empirical Background

3.1 Introduction

With the development of economic globalisation, more and more enterprises are interested in the international market. These enterprises have committed to develop opportunities and establish their subsidiaries overseas. Therefore, people began to focus on the development of foreign direct investment (FDI). In recent times, the causality between foreign direct investment and economic growth, as well as the relationship between foreign direct investment and international trade has a modern research topic. This chapter will review the empirical background of FDI and a series of relationships among FDI, international trade, and economic growth. The empirical studies in this thesis are present in chapters 6, 7, and 8.

The structure of this Chapter will be as follows:

- Section 3.2 will review the previous empirical study of the relationship between foreign direct investment and economic growth
- Section 3.3 will discuss how research and development (or innovation) influences FDI in the empirical studies
- Section 3.4 will focus on the relationship between FDI and international trade in the previous research
- Section 3.5 will reflect over some previous empirical studies relating to the FDI research
- Section 3.6 will display the details of each empirical study through tables of six categories (Author's name, year to published, sample size, econometric methods, data source, and variables) and indicated in the Appendices for Chapter 3 (from Table 3.1 to Table 3.4)

3.2 Previous Empirical Study 1: The Relationship between FDI and Economic Growth

The first research question in this thesis is: has the foreign direct investment influenced the economy of a country? Some previous studies have proved that foreign direct investment could independently affect economic growth. For example, in 2001, Carr, Markusen, and Maskus found that an interplay between outward FDI flows and economic growth in the host country, by using the knowledge-capital Model, measuring 36 countries from 1986 to 1994.

Moreover, Pegkas (2015) measured Eurozone countries from 2002 to 2012 and found that stock of FDI had a significant and positive effect on the economic growth. Furthermore, by using the generalised method of moments in 13 MENA countries from 1980 to 2012, Omri (2014) examined the effect of FDI and economic growth. He found a positively bi-directional causal relationship between them. Turkcan, Duman, and Yetkiner (2008) used the simultaneous equation to examine 23 OECD countries from 1975 to 2004. They also indicated that FDI and economic growth had a bi-directional relationship. Choong (2011), Adeniyi, Omisakin, and Edwaikhide (2012) added the financial sector to measure the causality between FDI and economic growth to find that a well-developed domestic financial sector has a significant FDI effect on economic growth.

On the other hand, some studies indicate that FDI does not have direct influence on economic growth. For instance, Carkovic and Levine (2002) measured 72 countries from1965-1995 and found that foreign direct investment inflows cannot exert an independent effect on economic growth. Moreover, Temiz and Gomen (2014) examined the case of Turkey, and found that no significant relations determined the FDI inflow and economic growth both in the short- and the long-run.

The initial limitation of the recent causality studies between FDI and economic is sample size with the period being narrow. For example, Pegkas (2015), Temiz and Gokmen (2014) measured this causality in 11 and 16 years, separately. Hence, their result can prove the relationship in the short-run, without explaining how the relationship changed in long-run. The second limitation is of data bias. For instance, Carkovic and Levine (2002) used the average of over seven -5 year periods. It may become a data bias in case of missing data in the research.

Furthermore, some other scholars have examined the impact of FDI and economic growth on the international trade. For example, Cieslik and Tarsalewska (2011) reviewed 97 developing countries using the static and dynamic panel data, and found that both trade and FDI positively related to economic growth. Additionally, they discussed that openness to FDI has a significant growth than international trade does. Tekin (2012) examined 18 least developed countries from1979 to 2009 and found that FDI might enhance the export performance, while economic growth does not accompany the increase in export. Akoto (2016) tested South Africa between 2008 and 2009, and found that FDI has a significant impact on promoting exports in the long run, but in the short term, exports were not responsive to changes in FDI inflow.

Consequently, certain notable cases exist in specific countries. For instance, Belloumi (2014) focused on Tunisia and examined the period between 1970 and 2008 to find that trade liberalisation has a significant positive impact on attracting foreign direct investment. Tahir, Khan, and Shah (2015) used time series data in Pakistan from 1977 to 2013 and found that FDI plays a significant and decisive role in the economic growth of Pakistan. Additionally, they found that the imports have adversely impacted the growth process of Pakistan.

The recent researches are more focused on only one or few countries. For example, Akoto (2016), Belloumi (2014), Tahir, Khan and Shah (2015), Tekin (2012) researched in South Africa, Tunisia, Pakistan and 18 least developed countries. These studies may not indicate the impact of FDI and economic growth of international trade in a general.

3.3 Previous Empirical Study 2: The Relationship between FDI and R&D

The previous chapter reviewed that the R&D intensity is a crucial factor in a company, which could help the company have an ownership advantage compared to others. The R&D (or innovation) department in a company could update the new technology and start the first stage of product life-cycle. With the latest production by the firms indicate increased competition strength in the local and global market. The second research question in this thesis is, 'what is the role of research and development played in the foreign direct investment flow?' More specific, if a country has a high technology production, will this situation attract other countries to invest in that country? Or will this country 'sell' new technology and conduct investment into other countries?

With regards to empirical study, Barrell and Pain, in 1997 observed the United Kingdom and Germany from 1980 to 1995, and found an interrelationship between international trade, FDI, and economic growth in European countries. They also argued that foreign direct investment could likely be an essential platform for the diffusion of ideas and technology. In addition, Walz (1997) used steady-state equilibrium and proved that companies conduct foreign direct investment in developed countries, the latest knowledge of which, could be acquired to establish subsidiaries in low-cost countries. His research indicated a factor in the late 20th century that the knowledge-seeking FDI became the most noteworthy motivation for firms around the world, especially within high-technology countries.

According to recent empirical studies, Annan-Diab and Filippaios, in 2017, measured 98 multinational enterprises in Ireland between 2003 and 2009, followed by a discussion that high-technology related FDI (such as software sector and IT sector) prefer seeking a country with a comparative advantage in the labour force. On the contrary, in the financial sector, they also found that the investor would seek efficient FDI in Ireland. This gave a general idea of the motivation varying when MNEs conduct FDI in different industry sectors. Therefore, the investor should rely on the characteristics of the industry sector to set up their strategies.

Another empirical study came into play, written by Pradhan, Arvin, Bahmani, and Bennett in 2017, who measured 36 OECD countries between1970 and 2016 using panel integration techniques. They found a bi-direction link between innovation and economic growth in the long run and a diverse pattern of this relationship in the short-run. Thus, it is implying that the information and communication technology (ICT) infrastructure could improve the increasing trend of government consumption expenditure.

In the previous studies, few researchers focused on the causality between FDI flows and local activities. Most of them used R&D as an extra variable to measure the relationship between trade, FDI, and economic growth. Therefore, in this thesis, we will investigate the direct link between the R&D and FDI inward, and FDI outward flows (See Chapter 7 empirical study for this causality).

3.4 Previous Empirical Study 3: The Relationship between FDI and International Trade

The final research question is, ‘what is the relationship between FDI and international trade?’ In the empirical study, the causality of FDI and international trade is divided into two categories, ‘complementary’ or ‘substitute’. Hence, the following question will focus on: if we use OECD countries to measure this causality, does the relationship between FDI and international trade still indicate ‘complementary’, ‘substitute’ or none? Moreover, a new issue might occur, that of: if we prove that a relationship between FDI and trade exists, regardless of it being ‘complementary’ or ‘substitute’, what is the pattern of FDI and trade? Based on an in-depth analysis, the focus is on what situation or under what conditions, will the causality of FDI and trade most likely become ‘complementary’ or ‘substitute’.

The previous empirical studies in this causality had a breakthrough in the 1980s. The theory of the relationship between foreign direct investment and international trade is presenting multinational enterprises as the carrier. As a result, some scholars found that the causality of foreign direct investment and international trade existed in both the substitute and complementary effect.

For example, Markuson and Svensson (1985) raised a series of non-factors endowment model. After combining with the factors endowment model, they argue that five factors (technical differences, production tax, monopoly, external economies of scale, and market distortions) may lead to foreign direct investment, and international trade becoming complementary. According to this model, Markuson and Svensson believe that if trade product and non-trade product (like services, buildings, education, and housing) were to match, the relationship between foreign direct investment and international trade will be substitute. In contrast, if the trade product and the non-trade products do not match, the causality of FDI and trade will be complementary.

Wacker (2015) examined 50 developing countries from 1980 to 2008 and found that foreign direct investment had a significant positive impact on the net barter terms of trade. Furthermore, using OLS method and testing 105 countries between 1984 and 2000, Harding and Javorcik (2012), also discovered a positive effect of FDI on the unit values of exports in developing countries. Rana and Kebewar (2014) examined 122 developing countries in 36 years and found that the more the FTA-CU (full-fledged trade agreement) concludes, the greater the amounts of FDI inflows are attracted in the developing countries. Therefore, the PSA (partial scope agreement) are insignificant in determining the FDI inflows. Pain and Wakelin (1998), using OLS method, examined 11 OECD countries from1970 to 1992 and found that FDI outward had an adverse effect on trade shares, but FDI inward had a significantly positive impact on trade shares.

The limitation of the causality of FDI and international trade is unable to clearly identify the relationship between them. Most of the researchers focus on how the trade policy affects FDI or trade itself, like Harding and Javorcik (2012) and Rana and Kebewar (2014). Another other limitation is the duration. The previous research period does not include the recent years, like from 2000 to 2014; even their research has been public in the past two years.

3.5 Conclusions

This chapter focused on three research questions, which formed the base of this thesis. Each question was followed by answers obtained from several previous studies. Subsequently, it was observed that five main reasons may vary the research results. The first being sample size selection, for example, some people would like to research in developing countries, others may prefer less developed countries. The second is the estimation technique selection. For example, in the recent studies, most people would like OLS, GMM, Simultaneous Equation, Co-integration, and Vector Error Correlation. The former two techniques have frequently been used, which may be because they are fundamental and easy techniques to grasp. The third is the period selection, with the average range of a time limit in the recent research being between 10 to 30 years.

However, some research may focus on 40 years, and some others may focus on fewer than five years. The fourth is the estimation methodology selection, such as time series, cross-section, and panel data (fixed effects or random effects). The choice of methodology might be different because the researchers have a different aim. For example, if they choose the time series methodology, they would find out how the term trend affects their research. The final question, is on data selection. In the causality between FDI and economic growth research, most people have used data from World Bank, UNCTAD, and OECD statistics. Therefore, based on the differing data, the results will also be altered, although they often use the same database, the category data is different.

According to the experience of previous studies, we will use 30 OECD countries as a sample and the measure these countries one by one to find out if a standard pattern flow of FDI and international trade in some countries exists. The period in question is between 1981 to 2015. The variables in this thesis involve FDI inward flows, FDI outward flows, export, import, GDP, and government expenditure on research and development. Therefore, the following chapter is about the description and characteristics of the database.

Chapter 4 Data Description

4.1 Introduction

The previous two chapters reviewed the theory of foreign direct investment in the international business sector, and the empirical studies of the relationship among of foreign direct investment, international trade, and economic growth. According to the three research questions that were addressed in chapter 1, this thesis will use 30 OECD countries as observation, and investigate the causality between FDI, trade, and economic growth. The examined period is 35 years between 1981 to 2015.

Firstly, the reason to analyse the OECD membership country is that OECD is an intergovernmental organisation with the mission 'to promote policies that will improve the economic and social well-being of people around the world.' (OECD, 2017). Secondly, since most countries are developed in OECD, it could provide guidance in the future studies of developing countries. The dataset to be used in this thesis is collected from the UNCTAD and the OECD statistics. Since the R&D variable in the UNCTAD statistic dataset is not available in the whole period, OECD statistic database is being used to fill the gap in missing years.

The structure of this chapter is organised as follows:

- Section 4.2 focuses on database description, which briefly introduces the UNCTAD and OECD database
- Section 4.3 discusses data description of the main variables in the thesis
- Section 4.4 talks about the country profile factors in each country
- Section 4.5 reflects on the reliability and validity of data
- Section 4.6 and section 4.7 include the conclusion of the chapter

4.2 Database Description

In this thesis, two different databases will estimate the variables. Foreign direct investment, trade, and gross domestic product were collected from the United Nations Conference on Trade and Development (UNCTAD) database, while the research and development was collected from OECD statistic database. This section will briefly introduce these two datasets. Table 4.1 gives information about the details of the database selected for each variable, data usage in this thesis, and the updated time of each database.

4.2.1 UNCTAD Database

UNCTAD stands for the United Nations Conference on Trade and Development. The aim of UNCTAD statistic is to help the 'treatment of trade and development and the interrelated issues in the areas of finance, technology, investment and sustainable development.' (UNCTAD, 2017). UNCTAD database contains a broad range of data collected from national and international sources over long durations. It allows for the analysis of some emerging and urgent issues within a framework of longtime tendencies with a broad geographical scope.

In case of missing data or a break in the data series, the UNCTAD statistics use their methodology to make estimates or to be complemented by other international organisations, such as: The World Bank, the Organisation of Economic Co-operation Development, and the International Monetary Fund. UNCTAD Statistics confirm that their work comes under the Principles of Governing International Statistic Activities. The details of categories of UNCTAD database can be found in the Notes.

4.2.2 OECD Database

The OECD collected data from its member countries and some non-member countries each year. The data providers come from national statistical offices, departments of national governments, such as agriculture, education, finance, health, and science and technology. Additionally, international organisations support OECD to supplement their dataset. The characteristic of OECD database is to avoid duplication when they collect the data from different resources. The purpose of this database is to provide direct and indirect data information on OECD's statistic practices for data users. (OECD, 2017). The OECD database lists that their statistical categories rely on different themes. This has been indicated in the Notes section at the end of this chapter.

Table 4. 1 Main Variables Data Collection Source

Variables	Databases	Categories	Data Usage in Thesis	Updated Time
Foreign Direct Investment	The UNCTAD Database	**a) Foreign Direct Investment Flows and Stock**	a) Foreign Direct Investment: Inward and Outward Flows and Stock, Annual, 1970-2015	24/10/2016
International Trade	The UNCTAD Database	**a) Trade Trends** b) Trade Structure by Partner, Product or Service category c) Trade Indicators d) Market Access	a) BPM6: Exports and Import of Goods and Services, Annual, 1980-2013	19/08/2014
			b) BPM6: Exports and Import of Goods and Services, Annual, 2005-2015	20/07/2016
Economic Growth	The UNCTAD Database	**a) National Accounts** b) Balance of Payments c) Exchange Rates d) Inflation Rates	a) Gross Domestic Product: Total and per capita, Current and Constant (2005) Prices, Annual, 1970-2015	25/04/2017
Research and Development	The OECD Database	a) OECD Science Technology and Industry Outlook b) Patents Statistics **c) Research and Development Statistics** d) Science and Technology Indicators	a) Gross Domestic Expenditure on R-D by sector of Performance and Type of Cost, Annual, 1981-2015	18/05/2017

Source: UNCTAD Statistics; OECD Statistics

4.3 Data Sources and Description

This section will discuss four variables including FDI variable (inward flows and outward flows), international trade variable (export and import), economic growth variable, and R&D variable. Each variable is divided in six categories: mean, median, maximum, minimum, standard deviation, and observations.

4.3.1 Foreign Direct Investment

According to BPM 5 (1993) Benchmark recommend that the foreign direct investment statistics consist of transactions data (known as FDI flow data) and position data (known as FDI stock data) and both consist of standard components (See Table 4.1.1 in Appendix 4.1). This thesis will use transaction data to measure the time trend effect on FDI. The data sources of foreign direct investment are collected from four parts: enterprise survey, international transactions reporting system, exchange control or investment approval authorities, and others (like published sources, press reports or bilateral sources). The tables below indicate the changes of data sources collected for OECD countries in 1997 and 2001, divided into ‘most timely’ and ‘most comprehensive’ data. To simplify, the ‘most timely’ data stands for the data displayed initially after collection. The definition of ‘most timely’ data and ‘most comprehensive’ data can be found in Notes at the end of this chapter. The details of each country of data sources are collected in Appendix 4.1, from Table 4.1.2 to Table 4.1.8.

Table 4. 2 Primary Data Sources for the Most Timely FDI Flow

	Enterprise Survey		**International Transactions Reporting System**		**Exchange Control or Investment Approval Authorities**		**Other (Published Sources, Press Reports, Bilateral Sources)**	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
OECD 1997 (29)	12	11	18	18	2	0	0	0
OECD 2001 (30)	16	16	16	16	3	2	4	4
Changes	+4	+5	-2	-2	+1	+2	+4	+4

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4. 3 Primary Data Sources for the Most Comprehensive FDI Flow

	Enterprise Survey		**International Transactions Reporting System**		**Exchange Control or Investment Approval Authorities**		**Other (Published Sources, Press Reports, Bilateral Sources)**	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
OECD 1997 (29)	13	11	8	8	2	0	0	0
OECD 2001 (30)	12	11	2	1	0	0	1	0
Changes	-1	0	-6	-7	-2	0	+1	0

Source: Foreign Direct Investment Statistics, IMF, 2003

The database of foreign direct investment corresponds to the Statistical Annexes of the UNCTAD World Investment Report 2016 (WIR, 2016). This Report was released in June of each year, containing annual data up to the previous year. However, the data for the most recent year is preliminary and will be re-edited by the national authorities. The UNCTAD reports statistics of FDI is on a directional basis along with the implementation of the guidelines from the balance of payments and international investment position manual (BPM6, 2009). On the contrary, a few countries halted the reporting of directional basis and began reporting on asset/liability basis only.

Furthermore, the data from UNCTAD statistics is regularly collected from the official annual data of each country in both published and unpublished FDI data. In addition, this statistic database is supported by some other international organisations, such as International Monetary Fund (IMF), the World Bank, the Organization for Economic Co-operation and Development (OECD), the Economic Commission for Europe (ECE), and the Economic Commission for Latin America and Caribbean (ECLAC). (WIR, 2016). Table 4.1.2 gives information about the data resources of FDI flows in 30 OECD Countries, shown in Appendix 4.1. In this table, the focus is on: the national institution reporting FDI in each country, the reporting system used to collect the FDI data, the evaluation system used, and the data source used in the WIR. In this thesis, the focus will be on the flow of FDI, followed bythe details of stock FDI in the Methodological Note of the World Investment Report 2016.

The UNCTAD defined that the data on FDI flows is on a net basis (capital transactions' credits fewer debts between direct investor and their foreign affiliates). (WIR, 2016). Therefore, the net decreases in FDI outward or net increases in FDI inward are recorded with a positive sign in the balance of payment. On the contrary, the net increases in FDI outward or net decreases in FDI inward are recorded with a negative sign in the BoP. Table 4.4 and 4.5 indicate the details of the FDI inward flows, and FDI outward flows, separately. In each table, the summary of FDI flow data can be found with mean, median, maximum, minimum, standard deviation, and the observations in 30 OECD countries from 1981 to 2015**.** The negative FDI flow in the table represents disinvestment or reinvestment outside of the country. For example, the parent company may borrow money from its affiliate, or the affiliate pays off a loan from its direct investor. (OECD FDI Statistic Notes, 2017).

Table 4. 4 Foreign Direct Investment: Inward Flow

	Mean	Median	Max.	Min.	Std. Dev.	Obs.
Australia	16,265	7,825	58,981	-28,294	19,885	35
Austria	4,057	2,669	25,484	115	4,975	35
Belgium	25,324	11,018	119,693	-12,271	32,778	34
Canada	23,968	9,634	116,821	-445	27,055	35
Czech Republic	4,643	4,974	11,653	653	3,045	23
Denmark	3,552	1,132	33,823	-10,716	7,389	35
Finland	3,339	1,088	17,302	-1,144	4,379	35
France	19,783	16,628	63,500	-2,574	15,121	35
Germany	32,533	24,199	198,277	-10,193	41,906	26
Greece	1,219	984	5,355	-289	1,150	35
Hungary	4,010	3,323	14,409	554	2,912	26
Iceland	572	83	6,824	-76	1,369	35
Ireland	11,495	1,443	100,542	-31,689	23,112	35
Italy	10,753	4,961	43,849	-10,835	12,491	35
Japan	3,482	1,284	24,425	-6,506	6,394	35
Korea	5,357	5,042	13,643	121	4,596	35
Luxembourg	18,660	8,678	143,003	-29,679	33,797	34
Mexico	14,853	12,830	45,855	1,541	11,614	35
Netherland	22,742	11,724	119,636	-7,184	26,459	35
New Zealand	1,400	1,347	4,229	-2,788	1,505	35
Norway	4,345	2,409	18,774	-4,239	5,579	35
Poland	5,924	4,030	21,643	11	6,110	35
Portugal	2,921	1,793	10,594	60	2,868	35
Slovakia	2,128	2,275	5,865	-604	1,962	23
Spain	18,981	10,666	76,993	1,622	17,574	35
Sweden	10,480	6,350	61,135	-41	12,799	35
Switzerland	11,312	5,484	68,838	-951	15,384	33
Turkey	5,126	885	22,047	46	6,994	35
United Kingdom	47,760	30,461	183,822	-347	48,620	35
United States	121,989	84,455	379,894	11,518	100,182	35
Total OECD	446,254	360,289	1,291,802	34,134	364,827	35
World	702,574	550,589	1,902,244	50,392	598,392	35

Source: UNCTAD Statistics, 2017

Table 4. 5 Foreign Direct Investment: Outward Flow

	Mean	Median	Max.	Min.	Std. Dev.	Obs.
Australia	4,223	2,864	30,396	-35,783	10,528	35
Austria	6,461	2,768	35,840	44	8,446	35
Belgium	21,871	10,250	122,304	-69	28,165	34
Canada	26,303	22,924	79,277	2,402	22,689	35
Czech Republic	921	206	4,323	-327	1,258	23
Denmark	5,497	3,070	26,549	-10,365	6,916	35
Finland	3,628	2,217	24,030	-10,538	6,040	35
France	40,951	30,124	161,948	1,841	38,678	35
Germany	60,743	53,681	169,321	5,569	41,214	26
Greece	865	412	5,246	-785	1,323	29
Hungary	1,891	1,248	11,703	-4	2,565	24
Iceland	647	27	10,186	-4,209	2,746	30
Ireland	12,873	4,629	101,616	-1,165	20,495	29
Italy	16,900	7,326	96,231	969	21,161	35
Japan	45,457	31,557	135,749	3,612	39,852	35
Korea	8,859	3,967	30,632	61	10,665	35
Luxembourg	19,101	8,119	122,304	-69	29,367	34
Mexico	7,235	1,058	89,806	-263	16,803	35
Netherland	28,609	17,243	106,009	2,613	26,433	35
New Zealand	8,333	447	113,429	-1,566	24,104	35
Norway	5,253	1,604	23,678	-456	7,243	35
Poland	3,194	31	19,561	-300	6,163	35
Portugal	1,516	601	8,055	-9,782	3,181	35
Slovakia	883	95	13,435	-8,206	3,820	23
Spain	20,934	3,425	137,052	-313	32,541	35
Sweden	15,217	11,215	40,907	409	11,969	35
Switzerland	24,527	16,152	85,701	-3,327	23,614	33
Turkey	3,856	143	41,164	-3,982	10,632	35
United Kingdom	59,842	32,199	319,330	3,707	71,823	35
United States	101,614	70,277	393,518	-3,327	104,626	35
Total OECD	568,022	457,450	1,858,982	25,536	465,455	35
World	691,209	497,471	2,165,190	27,291	589,870	35

Source: UNCTAD Statistics, 2017

4.3.2 International Trade

The dataset of international trade in UNCTAD database is collected from Balance of Payment Manual 5th Edition (BPM5) and 6th Edition (BPM6), See Table 4.6 and Table 4.7. BPM5 published in 1993. Thus it has a historical data set than BPM6. According to the description of international trade database, the exports and imports of goods and services annual data from 1980 to 2013 comes from BPM5, while from 2005 to 2015, the data is collected from BPM6. Both BPM5 and BPM6 are published by the International Monetary Fund. One of the purposes of BPM is to improve the international comparability of data through the promotion of adaptable guidelines in the world. In addition, BPM may close the links with other macroeconomic statistics to enhance the consistency between different databases. (BMP6, 2009).

Table 4. 6 International Trade: Export

	Mean	**Median**	**Max.**	**Min.**	**Std. Dev.**	**Obs.**
Australia	115,226	79,498	324,237	23,952	95,142	35
Austria	110,808	87,297	234,756	23,967	72,247	35
Belgium	223,417	209,711	443,414	58,368	123,590	35
Canada	289,770	254,375	565,450	78,295	166,265	35
Czech Republic	85,892	76,736	171,693	18,952	56,203	23
Denmark	88,004	66,347	190,221	21,095	57,515	35
Finland	56,036	48,493	126,414	14,704	33,976	35
France	433,146	374,120	860,180	125,563	242,261	35
Germany	993,244	790,355	1,756,753	442,965	477,832	26
Greece	33,341	21,466	82,707	6,957	25,583	35
Hungary	49,235	28,977	125,653	9,200	43,672	34
Iceland	3,895	2,886	9,147	1,026	2,628	35
Ireland	107,263	68,067	288,950	8,905	95,440	35
Italy	334,467	302,459	644,742	90,600	183,796	35
Japan	506,595	462,923	931,768	160,220	241,443	35
Korea	254,895	165,434	725,127	25,860	232,383	35
Luxembourg	121,339	108,481	240,724	36,346	61,391	35
Mexico	163,141	129,201	418,952	26,394	130,316	35
Netherland	291,043	243,199	770,836	78,093	228,153	30

Source: UNCTAD Statistics, 2017

Table 4.6 International Trade: Export (Cont.)

	Mean	Median	Max.	Min.	Std. Dev.	Obs.
New Zealand	23,607	18,456	56,343	6,594	15,686	35
Norway	90,905	64,900	214,316	25,164	64,235	35
Poland	82,431	39,638	258,509	12,455	83,575	35
Portugal	40,509	34,126	94,011	5,730	28,211	35
Slovakia	43,226	31,358	92,094	7,391	32,317	23
Spain	197,066	161,395	449,575	32,159	142,894	35
Sweden	125,164	102,674	262,191	33,097	78,421	35
Switzerland	175,022	108,857	487,793	42,397	142,859	35
Turkey	75,696	50,827	220,782	5,967	70,564	35
United Kingdom	425,225	381,572	848,959	121,033	248,337	35
United States	1,047,947	934,936	2,343,204	266,019	664,910	35
Total OECD	6,244,898	5,319,896	13,903,449	1,387,665	4,085,024	35
World	9,664,923	6,963,164	23,778,485	2,169,496	7,242,712	35

Source: UNCTAD Statistics, 2017

Table 4. 7 International Trade: Import

	Mean	Median	Max.	Min.	Std. Dev.	Obs.
Australia	121,587	79,917	335,243	26,729	97,544	35
Austria	105,530	86,451	219,594	23,941	66,294	35
Belgium	216,940	194,447	441,638	57,656	124,156	35
Canada	281,770	242,773	587,079	66,790	171,699	35
Czech Republic	82,827	76,620	158,405	18,457	51,124	23
Denmark	78,812	59,691	178,685	20,475	51,960	35
Finland	51,441	38,705	115,446	14,279	33,104	35
France	430,943	342,440	882,498	123,294	259,093	35
Germany	888,755	701,152	1,509,273	427,770	388,116	26
Greece	44,039	28,182	124,316	9,860	33,175	35
Hungary	47,918	29,898	125,005	8,853	40,955	34
Iceland	3,909	3,168	9,068	1,002	2,581	35
Ireland	91,784	61,703	239,456	10,062	80,014	35
Italy	323,641	270,654	664,553	88,678	184,172	35
Japan	471,179	419,557	1,014,601	147,870	270,393	35
Korea	237,776	171,312	662,850	28,293	212,551	35
Luxembourg	106,235	92,268	224,702	23,934	58,956	35

Source: UNCTAD Statistics, 2017

Table 4. 7 International Trade: Import (Cont.)

	Mean	Median	Max.	Min.	Std. Dev.	Obs.
Mexico	170,901	138,380	433,977	16,325	137,615	35
Austria	105,530	86,451	219,594	23,941	66,294	35
Netherland	254,670	217,088	641,746	73,029	186,161	30
New Zealand	22,920	17,362	54,176	6,858	15,172	35
Norway	66,381	50,544	147,966	20,852	42,151	35
Poland	85,580	51,961	251,481	12,444	84,576	35
Portugal	48,605	45,568	106,987	8,448	30,308	35
Slovakia	43,595	32,637	88,189	8,031	31,230	23
Spain	208,213	161,006	497,171	32,882	149,595	35
Sweden	109,889	87,523	231,716	31,528	67,211	35
Switzerland	150,100	93,632	412,308	43,036	118,939	35
Turkey	88,262	48,757	266,224	9,035	86,935	35
United Kingdom	455,673	395,778	903,662	117,610	272,194	35
United States	1,348,402	1,101,073	2,851,528	298,682	871,350	35
Total OECD	6,328,643	5,194,192	13,844,668	1,396,265	4,166,959	35
World	9,510,733	6,845,794	23,168,052	2,202,135	7,032,611	35

Source: UNCTAD Statistics, 2017

4.3.3 Gross Domestic Product

The source of the gross domestic product in UNCTAD statistic is collected from the National Accounts Main Aggregates Database. This database presents the national accounts data from more than 200 countries and areas of the world from 1999, which was published by the Statistics Division of the Department of Economic and Social Affairs in the United Nations. The Statistics Division sends the United Nations National Accounts Questionnaire (UN-NA Q) to these countries and areas annually, for the collection of national accounts data. In some cases, when the countries did not report their data to the Statistics Division, the data is supplemented by national publications or other sources. The UNSD also co-operates with other international organisations to reduce the burden of reporting by countries, such as Organisation for Economic Co-operation and Development (OECD), the United Nations Economic Commission for Europe (ECE) and the Caribbean Community (CARICOM) on behalf of their constituents. (UN DESA, 2017).

Table 4. 8 Gross Domestic Product

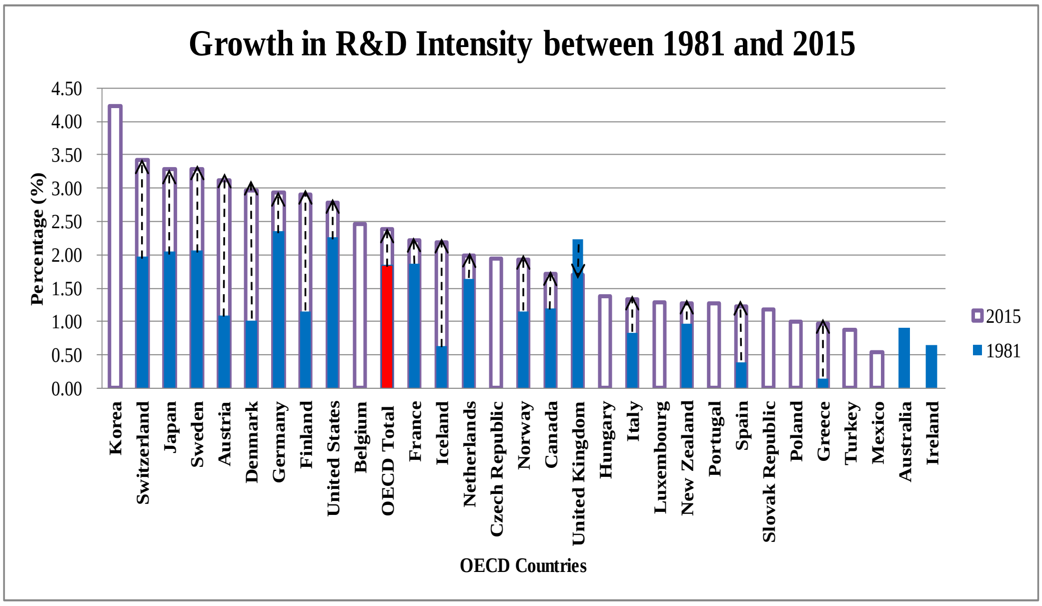
	Mean	Median	Max.	Min.	Std. Dev.	Obs.
Australia	613,197	408,865	1,578,361	181,698	448,873	35
Austria	239,661	212,980	438,376	67,821	121,574	35
Belgium	292,570	258,872	531,762	83,794	147,425	35
Canada	889,823	652,818	1,842,627	306,213	506,786	35
Czech Republic	130,493	118,976	235,205	40,452	69,627	23
Denmark	196,280	176,991	353,359	59,105	97,623	35
Finland	154,908	133,935	283,753	51,013	74,809	35
France	1,669,049	1,503,094	2,930,051	533,678	773,813	35
Germany	2,741,311	2,548,542	3,879,277	1,764,944	703,763	26
Greece	162,447	143,150	354,474	47,816	91,746	35
Hungary	70,868	47,209	157,291	23,303	45,210	35
Iceland	9,667	8,146	21,295	2,789	5,118	35
Ireland	123,211	90,112	283,716	20,127	92,681	35
Italy	1,361,546	1,248,527	2,390,818	425,855	606,762	35
Japan	3,981,366	4,445,659	6,203,213	1,129,895	1,441,672	35
Korea	605,856	556,129	1,411,334	72,426	420,160	35
Luxembourg	27,421	21,375	65,372	4,582	19,640	35
Mexico	614,776	470,125	1,294,695	154,119	370,672	35
Netherland	492,214	432,486	936,263	142,011	260,434	35
New Zealand	81,757	59,919	198,734	23,948	53,594	35
Norway	225,361	162,287	522,746	61,628	153,588	35
Poland	230,106	169,717	545,152	56,017	173,145	35
Portugal	133,143	121,545	262,017	25,221	76,380	35
Slovakia	52,895	43,056	100,761	13,753	34,075	23
Spain	779,634	625,970	1,635,050	170,481	464,317	35
Sweden	310,624	266,802	578,742	103,534	147,128	35
Switzerland	351,455	294,092	709,369	106,581	187,484	35
Turkey	349,579	243,933	823,256	80,641	253,889	35
United Kingdom	1,657,154	1,613,139	3,063,179	461,483	851,403	35
United States	9,771,103	9,144,014	18,139,554	3,227,080	4,620,866	35
Total OECD	28,095,899	25,746,969	49,269,446	8,926,670	13,334,961	35
World	38,057,792	31,696,129	78,612,131	12,444,583	21,330,095	35

Source: UNCTAD, Statistics, 2017

4.3.4 Research and Development

Research and development expenditure statistical dataset is reported in the OECD statistic website, which is collected according to the Frascati Manual in 2015 edition. This database describes the gross domestic spending on the research and development sector in total intramural. Additionally, it displays the R&D expenditure by source of funds, such as: the business enterprise, government funds, education funds and private non-profit funds. The database provides detail on methods used in the member countries and selected non-member economies. These two groups of economies were submitted in the International Survey of Research and Development twice a year in March and July and published as the Main Science and Technology Indicators in OECD Statistics database. (OECD, 2017).

Figure 4. 1 Growth in R&D (GERD as a percentage of GDP), 1981 and 2015



Source: OECD Statistics, MSTI Database

Figure 4.1 shows the growth in R&D intensity in 30 OECD countries in 1981 and 2015. It is clear that the government in Germany, United Kingdom, and the United States had greater budgets for research and development area in 1981 as compared to other OECD countries, which came to 2.25% of GDP. This was followed by Switzerland, Japan, and Sweden, with this ratio being approximately 2% in 1981. In 2015, most of OECD countries' government had allocated a greater budget in their R&D sector, with the exception of the United Kingdom (decreased by 0.5%). Moreover, the growth in R&D intensity vastly increased in Austria, Denmark, Finland, and Iceland. The ratio in these four countries saw an average raise of 1.5% to 2%, implying that the government increasingly focused on research and development.

The differences between R&D and innovation need to be identified before progressing to the next section. R&D is the fundamental research, which usually generates new knowledge and applied research, like the development of applications, or conducting experimental development. By contrast, people use innovation only if a something is created and becomes value-added, like new ideas, product innovation, system innovation, and business model innovation. In this thesis, we will focus on the R&D in one country and try to find the link with foreign direct investment instead of estimating the innovation ability in a country. The statistic of R&D is presented in Table 4.9, with the application of the global innovation index ranking for the selected country as well in the Appendix (see Table 4.1.9).

Table 4. 9 Research and Development

	Mean	Median	Max.	Min.	Std. Dev.	Obs.
Australia	8,620	6,701	20,956	1,608	6,616	17
Austria	4,681	3,540	11,030	951	3,304	34
Belgium	5,277	5,012	10,603	1,872	2,588	29
Canada	14,557	12,173	25,393	3,880	7,770	33
Czech Republic	2,644	2,098	5,813	1,254	1,329	23
Denmark	3,256	2,566	7,513	579	2,288	31
Finland	3,741	3,127	7,892	553	2,497	32
France	31,159	28,475	55,218	10,967	13,169	33
Germany	51,033	43,259	100,991	18,511	24,256	33
Greece	1,271	1,422	2,285	133	730	21
Hungary	1,502	1,438	3,250	614	795	23
Iceland	155	112	338	20	118	26
Ireland	1,230	967	3,271	161	1,031	32
Italy	15,019	13,208	26,850	4,984	6,446	33
Japan	91,682	87,778	160,247	25,809	40,548	33
Korea	28,977	22,507	68,937	7,140	18,771	23
Luxembourg	574	594	684	387	99	12
Mexico	4,351	4,171	8,058	1,351	2,056	19
Netherland	8,063	7,476	15,377	2,673	3,790	33
New Zealand	828	681	1,767	289	475	16
Norway	2,686	2,664	5,520	511	1,670	25
Poland	3,325	2,609	7,918	1,620	1,872	24
Portugal	1,532	931	4,377	175	1,416	32
Slovakia	581	500	1,191	368	234	24
Spain	8,715	5,610	20,555	1,128	6,803	33
Sweden	8,794	10,380	14,151	2,079	4,093	22
Switzerland	5,880	4,818	13,251	2,108	3,594	10
Turkey	4,602	2,927	13,315	779	3,928	24
United Kingdom	26,656	23,945	39,859	12,246	8,986	31
United States	233,279	205,250	453,544	72,750	114,897	32
Total OECD	586,229	505,103	1,147,773	160,720	313,411	35

Source: OECD Statistics, 2017

4.4 Country Profile Factors

This section will introduce country profile factors in five aspects and will be used to analyse the regression result in each empirical chapter. Subsequently, the focused aspects are: government institutions, market sophistication, knowledge input, knowledge and technology output, and product market regulations. The reason behind choosing these factors is the motivation of multinational enterprises. For example, if a country has a more flexible political environment, it may attract more foreign investment from other countries. It reflects that the MNEs prefer to seek a good investment environment to reduce risk. This way, it could be a type of resource-seeking or political resource seeking factor.

Moreover, the condition of the market in one country should also be considered, such as: market size, local market competition, and market openness, which reflects on market seeking. Finally, efficiency-seeking and knowledge seeking gain more importance in being motivations for MNEs' activities. For instance, if a country has sufficient skilled labours, a higher innovation efficiency ratio and a higher level of knowledge output, it can be said that it has a comparative advantage in knowledge area as compared to countries. Therefore, such countries can develop faster than others. Therefore, the country's ranking in each factor will be used to divide them into different groups and explain how these factors may influence the pattern of foreign direct investment (See Chapter 9).

4.4.1 Government Institutions

The first aspect focuses on institutions, which represents the framework of a country along with being the first thing that MNEs consider when employing their subsidiaries into a foreign country. Governance indicators are used to present the situation of the government institutions in one country. Table 4.13 shows the scores of 30 OECD countries in six categories (control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, the rule of law, and voice and accountability) in 2016. Additionally, the changing score between 1996 and 2016 (under the Δ column) indicates whether their score had huge differences during the last two decades. For example, 25 countries got a negative sign of the changing score in the PV category, which indicates that most OECD countries had worse political stability and more violence in the past 20 years, especially in France (-32.31), Belgium (-30.59), and Italy (-28.61).

When compared within the countries, Turkey is at the bottom of the list (see the number in the brackets). In the PV category, Turkey only got 5.71 in 2016, at quite a substantial distance from other countries on the list. The reason might be a civil war in Turkey, thereby presenting its precarious government institutions. Another country to be mentioned here is Greece. The government debt crisis created a shock in 2010, which also reflected in the indicators. Therefore, the score reduced from 1996, especially in the RL, PV, and GE category.

According to this table, it can be observed how the government institution changed in long-run. Data was collected from these categories in selected years: 1996, 2006, and 2016, which is presented in Appendix (Table 4.2.1 to Table 4.2.6). Analysing the modifications of each of the years would yield no results, despite these indicators being annually available in the World Bank. This is because political changes in a country need an extended period of the process; only after which, can the policy maker observe the results.

Table 4. 10 Governance Indicators in 30 OECD Countries

Country Name	CC[1]		GE[2]		PV[3]		RQ[4]		RL[5]		VA[6]	
	2016	**Δ[7]**	**2016**	**Δ**	**2016**	**Δ**	**2016**	**Δ**	**2016**	**Δ**	**2016**	**Δ**
Australia	93.27**(13)**	-0.28	92.31**(13)**	-3.32	81.90**(11)**	-14.37	97.60**(04)**	7.38	95.19**(10)**	-1.29	94.09**(13)**	1.09
Austria	91.35**(16)**	-1.13	91.83**(14)**	-1.07	72.86**(16)**	-23.95	91.35**(15)**	-4.85	95.67**(09)**	-1.81	93.10**(15)**	-0.40
Belgium	92.31**(15)**	3.60	86.54**(19)**	-4.72	61.43**(22)**	-30.59	88.46**(17)**	3.68	88.94**(18)**	-1.01	95.57**(10)**	3.07
Canada	95.19**(09)**	-1.04	95.19**(08)**	1.75	93.33**(05)**	3.44	94.23**(10)**	2.93	96.63**(08)**	1.66	96.06**(09)**	-2.94
Czech Republic	67.79**(23)**	-6.94	79.81**(23)**	7.68	83.33**(09)**	-4.43	80.77**(22)**	-1.30	84.13**(22)**	4.24	80.79**(21)**	2.79
Denmark	99.04**(03)**	-0.96	99.04**(02)**	4.50	74.76**(15)**	-23.11	92.31**(13)**	-5.52	97.60**(06)**	-0.39	98.03**(05)**	2.03
Finland	99.52**(02)**	0.06	96.63**(05)**	4.28	80.95**(12)**	-16.39	96.63**(06)**	2.07	99.04**(03)**	0.04	99.01**(03)**	4.01
France	90.38**(18)**	5.44	89.90**(17)**	4.11	44.29**(27)**	-32.31	83.17**(20)**	1.65	89.42**(17)**	-2.54	82.27**(19)**	-6.73
Germany	93.75**(12)**	-0.34	94.23**(10)**	2.43	70.95**(17)**	-21.07	96.15**(07)**	5.39	91.35**(14)**	-2.62	94.58**(12)**	4.58
Greece	56.73**(28)**	-7.79	62.50**(28)**	-15.10	41.90**(28)**	-21.93	59.13**(30)**	-8.26	59.13**(28)**	-24.28	68.97**(26)**	-7.53
Hungary	61.06**(26)**	-13.14	69.23**(27)**	-9.46	69.05**(18)**	-10.21	71.63**(27)**	-3.91	70.19**(26)**	-9.20	57.14**(28)**	-19.86
Iceland	95.67**(08)**	2.66	90.38**(16)**	-5.79	96.19**(03)**	2.04	86.54**(18)**	0.13	89.90**(16)**	-3.56	95.07**(11)**	1.07
Ireland	92.79**(14)**	0.85	88.46**(18)**	-1.70	76.67**(14)**	-18.55	94.71**(09)**	1.78	90.38**(15)**	-2.58	93.60**(14)**	2.10
Italy	59.62**(27)**	-7.59	71.63**(26)**	-6.51	58.10**(25)**	-28.61	75.00**(26)**	-1.09	61.06**(27)**	-23.36	79.31**(22)**	-5.19
Japan	90.87**(17)**	6.46	95.67**(07)**	14.25	86.19**(08)**	-2.11	90.38**(16)**	17.56	88.46**(19)**	-0.99	77.83**(23)**	-3.17

Source: Worldwide Governance Indicators, World Bank

*Notes: 1) CC indicates Control of Corruption; 2) GE indicates Government Effectiveness; 3) PV indicates Political Stability and Absence of Violence; 4) RQ indicates Regulatory Quality; 5) RL indicates Rule of Law; 6) VA indicates Voice and Accountability; 7) **Δ** indicates the differential of rank between 1996 and 2016 in each category; 8) Number in the brackets indicates the country's ranking in each category.*

Table 4. 10 Governance Indicators in 30 OECD Countries (Cont.)

Country Name	**CC[1]**		**GE[2]**		**PV[3]**		**RQ[4]**		**RL[5]**		**VA[6]**	
	2016	**Δ[7]**	**2016**	**Δ**	**2016**	**Δ**	2016	**Δ**	**2016**	**Δ**	**2016**	**Δ**
Korea, Rep.	66.83 **(24)**	1.24	80.77 **(22)**	13.56	51.90 **(26)**	-14.05	84.13 **(19)**	18.92	86.06 **(20)**	14.70	67.00 **(27)**	-0.50
Luxembourg	97.60 **(06)**	2.97	93.27 **(11)**	-6.18	97.62 **(02)**	1.87	93.75 **(11)**	-3.53	93.75 **(11)**	-2.23	96.55 **(08)**	0.05
Mexico	23.08 **(30)**	-12.94	59.62 **(29)**	-2.68	20.00 **(29)**	-0.74	64.42 **(28)**	4.64	33.17 **(30)**	6.04	43.84 **(29)**	-6.66
Netherlands	94.71 **(10)**	-2.06	96.15 **(06)**	-2.21	77.62 **(13)**	-22.38	98.56 **(02)**	0.19	97.12 **(07)**	1.64	98.52 **(04)**	1.52
New Zealand	100.00 **(01)**	2.15	97.12 **(04)**	2.03	99.05 **(01)**	4.37	99.04 **(01)**	0.13	98.08 **(05)**	-0.42	97.04 **(07)**	-2.96
Norway	98.08 **(05)**	-0.31	98.56 **(03)**	-0.35	91.43 **(06)**	-8.04	92.79 **(12)**	-0.69	99.52 **(02)**	0.02	100.00 **(01)**	2.50
Poland	76.44 **(21)**	0.64	73.56 **(25)**	-1.85	63.33 **(20)**	-10.60	79.81 **(23)**	7.53	74.52 **(25)**	3.66	72.41 **(25)**	-7.59
Portugal	80.77 **(20)**	-8.48	85.58 **(20)**	-0.76	88.10 **(07)**	-2.86	76.44 **(25)**	-8.88	85.10 **(21)**	-3.85	86.21 **(17)**	-8.29
Slovak Republic	63.46 **(25)**	0.56	76.44 **(24)**	10.32	66.67 **(19)**	-8.87	78.85 **(24)**	7.65	75.00 **(24)**	17.71	75.37 **(24)**	8.37
Spain	68.75 **(22)**	-14.05	83.17 **(21)**	-6.44	61.90 **(21)**	8.71	81.73 **(21)**	-2.51	80.77 **(23)**	-9.68	81.28 **(20)**	-8.22
Sweden	98.56 **(04)**	-0.37	94.71 **(09)**	-2.56	82.38 **(10)**	-17.09	97.12 **(05)**	7.98	100.00 **(01)**	3.02	99.51 **(02)**	4.01
Switzerland	96.15 **(07)**	0.45	99.52 **(01)**	5.53	95.71 **(04)**	-3.75	98.08 **(03)**	2.97	98.56 **(04)**	-1.44	97.54 **(06)**	5.54
Turkey	50.48 **(29)**	-1.13	54.81 **(30)**	-0.93	5.71 **(30)**	-4.92	61.06 **(29)**	1.82	48.56 **(29)**	1.32	29.56 **(30)**	-15.94
United Kingdom	94.23 **(11)**	-0.93	92.79 **(12)**	-3.93	59.05 **(23)**	-19.68	95.19 **(08)**	-4.26	91.83 **(13)**	-2.65	90.64 **(16)**	3.64
United States	89.90 **(19)**	-1.49	91.35 **(15)**	2.28	58.57 **(24)**	-19.09	91.83 **(14)**	-3.83	92.31 **(12)**	-0.15	84.24 **(18)**	-6.76

Source: Worldwide Governance Indicators, World Bank

Notes: 1) CC indicates Control of Corruption; 2) GE indicates Government Effectiveness; 3) PV indicates Political Stability and Absence of Violence; 4) RQ indicates Regulatory Quality; 5) RL indicates Rule of Law; 6) VA indicates Voice and Accountability; 7) Δ indicates the differential of rank between 1996 and 2016 in each category; 8) Number in the brackets indicates the country's ranking in each category..

Table 4. 11 Country Profile Factor: Institutions

	2015		2017		
Country	**Rank**	**Score**	**Rank**	**Score**	**Rank Change**
Finland	1	95.8	4	92.2	-3
Norway	3	94	5	91.8	-2
Denmark	4	93.1	6	91.4	-2
New Zealand	5	93	2	93.4	3
Canada	6	92.7	7	91	-1
Netherlands	7	91.9	11	88.2	-4
Sweden	9	90	10	88.3	-1
Switzerland	10	89.6	8	89.5	2
Australia	11	89.3	14	87.4	-3
Austria	12	88.7	15	87.1	-3
Iceland	13	87.8	16	86.6	-3
United Kingdom	14	87.3	9	88.4	5
Ireland	15	87.2	12	87.6	3
United States	16	86.8	17	86.2	-1
Japan	17	86.5	13	87.4	4
Luxembourg	18	83.5	19	82.6	-1
Belgium	19	83.3	26	80.5	-7
Germany	20	83.2	18	83.5	2
France	21	81.7	24	80.7	-3
Portugal	25	80.6	23	80.8	2
Czech Republic	32	76.4	30	77.6	2
Korea, Rep.	33	76.2	35	74.5	-2
Poland	34	75.3	33	75.6	1
Spain	35	75.2	32	75.9	3
Slovakia	36	75.1	34	74.5	2
Italy	38	73.8	38	71.9	0
Hungary	40	73.4	40	70.7	0
Greece	52	68.2	59	65.2	-7
Mexico	66	61.5	68	58.5	-2
Turkey	84	55.8	95	50.6	-11
OECD Average Score	**..**	**82.6**	**..**	**81.3**	**..**
World Average Score	**..**	**62.1**	**..**	**63.0**	**..**

Source: The Global Innovation Index, 2015 and 2017

Moreover, in the business environment, Canada was at the first place in 2015 but decreased to seventh in 2017. Other OECD countries, like Finland, Korea, Norway, Denmark, Ireland, Netherlands, and the United Kingdom entered top 10 in both 2015 and 2017. These countries have a relatively simple environment to start a new business, or preferential tax policies in their country. These could attract more multinational enterprises to establish their subsidiaries in their country and attract more foreign direct investment inflow from other countries.

4.4.2 Market Sophistication

The second aspect for MNEs to consider conducting investment in the foreign countries is market sophistication or market seeking (through the motivation way). The score under market sophistication measures the conditions and transactions of the market. Table 4.12 gives information about the rank of market sophistication of 30 OECD countries in 2015 and 2017. Unsurprisingly, the United States ranked first in both 2015 and 2017, followed by the United Kingdom (74.3, rank third), Canada (73.5, rank fourth), Switzerland (72.3, rank fifth), and Denmark (68.3, rank seventh). Table 4.2.2 (in Appendix 4.2) shows the division of market sophistication into three categories: country credit, investment, and trade and competition. In the first category, the United States ranked at the first place with 79.2 in 2015 and 85.5 in 2017. This implies that the United States has a stable economic outlook, balance of payment, with the government having high solvency, which attracts MNEs to conduct investment. In addition, four more OECD countries are entering into top 10 of credit in 2017, consisting of New Zealand, Denmark, Australia, and the United Kingdom.

With regards to the investment category, if one country could deal with venture capital, and the degree of market capitalisation, it could protect the minority investors. The top five countries under this category are: the United States, Switzerland, Canada, the United Kingdom, and Korea. In accordance, the investment environment in these countries is better than other OECD countries. Thus, they can attract more foreign investment inflows from the world.

The final category in the market sophistication is trade and competition. This category represents if the local market has intense competition with the foreign company, alongside presenting the scale of the domestic market. In this case, Japan, the United Kingdom, Belgium, Germany, and Netherland have a comparative advantage over OECD countries. However, Belgium dropped to the 24th position, and the United States reached the first place in 2017.

Table 4. 12 Country Profile Factor: Market Sophistication

	2015		2017		
Country	**Rank**	**Score**	**Rank**	**Score**	**Rank Change**
United States	1	81.5	1	83.4	0
United Kingdom	3	74.3	5	70.2	-2
Canada	4	73.5	3	73.7	1
Switzerland	5	72.3	7	67.5	-2
Denmark	7	68.3	6	70.2	1
New Zealand	8	67.6	8	66.3	0
Australia	9	66.7	9	65.3	0
Spain	10	64.7	18	59	-8
Japan	12	64.3	12	64.3	0
Ireland	13	64	25	55	-12
Sweden	14	63.7	10	64.9	4
Korea, Rep.	16	63.3	14	61.6	2
Netherlands	17	61.8	17	59	0
Finland	19	61.5	13	61.6	6
Germany	22	59.2	16	60	6
France	25	59	11	64.3	14
Norway	29	56.5	22	57.2	7
Austria	30	56.5	30	53.1	0
Luxembourg	31	56.2	78	43.4	-47
Portugal	34	55.4	43	51.1	-9
Belgium	35	54.9	40	51.8	-5
Italy	39	53.6	36	52.6	3
Iceland	43	52.7	24	55.2	19
Czech Republic	45	52.4	47	50.2	-2
Greece	49	51.2	48	50.2	1
Slovakia	53	50.4	67	45.8	-14
Turkey	58	49.5	57	47.8	1
Poland	60	49	55	48.2	5
Mexico	69	47	49	50	20
Hungary	77	46	91	41.5	-14
OECD Average Score	**..**	**59.9**	**..**	**58.1**	**..**
World Average Score	**..**	**32.2**	**..**	**47.2**	**..**

Source: The Global Innovation Index, 2015 and 2017

4.4.3 Knowledge Input

The third aspect is knowledge input to measure how advantageous a country needs to be for creating innovation. Table 4.13 indicates a summary of knowledge input in 30 OECD countries in 2015 and 2017. Luxembourg got the 2^{nd} place for knowledge input ranking in 2015, with the score being 60.3 and decreasing to 7^{th} position in 2017. Six additional countries entered into top 10 around the world in 2015. The Netherlands, in particular, went up to 1^{st} place in 2017 with 63.7. Moreover, Table 4.2.3 (in Appendix 4.2) provides detail information about the knowledge input divided it into two categories. The first category is total knowledge workers in each country. Sweden achieved 2^{nd} place with 80.7 in 2017, followed by Finland, Switzerland, Ireland, and Denmark. The more knowledge work in one country, the more products can be created.

The second category under the knowledge input aspect is knowledge absorption, described the ability of one country to attract knowledge from another country. Three countries of OECD entered into top 10 in 2015, including Luxembourg (4^{th} place with 61.7), Netherlands (7^{th} with 55.5, with the first place in 2017), and Finland (9^{th} place with 52.7). This implies that these three countries had a greater advantage in absorption of knowledge over other OECD countries. Therefore, they may excel more in terms of innovation if they had enough knowledge workers to support.

Table 4. 13 Country Profile Factor: Knowledge Input

	2015		2017		
Country	**Rank**	**Score**	**Rank**	**Score**	**Rank Change**
Luxembourg	2	60.3	7	57.8	-5
Switzerland	3	60	3	62.6	0
Finland	4	58.8	6	60.1	-2
Ireland	5	58.4	10	54.5	-5
Sweden	7	56.9	4	62.6	3
United States	9	55.4	8	56.4	1
Netherlands	10	55.3	1	63.7	9
United Kingdom	13	53.6	13	52.2	0
Belgium	14	51	22	48.5	-8
Japan	16	50.4	11	54.5	5
Denmark	17	49.7	12	52.5	5
Canada	18	49.3	24	47.8	-6
France	19	49.3	18	50.6	1
Germany	20	49.2	15	51.4	5
Australia	23	47.5	27	45.4	-4
Austria	24	47	19	50.3	5
Iceland	25	46.4	20	29.8	5
New Zealand	26	45.8	28	44	-2
Norway	27	45.8	23	48.3	4
Czech Republic	28	45.3	26	45.9	2
Korea, Rep.	30	45.2	17	51.1	13
Italy	39	40.6	35	39.6	4
Spain	47	38.2	37	38.4	10
Mexico	56	36.9	71	30.8	-15
Hungary	57	36.8	40	37.8	17
Slovakia	58	36.7	38	38.3	20
Portugal	65	35.3	50	35.4	15
Poland	66	35.2	42	37.4	24
Greece	90	30.8	80	28.8	10
Turkey	117	26.3	75	29.3	42
OECD Average Score	**..**	**46.6**	**..**	**46.9**	**..**
World Average Score	**..**	**28.4**	**..**	**35.0**	**..**

Source: The Global Innovation Index, 2015 and 2017

4.4.4 Knowledge and Technology Output

The fourth aspect is of the knowledge and technology output, which gives information about how the countries transfer the knowledge (or innovation) into other countries. Table 4.14 shows the knowledge and technology output in 30 OECD countries in 2015 and 2017. Eight countries of OECD entered into top 10 in 2015, consisting of Switzerland, Sweden, the United States, Korea, Netherlands, Ireland, the United Kingdom, and Germany. These countries are good at knowledge output, owing to latest technology. Their knowledge or technology could be used to create new value in the foreign countries. In Appendix 4.2, the Table 4.2.4 provides additional information about this aspect, divided into three categories, including knowledge creation, knowledge impact, and knowledge diffusion.

In terms of knowledge creation, Korea, Sweden, Switzerland, the United States, and Germany rank in top 5. As a result, these countries have a strong knowledge and technology background, which could help them frequently create new products. Moreover, in the knowledge impact category, the United Kingdom, Switzerland, the United States, and Italy are the leading countries that use their knowledge to influence other countries. They have adequate high technology, which can be sold to foreign countries to impact people in improving their lifestyle. The final category in this aspect is knowledge diffusion, which measures how the amounts of high technology or innovation are exported into foreign countries. Switzerland, Ireland, Luxembourg, Netherland, Sweden, and Finland in 2015 have the most technology export in OECD countries.

Table 4. 14 Country Profile Factor: Knowledge and Technology Output

	2015		2017		
Country	**Rank**	**Score**	**Rank**	**Score**	**Rank Change**
Switzerland	1	72.4	1	69.1	0
Sweden	2	60.5	3	62.5	-1
United States	4	58	7	54.4	-3
Korea, Rep.	5	56.7	6	54.7	-1
Netherlands	6	55.9	2	62.9	4
Ireland	7	55.7	5	55.9	2
United Kingdom	8	54.9	13	46.5	-5
Germany	10	53.4	8	51.1	2
Finland	11	51.9	10	48.8	1
Luxembourg	13	49.1	15	45	-2
Japan	14	48.6	12	47.1	2
Czech Republic	15	46.7	14	45.8	1
Denmark	16	46.1	16	43.9	0
Austria	17	43	21	38.2	-4
New Zealand	20	42	29	34.2	-9
Canada	21	41.9	19	38.7	2
Italy	22	41.2	26	36.1	-4
France	23	41.1	20	38.5	3
Iceland	24	40.7	18	39.9	6
Spain	25	39.9	24	36.3	1
Norway	27	39.2	22	37.5	5
Belgium	36	36.1	31	33.2	5
Australia	39	34.8	34	32.1	5
Hungary	40	34.8	33	32.3	7
Slovakia	41	33.7	30	33.5	11
Portugal	42	33.2	39	29.9	3
Mexico	50	29.4	64	21.5	-14
Poland	56	28.4	44	27.9	12
Turkey	60	27.3	46	27.6	14
Greece	71	26	74	20.4	-3
OECD Average Score	**..**	**44.1**	**..**	**41.5**	
World Average Score	**..**	**28.2**	**..**	**25.8**	

Source: The Global Innovation Index, 2015 and 2017

4.4.5 Product Market Regulation

Product market regulation is one of the essential indicators of multinational enterprises to consider conducting investment in foreign countries. Both table 4.15 and 4.16 provide information about the regulation of total economy of OECD countries in 2013. Table 4.18 is focusing on the overall product market regulation in all OECD countries, thereby introducing three different groups of countries according to the various levels of the regulatory environment. Additional details are displayed in table 4.19 where product market regulation is divided into three categories: state control (STC), barriers to entrepreneurship (BTE), and obstacles to trade and investment (BTI). Subsequently, there can be more ideas for regulation in each country.

a) Most Competition-Friendly Regulatory Environment

Among OECD countries, the Netherlands and the United Kingdom have the most competition-friendly regulatory framework. The Netherlands especially has three ‘Green’ signs in state control, barriers to entrepreneurship, and obstacles to trade and investment. In accordance to that, multinational enterprises are welcome to conduct investment in the Netherlands.

State control of businesses in the United Kingdom is deficient, regardless of public ownership or involvement in the business operation. At the industry level, such as: electricity, rail, gas, and telecoms, the state control or state ownership is almost nonexistent in this country. However, the level of regulatory environment in BTE and BTI just arrived at ‘Yellow’ degree, implying that the United Kingdom has no comparative advantage to attract inward investment from other countries. The manager of MNEs may treat the market of the United Kingdom similar to other European countries due to the neutral level of barriers.

b) Around OECD Average Regulatory Environment

Austria will be discussed as the first country, because the total economy has an average in the OECD countries, with a ‘Green’ sign in both state control and barriers to entrepreneurship. When compared to the United Kingdom, Austria has a more competition-friendly environment in the BTE area, but Austria still has an OECD average for regulatory environment. This could be due to many limitations of regulation in network industries, retail industry, and some professional services. For instance, if there is a strict regulation of registration and licensing in the retail, which means it easily leading a monopoly in the market. The purpose of the government is to restrict licensing in the retail industry to protect existing companies, although suitable for attracting foreign investment inflow into Austria.

Secondly, Denmark, Italy, New Zealand, and Slovakia are excellent locations to start a new business because the barriers to entrepreneurship are lower than the average score in the OECD countries. For example, the professional services, such as: accounts, lawyer, architects, and engineers, have a low entry regulation and conduct regulation, which encourages people to establish a new company. Furthermore, the regulation of retail industry in New Zealand has a more competition-friendly environment. The registration and licensing stay at the neutral level, but the manager has ample space in the price control of goods. The government of Slovakia has established some rules to minimise protection for the existing business to encourage new business or entrepreneurs for entering the market.

Thirdly, the regulation of state control is less competition-friendly in Greece, Poland, Switzerland, and the United States. Greece, in particular, had a government-debt crisis that damaged the whole country, which led the credit rating to drop to junk bond level. However, the Greece government introduced a series of reforms to raise their competition and credit after the Crisis. At the same time, the regulatory environment in the total economy came to the average level, maintaining the neutral trend in the BTE and BTI areas, while the government still had strict control of the regulation and price in business operation. Contrarily, in Poland and Switzerland, the strict state control contributed to the public ownership sector, especially in the gas and telecom industry.

In addition, Iceland and Spain have a less competition friendly regulatory environment in the BTE area, which means that these two countries may not attract new businesses, although the government minimised the impact of politics to reduce the interference. Comparatively, Canada is the only country with a strict regulation in barriers to trade and investment.

Canada has an explicit barrier to FDI, including limits on foreign equity, employment of foreigners, restrictions on the number of branches, and the limitation of capital repatriation. Therefore, the environment of foreign investment in Canada is not beneficial for multinational enterprises to develop their businesses, since it has a less comparative location advantage over countries. The probability of the limitation for FDI could be because of a relatively relaxed investment in the previous years with a significant impact on the local business. This regulation may guarantee that the local business had competition with foreign companies.

Furthermore, the remaining thirteen countries indicate a regulatory environment in the state control sector; BTE sector and BTI sector are staying at the average level of the OECD countries. Hence, these countries have an average degree of competition. For example, Australia has released the condition of import tariffs and lowered barriers to trade and investment for attracting investment from another country. Moreover, in the professional services, the entry regulation in accountants and architects also has a friendly competitive environment. Accordingly, the more professional people might consider developing their career in Australia. Another example is Japan as one of the developed countries in the Asia, it considers regulatory environment as a significant indicator for MNEs in terms of investment. According to Kojima's work in 1978, Japan has a comparative location advantage over other countries. However, the regulatory environment is average level around OECD countries in all three categories. Specific to the regulation area, Japan has no comparative advantage over other OECD countries.

c) Less Competition-Friendly Regulatory Environment

Three countries, including Korea, Mexico, and Turkey, have a less competition friendly environment in their regulatory framework. For instance, Korea has a high barrier to investment and tariff. Therefore, it may not in Korea's favor to attract foreign investment, which could be due to the government of Korea wanting to protect local business.

Moreover, the regulatory environment in the BTE and BTI area indicates a less competition friendly situation in Mexico, but the state control sector was at the average level of OECD countries. Therefore, it is difficult to start a new company, owing to substantial administrative burdens on sole proprietor businesses, including barriers in transport industries.

Finally, the regulatory environment in Turkey is stringent, and the regulation of total economy indicates less competition in a friendly way. For state control, the government holds the largest company in the networks industry, like gas, transport, telecoms, and electricity. Moreover, Turkey's government also controls the price for public transport. On the contrary, it is not a good choice to start a new business in Turkey, because the government makes several rules to protect incumbents, and also has a sophisticated system for licenses and permits. Consequently, the high barriers to entrepreneurship may limit the development of new businesses. Considering the trade and investment section, the barriers to FDI and commerce are not very strict, but a high obstacle to the trade facilitation exists along with the treatments of foreign suppliers being different. As a result, it is difficult for the multinational enterprises to develop a new market in Turkey, indicating that it is a conservative country in the regulation sector.

Evidently, a healthy competition environment in the open market is quite remarkable. The regulation market constrains the behaviours of the producer, investor, governors, and consumers. Additionally, it has the advantage to allow new businesses to enter into the market to challenge the incumbents, and boost the economic growth in their own country. To get a more competition-friendly regulatory environment in the product market, the government in OECD should set up a series of approaches to improve market supervision. Furthermore, the government should have a frame of antitrust to guarantee a relatively clean environment of competition.

Table 4. 15 Regulation of Total Economic in OECD

Country	Product Market Regulation	Environment of Competition
Netherlands	0.92	More Competition-Friendly
United Kingdom	1.08	
Australia	1.27	Around OECD Average
Austria	1.19	
Belgium	1.39	
Canada	1.42	
Czech Republic	1.41	
Denmark	1.21	
Finland	1.29	
France	1.47	
Germany	1.28	
Greece	1.74	
Hungary	1.33	
Iceland	1.50	
Ireland	1.45	
Italy	1.29	
Japan	1.41	
Luxembourg	1.46	
New Zealand	1.26	
Norway	1.46	
Poland	1.65	
Portugal	1.29	
Slovakia	1.29	
Spain	1.44	
Sweden	1.52	
Switzerland	1.50	
The United States*	1.59	
Korea	1.88	Less Competition-Friendly
Mexico	1.91	
Turkey	2.46	

Source:

http://www.oecd.org/economy/growth/indicatorsofproductmarketregulationhomepage.htm

Table 4. 16 Details of Regulation in the OECD Countries

Country	State Control	Barriers to Entrepreneurship	Barriers to Trade and Investment	Total Economic
Australia	Y	Y	Y	Y
Austria	G	G	Y	Y
Belgium	Y	Y	Y	Y
Canada	Y	Y	R	Y
Czech Republic	Y	Y	Y	Y
Denmark	Y	G	Y	Y
Finland	Y	Y	Y	Y
France	Y	Y	Y	Y
Germany	Y	Y	Y	Y
Greece	R	Y	Y	Y
Hungary	Y	Y	Y	Y
Iceland	Y	R	Y	Y
Ireland	Y	Y	Y	Y
Italy	Y	G	Y	Y
Japan	Y	Y	Y	Y
Korea	Y	Y	R	R
Luxembourg	Y	Y	Y	Y
Mexico	Y	R	R	R
Netherlands	G	G	G	G
New Zealand	Y	G	Y	Y
Norway	Y	Y	Y	Y
Poland	R	Y	Y	Y
Portugal	Y	Y	Y	Y
Slovakia	Y	G	Y	Y
Spain	Y	R	Y	Y
Sweden	Y	Y	Y	Y
Switzerland	R	Y	Y	Y
Turkey	R	R	R	R
United Kingdom	G	Y	Y	G
The United States*	R	Y	Y	Y

Source:

http://www.oecd.org/economy/growth/indicatorsofproductmarketregulationhomepage.htm

Note: 'G' for 'Green' and indicates the country has the most competition friendly in this category; 'Y' for 'Yellow' and indicates the country has an average level of competition; 'R' for 'Red' and indicates the country has a less competition friendly in the category.

4.5 Reliability and Validity of Data

Data collection should have reliability and validity to ensure that the result of research can be more complete. The UNCTAD Statistics database provides a collection of indicators and statistics for the analysis of international trade, investment and development. It allows all users, like policymakers, academics, international organisations, and research specialists to access cross-comparable sets of data. The UNCTAD Statistics is continuously updated and enhanced, thus providing users with the latest available data. For OECD statistics, the data is collected directly or indirectly from countries' official statistics producers. This statistic producer uses questionnaires, online platforms, and Web Queries to collect raw data. Moreover, the OECD cooperates with other organisations, like Eurostat, UN agencies, who exchange their data with primary users.

4.6 Data Limitation

The first challenge of data collection is the time-period. We expect to measure all variables from 1981 to 2015 in each country. However, in some countries the data is either unavailable or inaccurate. For example, the same data is used for Belgium and Luxembourg from 1981 to 2001 since they form an economic alliance, but from 2002 onwards the data covers Belgium and Luxembourg separately. Regarding Germany, according to the UNCTAD dataset, the data is available for Federal Republic of Germany only from 1971 onward until 1989, and there is no available data for Democratic Republic of Germany. Therefore, we collect data for all variables from 1990 to 2015, as the German reunification.

In addition, the collection for R&D variable is concerning since a good resource is not available. Hence, six countries (Australia, Greece, Luxembourg, New Zealand, Sweden, and Switzerland) only have 11 observations in this variable. We were unable to use VAR model to estimate the relationship between FDI and R&D in these countries, due to an insufficient number of observations. Therefore, the regression for other 24 countries is individually undertaken alongside pooling all 30 countries together to measure the causality (see Chapter 7).

Finally, country profile factors were added in this thesis and grouped countries according to their ranking in each factor. However, it was difficult to find the history ranking for every factor, which is why a bias exists in the process of grouping countries. To reduce the bias, governance indicators were added to capture the longitudinal form of a government institution in each country.

4.7 Conclusions

This chapter reviewed the key variables used in the regression equation that included FDI inward flow, FDI outward flows, export, import, GDP, and R&D. The necessary information of each variable in every single country, like mean, median, maximum, minimum, standard deviation, and observations of variables was also discussed. This was followed by the four aspects: institutions, market sophistication, knowledge input, and knowledge and technology output as a country profile. These factors are used to explain the regression result in chapter 9, although not as an independent variable in the regression equation. The following chapter will discuss the econometric and methodology of this thesis.

Notes

1. OECD Membership: Australia, Austria, Belgium, Canada, Chile*, the Czech Republic, Denmark, Estonia*, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel*, Italy, Japan, Korea, Latvia*, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia*, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. (The countries with 'Star', are not measuring in this thesis)

2. UNCTAD Statistic Categories: International trade in goods and services, Economic Trends, Foreign direct investment, External financial resources, Population and labour force, Commodities, Information Economy, Creative economy, and Maritime transport.

3. OECD Statistic Categories: General Statistics, Agriculture and Fisheries, Demography and Population, Development, Economic projections, Education and Training, Environment, Finance, Globalisation, Health, Industry and services, Information and communication technology, International trade and balance of payments, Labour, National Accounts, Monthly economic indicators, Prices and Purchasing power parities, Productivity, Public sector, taxation and market regulation, Regions and Cities, Science, technology and patents, Social protection and well-being, and Transport.

4. Most Comprehensive Data

This term refers to the direct investment statistics that disseminated and based on the most comprehensive regularly available data sources. These data may be preliminary and subject to revision. If a country compiles and disseminates data that have the same periodicity and based on the same sources and coverage, the "most comprehensive data" is the same as the "most timely data."

5. Most Timely Data

The term refers to the direct investment statistics that are the first disseminate; that is, the data with the shortest lapse of time between the end of the reference period (or the reference date) and dissemination of the data. Although disseminated, such data may be preliminary and subject to revision.

6. EUR: Europe; LCN: Latin America and the Caribbean; NAWA: Northern Africa and Western Asia; NAC: Northern America; SEAO: South East Asia, East Asia, and Oceania; HI: High Income; UM: Upper-Middle Income

Chapter 5 Econometric Methods

5.1 Introduction

This chapter will describe the main econometric techniques used in this thesis-VAR and ARDL Model. As previously mentioned several variables will be used in the model, which includes GDP, FDI inward flows, FDI outward flows, exports, imports, and the data of R and D (See Chapter 4). The structure of this chapter is as follows:

- Section 5.2 will display the process of the established model with the empirical study and regression result in chapters 6, 7, and 8.
- Section 5.3 will discuss the stationary of variables with unit-root test and cointegration test
- Section 5.4 will introduce an alternative method of Engle-Granger two step approach.
- Section 5.5 will include applications and conclusions of this chapter

5.2 Establishing Model

5.2.1 VAR Model

Firstly, considering a simple OLS model with two variables, y_t and x_t, we get an equation to indicate the relationship between y_t and x_t:

$$y_t = \alpha_{10} + \beta_{10} x_t + v_t \quad (5.1)$$

$$y_{t-1} = \alpha_{10} + \beta_{10} x_{t-1} + v_{t-1} \quad (5.2)$$

According to AR (1) Model, we can have $v_t = hv_{t-1} + \mu_t$, where $\mu_t = E(\mu_t) = 0$; $E(\mu_t^2) = \sigma^2$; $E(\mu_t, \mu_{t-n}) = 0, n \geq 1$; h represents unit-root.

If $h = 1$, which means there is a unit root in the time series sequence, the original sequence is nonstationary, then we need do the different to make the sequence stationary.

$$y_t - y_{t-1} = \beta(x_t - x_{t-1}) + (v_t - v_{t-1})$$

$$\Delta y_t = \beta \Delta x_t + \mu_t$$

where, $\mu_t = v_t - v_{t-1}$

On the contrary, if $-1 < h_i < 1, (i = 1, 2, 3, 4)$, which implies that there is no unit root in the original time series sequence, then,

$$y_t = \alpha + \beta x_t + v_t$$
$$hy_{t-1} = h\alpha + h\beta x_{t-1} + hv_{t-1}$$

So,

$$y_t = \alpha(1-h) + hy_{t-1} + \beta x_t - h\beta x_{t-1} + \mu_t \tag{5.3}$$

Then we perform the simultaneous equation to get:

$$\begin{cases} y_{1t} = \alpha_{11} + \beta_{11}x_{1t} + \beta_{12}x_{2t} + \beta_{13}x_{3t} + v_{1t} \\ y_{2t} = \alpha_{21} + \beta_{21}x_{1t} + \beta_{22}x_{2t} + \beta_{23}x_{23} + v_{2t} \end{cases}$$

Because

$$v_{1t} = h_1 v_{1t-1} + \mu_{1t}$$
$$v_{2t} = h_2 v_{2t-1} + \mu_{2t}$$

Followed by a new simultaneous equation, written as:

$$\begin{cases} y_{1t} = \alpha_{11}(1-h_1) + h_1 y_{1t-1} + \beta_{11}x_{1t} - h_1\beta_{11}x_{1t-1} + \beta_{12}x_{2t} - h_1\beta_{12}x_{2t-1} \\ \qquad +\beta_{13}x_{3t} - h_1\beta_{13}x_{3t-1} + \mu_{1t} \qquad (5.4) \\ y_{2t} = \alpha_{21}(1-h_2) + h_2 y_{2t-1} + \beta_{21}x_{1t} - h_2\beta_{21}x_{1t-1} + \beta_{22}x_{2t} - h_2\beta_{22}x_{2t-1} \end{cases}$$
$$\qquad +\beta_{23}x_{3t} - h_2\beta_{23}x_{3t-1} + \mu_{2t} \tag{5.5}$$

where, y_1 indicates FDI; y_2 indicates exports; x_1 indicates gross domestic product; and x_2 indicates research and development; x_3 in equation 5.4 indicates exports and in the equation 5.5 indicates FDI. These two equations show that the FDI lagged one year and export lagged one year, which may influence current FDI and exports. Due to the competitive market, policy influence may have a delayed impact.

Now, considering the interaction between these variables, we established a VAR Model with four variables:

$$\begin{cases} y_{1t} = a_{11} + b_{12}y_{2t-1} + b_{13}y_{3t-1} + b_{14}y_{4t-1} + c_{11}x_{1t} + c_{12}x_{2t} + v_{1t} & (5.6) \\ y_{2t} = a_{12} + b_{21}y_{1t-1} + b_{23}y_{3t-1} + b_{24}y_{4t-1} + c_{21}x_{1t} + c_{22}x_{2t} + v_{2t} & (5.7) \\ y_{3t} = a_{13} + b_{31}y_{1t-1} + b_{32}y_{2t-1} + b_{34}y_{4t-1} + c_{31}x_{1t} + c_{32}x_{2t} + v_{3t} & (5.8) \\ y_{4t} = a_{14} + b_{41}y_{1t-1} + b_{42}y_{2t-1} + b_{44}y_{3t-1} + c_{41}x_{1t} + c_{42}x_{2t} + v_{4t} & (5.9) \end{cases}$$

where, y_1 represents inward FDI flow; y_2 represents outward FDI flow; y_3 represents exports; y_4 represents imports; x_1 represents gross domestic product; and x_2 represents research and development. The variables of y_1, y_2, y_3, and y_4 are endogenous in this VAR model, while variables of x_1, and x_2 are exogenous in the model. Therefore, the general VAR (1) model will be:

$$\begin{pmatrix} FDIN_t \\ FDIO_t \\ EX_t \\ IM_t \end{pmatrix} = C\begin{pmatrix} \phi_{11} \\ \phi_{21} \\ \phi_{31} \\ \phi_{41} \end{pmatrix} + \prod\nolimits_1 \begin{pmatrix} FDIN_{t-1} \\ FDIO_{t-1} \\ EX_{t-1} \\ IM_{t-1} \end{pmatrix} + Exogenous\ Variables + \begin{pmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \end{pmatrix} \quad (5.10)$$

where, $t=1, 2, \ldots, T$ and $\Pi_1 = \begin{bmatrix} \phi_{12} & \phi_{13} & \phi_{14} \\ \phi_{22} & \phi_{23} & \phi_{24} \\ \phi_{32} & \phi_{33} & \phi_{34} \\ \phi_{42} & \phi_{43} & \phi_{44} \end{bmatrix}$, and

$\mathrm{E}(\mu_{it}) = 0, (i = 1, 2, 3, 4; t = 1, \ldots, T)$; $\mathrm{E}\left(\mu_{is}, \mu_{jt}\right) = 0, (i, j = 1, 2, 3, 4; t = 1, \ldots, T)$; $\mathrm{E}(\mu_{it^2}) = \sigma_i^2, (i = 1, 2, 3, 4; t = 1, \ldots, T)$.

The difference between the simultaneous equation and this VAR model is that: firstly we treat GDP and R&D as exogenous variables, with more focus on the causality between FDI and the international trade. Secondly, we do not add a previous year of the dependent variable in the equation, but focus further on the interaction between these four variables. Finally, there are 16 estimators that need to be measured in the equation 5.10, but the essential estimators are the coefficient indicated as ϕ_{14}, ϕ_{23}, ϕ_{33}, and ϕ_{42}. The coefficient of ϕ_{23}, and ϕ_{33} measures the causality between FDI outward where the export lagged 1 year, and the causality between the export at current year where the FDI outward lagged 1 year, respectively. Similarly, the coefficient of ϕ_{14}, and ϕ_{42} is to estimate the relationship between FDI inward (or lagged 1 year) and import (or lagged 1 year).

5.2.2 ARDL Model

Generally, autoregressive distributed lag models are linear time series models with p lags on dependent variable y_t and q lags on the explanatory variable x_k. (Patterson, 2000). Therefore, the general ARDL (p,q) model is given by:

$$\left(1-\sum_{i=1}^{p} \Psi_i L^i\right) y_t = \alpha_0 + \sum_{j=0}^{q} \beta_j L^j x_t + \varepsilon_t \tag{5.11}$$

where, ε_t are the error term, α_0 is a constant, and Ψ_i, β_j are the coefficients associated with lags of y_t, and lags of x_j, for j=1,…, k. Subsequently, L could indicate the usual lag operator and define Ψ(L) and β (L). If we let $\Psi(\mathrm{L}) = \left(1-\sum_{i=1}^{p} \Psi_i L^i\right)$ and $\beta(\mathrm{L}) = \sum_{j=0}^{q} \beta_j L^j$, then the ARDL (p, q) model can be written as:

$$\Psi(\mathrm{L}) y_t = \alpha_0 + \beta(L) x_t + \varepsilon_t \tag{5.12}$$

In the thesis, we will use ARDL (1, 1) model, which could be written as:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \beta_1 x_t + \beta_2 x_{t-1} + \varepsilon_t \tag{5.13}$$

When adding variables into the equation (5.13), and using the first empirical study as example, we have three models to measure the relationship between FDI inward (outward) flows and economic growth (see equation 5.14 to equation 5.16).

$$\begin{cases} FDIN_t = \alpha_0 + \alpha_1 FDIN_{t-1} + \alpha_2 FDIO_t + \alpha_3 FDIO_{t-1} + \alpha_4 GDP_t + \alpha_5 GDP_{t-1} + \varepsilon_t & (5.14) \\ FDIO_t = \beta_0 + \beta_1 FDIO_{t-1} + \beta_2 FDIN_t + \beta_3 FDIN_{t-1} + \beta_4 GDP_t + \beta_5 GDP_{t-1} + \mu_t & (5.15) \\ GDP_t = \gamma_0 + \gamma_1 GDP_{t-1} + \gamma_2 FDIN_t + \gamma_3 FDIN_{t-1} + \gamma_4 FDIO_t + \gamma_5 FDIO_{t-1} + \nu_t & (5.16) \end{cases}$$

where, FDIN denotes FDI inward flows and FDIO denotes FDI outward flows.

5.3 Unit-root and Cointegration Test

5.3.1 The definition of stochastic process

A set of random variables $\{y_t\}$ is a stochastic process if it depends on the time. There is a specific example of the stochastic process, called white noise. If in a pure stochastic process (the distribution will not change with time), (i) $E(y_t)=0$, for all time t; (ii) $Var(y_t)=E(y_t^2)=\sigma_y^2$ is constant, for any t; and (iii) $Cov(y_t, y_s)= E(y_{t*} y_s)=0$, $t\neq s$. This stochastic process is white noise.

Moreover, if the mean [$E(y_t)=\mu$, for any t] and variance [$Var(y_t)= E(y_t-\mu)^2 =\sigma^2$, for any t] of a stochastic process are constant over the time. The covariance in any two periods depends only on the distance or lag, not at time t ($\gamma_k = \mathrm{E}[(y_t - \mu)(y_{t+k} - \mu)]$, for any t), then this stochastic process is stationary.

However, if there is no cointegration relationship between a set of nonstationary time series, the regression model is likely to appear spurious regression. In case the spurious regression, and the residual is a non-stationary sequence, and it cannot reflect the real causality of the dependent variables and independent variables, this regression has a good R-square and p-value. The solution for spurious regression is that adding or reducing independent variables sometimes make use of the first difference for the original equation, to make the regression stable.

5.3.2 The Unit-root Test

This section will discuss the test for a unit root. There are four tests always used to measure the unit-root, involving ADF test, PP test, LLC test (if there is a common root in the panel data), and IPS test (if there is an individual unit root in the panel data). In general, ADF test and PP test are always used to verify unit-root in the time series data. This thesis will discuss the ADF test. The unit-root test result of each country is displayed in the Appendices of chapter 5, section 5.1.

Dickey and Fuller in 1979 put forward a test to estimate whether the unit-root exists in an autoregressive model. Furthermore, the DF test measures the remaining term, not the original data, so we cannot use the standard t-statistics, but use Dickey-Fuller statistics instead.

First of all, we need a general autoregressive model

$$Y_t = pY_{t-1} + \mu_t \qquad (5.11)$$

Where μ_t is a white noise with zero mean, constant variance and none serial-correlation. Subsequently, we can have more equations with previous time periods.

$$Y_{t-1} = pY_{t-2} + \mu_{t-1} \qquad (5.12)$$

$$Y_{t-2} = pY_{t-3} + \mu_{t-2} \qquad (5.13)$$

…

$$Y_{t-N} = pY_{t-N-1} + \mu_{t-N} \qquad (5.14)$$

Then we put equation (5.11), (5.12), and (5.13) into the equation (5.14), toget

$$Y_t = p^N Y_{t-N} + p\mu_{t-1} + p^2\mu_{t-2} + \cdots + p^N\mu_{t-N} + \mu_t \qquad (5.15)$$

According to equation (5.15), p-value has three different situations. (a) if p<1, $N \to \infty$, then $p^N \to 0$, the sequence will be stationary over the time; (b) if p>1, $N \to \infty$, then $p^N \to \infty$, the sequence is nonstationary and it will increase over the time; (c) if p=1, $N \to \infty$, then $p^N = 1$, the sequence is also nonstationary and it will experience no change over the time.

For equation (5.11), the DF test measures the coefficient of Y_{t-1} is significant or not. Thus, the null hypothesis is H_0: p=1, if the result of test rejects the null hypothesis, it indicates Y_t does not have unit-root. However, if the test accepts the null hypothesis, then Y_t has unit-root, with the sequence being known as random walk series.
Moreover, if we make the first difference for equation (5.11), we can get

$$\Delta Y_t = (p-1)Y_{t-1} + \varepsilon_t = \theta Y_{t-1} + \varepsilon_t \qquad (5.16)$$

Then, the null hypothesis becomes to H_0:$\theta = 0$, if we accept the null, the equation will be $\Delta Y_t = \varepsilon_t$, as a stationary series. This process is called integrated of order 1, written as I (1). In the practice, most time series data in the financial area is not stationary because they can change in every time point no matter in the short term or long term (such as money demand, price level, exchange rate, and trading volume). Therefore, the difference process is necessary if we do a regression analysis with non-stationary time series.

DF test is accomplished through three models: the first model does not include any intercept and time trend, written as$\Delta Y_t = \theta Y_{t-1} + \varepsilon_t$; the second model contains only the intercept, written as$\Delta Y_t = \beta_1 + \theta Y_{t-1} + \varepsilon_t$; the third model includes both intercept and time trend, written as$\Delta Y_t = \beta_1 + \beta_2 T + \theta Y_{t-1} + \varepsilon_t$. The null hypothesis of these three models is H_0: $\theta = 0$.

For example, if we test whether a variable is stationary, this variable should reject one of these three models. Otherwise, we consider one unit-root in the series. The levels of unit root test start with a sequence of basic level, and take the first-order differential test (if there is a unit-root in the primary level), and do the second-order differential in the last (if there still is a unit-root in the previous level). Thus, in the DF test, we need to keep conduct unit-root until the sequence is smooth.

Furthermore, if the error term has a serial correlation, we need to adjust the third model and add lag dependent variable into the model. Thus, we will get:

$$\Delta Y_t = \beta_1 + \beta_2 T + \theta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon_t \qquad (5.17)$$

This equation based on the DF test, also known as Augmented Dickey-Fuller Test (ADF). In the time series variable, time-trend is one of the factors that may lead the variable to be non-stationary, since the variable will become more flexible with the increase of time. Table 5.1 to Table 5.30 indicates the test result of unit-root for 30 OECD countries (See Appendices for Chapter 5). We are using the model with intercept. This model also has two pairs of hypotheses. The first pair is ‘I (2) vs I (1)’, which means the null hypothesis in this variable has a unit root at I (2) and the alternative hypothesis is that this variable has a unit root at I (1). If the test result has rejected the null hypothesis, it means the variable is stationary at I (1), and vice versa. We performed the same process in the second pair ‘I (1) vs I (0)’. If the test result has rejected the null hypothesis, it means that the variable is stationary at I (0), and vice versa. Moreover, for most variables we are using automatic selection and the maximum lags are eight. However, we reduce the maximum lags to four for R and D variables, which because there are too much missing values in this variable. Moreover, there is no test result of R and D variable in Australia, New Zealand, and Switzerland that because the sample is too small and discontinued, thus we cannot do unit-root test for these countries. The p-value has been used in the unit-root test is 5%.

5.3.3 Cointegration test

The previous section discussed the set of nonstationary time series data may lead to the appearance of spurious regression. The solution to avoid the spurious regression, we can do the cointegration test. EG test (Engle and Granger test) and CRDW (Cointegration Regression Durbin-Watson test) always used to measure the spurious regression. Assume, if we have two random walk series, X_t and Y_t, and both of them is I (1). Under the EG test, we need to run an OLS regression for $y_t = \alpha + \beta x_t + \varepsilon_t$, then we can test whether the residual is stationary, because of if X_t and Y_t has no cointegration relationship, then any of their linear combinations are nonstationary, as same as the residuals.

The second method is CRDW test, the statistic of the trail construction is

$$\mathrm{DW} = \frac{\sum(e_t - e_{t-1})^2}{\sum(e_t)^2}$$

where, the null hypothesis is H_0: DW=0. In the equation e_t is a random walk, so we expect the $(e_t - e_{t-1}) = 0$, if the test result rejects the null, we can say there is a cointegration relationship between the variables.

5.4 Alternative Method: Engle-Granger Two Step Approach

This approach is testing for non-cointegration variables. According to the unit-root test, we can find that most variables used in this thesis are nonstationary and integrating in the different level. Therefore, we will use this method as alternative model to test selected countries.

Basically, in Engle-Granger approach, if y_t and x_t are stationary at I(1), then we have the cointegrating regression $y_t = \alpha_1 + \alpha_2 x_t + \varepsilon_t$. Alternatively, suppose we added a third variable z_t, then the correct cointegrating regression is

$$y_t = \beta_1 + \beta_2 x_t + \beta_3 z_t + \mu_t \tag{5.25}$$

Therefore, the Engle-Granger two steps approach will established as follow:

i) y_t and x_t are stationary at I(1): $y_t \sim I(1)$ and $x_t \sim I(1)$.

Then we use OLS to estimate y_t and x_t equation:

ii) $y_t = \beta_0 + \beta_1 x_t + e_t$ (5.26)

where, $e_t \sim I(0)$, then we have the correct cointegrating regression:

iii) $\Delta y_t = \alpha_0 + \alpha_1 \Delta x_t + \alpha_2 e_{t-1} + \alpha_3 z_t + \nu_t$ (5.27)

According to the unit-root test (see Table 5.31 to 5.33 in Appendices for Chapter 5), we put 30 OECD countries into five group (Table 5.34). We will test one country in each group and will total estimate five countries. Moreover, we are using FDI inward flows as dependent variable; and FDI outward flows, GDP, export, import, and R and as independent variables. In order to measure how these factors effects on FDI inward flows. The Engle-Granger test can be found from Table 5.35 to Table 5.38; cointegrating regression result display from Table 5.39 to Table 5.42, and error correction model displayed from Table 5.39 to Table 5.42 in the Appendices.

The first group has two countries, Australia and the United Kingdom. The characteristic of these them is the variable of FDI outward flows is stationary at I(0), we could use equation (5.27) to estimate it. In addition, the z_t could be any stationary variable when we run the error correction model, but in this case, FDI outward flows variable represents z_t. Type B is including ten countries and all the variables are stationary at I(1), then we do the difference log for each variable and run error correction model. For type C, there are nine countries and in this group FDI inward flows stationary at I(0); while the remaining variables are stationary at I(1). Moreover, we cannot logarithm for FDI outward variable that because it could be negative in the flow data. Then we use $\Delta FDIO_t$ / $FDIO_{t-1}$ to measure its growth rate. In the fourth group is including five countries, which FDI inward and outward flows are stationary at I(0), but the remaining variables are stationary at I(1). Therefore, we do the difference log method for the remaining variables and then measured by Engle-Granger model.

Three countries exist in the last group, Hungary, Luxembourg, and New Zealand, and we could not use Engle-Granger model for them. The reason is the result of unit-root test in some variables are stationary at least in I(2). For example in Hungary, GDP and export are stationary at I(2); in Luxembourg, the GDP variable is stationary at I(2); and in New Zealand, FDI outward flows and export variable are stationary at I(2). Moreover, we have only 35 years data for each variable; therefore, we could not do the breakpoint unit-root test, since we do not have longer enough dataset.

When we do the regression test for these countries, we have to drop R and D variable for some countries, like Korea, Poland, Switzerland, and Turkey in type B; and Spain in type C. The reason because there are too many missing value in R and D variable of these countries, which makes it has a stationary at least on I(2).

Moreover, we do not need to do the Engle-Granger test if all the variables are cointegration, which because the definition of cointegration is a relationship between non-stationary variable. Since, we use Engle-Granger test and error correction model for selected country, so we will give general interpretation of model. For example, if there is a positive significant relationship between economic growth and FDI inward flows. That means the growth rate of GDP is another factor that can influence FDI inward flows and outflow. Because, if a country there is an increase in the growth rate of GDP, this means this country is a good place to invest for. This implies that there is a positive association between growth rate of GDP and FDI inward flows.

5.5 Conclusions

This chapter reviewed several econometric models, OLS model and VAR model. The application of unit-root problem in the time series database and the solution of this issue to make data series becomes stationary was also discussed. The final part of this chapter used motor vehicles industry as a case study and discusses the pattern of the relationship between FDI and international trade. The result of case study points out if the situation is varying, the causality of this relationship should also be different. Therefore, the four significant coefficients in section 5.5.2 could be positive or negative. Further details will be discussed in the final empirical study (See Chapter 8). The next three chapters will begin the analysis of our three empirical studies.

Chapter 6 Empirical Study 1: The Causality of FDI and Economic Growth

6.1 Introduction

This chapter begins analysing our three empirical studies, arranged as follows: chapter 6 discusses the essential link between foreign direct investment and economic growth. Chapter 7 analyses the second causality of this thesis, the relationship between FDI and R&D. The final empirical study will explain the causality of the foreign direct investment and international trade, in chapter 8.

The purpose of this chapter is to answer the first research question established in Chapter 1—what is the relationship between FDI and economic growth? The analysis of 30 countries in OECD will be done by using autoregressive distributed lag and pooling data analysis. The variable used in this empirical study includes FDI inward flow, FDI outward flows, and GDP. The regression result can be found from page 53 to page 82 in Appendices.

To interpret the relationship between foreign direct investment and economic growth, country profile factors analyse the regression result in four categories, including, FDI regulatory restriction, institutions, market sophistication, and product market regulation. 30 countries will be segregated into two main groups, based on the condition of FDI regulatory restriction. Subsequently, the focus will shift to how country characteristics work on the links between FDI and economic growth.

The structure of this chapter is organised as follows:

- Section 6.2 will display the regression result of the relationship between FDI and economic growth, including the stationary test
- Section 6.3 will consist of the pooling data analysis
- Section 6.4 will discuss the interpretation of the country profile analysis
- Section 6.5 will focus on the conclusion of this chapter

6.2 The causality of Foreign Direct Investment and Economic Growth

According to the GDP equation, the investment (portfolio investment and foreign investment) will affect economic growth in one country. Therefore, foreign investment flow out of the total investment in a country measured if it had a significant influence on economic growth by its own. Figure 6.1 indicates the summary of the relationship between FDI and economic growth. 18 countries show causality between FDI and economic growth, with the remaining countries failing to display a significant relationship between these two variables. The countries with a significant relationship are divided into three groups, including the bi-direction relationship (13 countries), the influence of FDI on economic growth (2 countries), and the effects of economic growth on FDI (3 countries).

Figure 6.2 displays the details of countries in each bi-direction and single direct relationship, consisting of two bi-direction causalities and four single direction relationships. The figure displays red box to indicate single direction from FDI flows to economic growth; while the single opposite direction from economic growth to FDI flows is presented in the light blue box. Additionally, we list country (indicated by the country code, which could find in Appendices for Chapter 6, Table 6.1) under each box. Moreover, some country code with a '*' suffix exists, implying that the regression result is not stationary and will be discussed in section 6.3. Therefore, section 6.2.1 will discuss the first bi-direction causality of FDI inward flows and economic growth, along with the second bi-direction relationship between FDI outward flows, and economic growth is indicated in section 6.2.2. The pooling data regression result will be displayed in section 6.2.3.

Figure 6. 1 Summary of the Relationship between FDI and Economic Growth

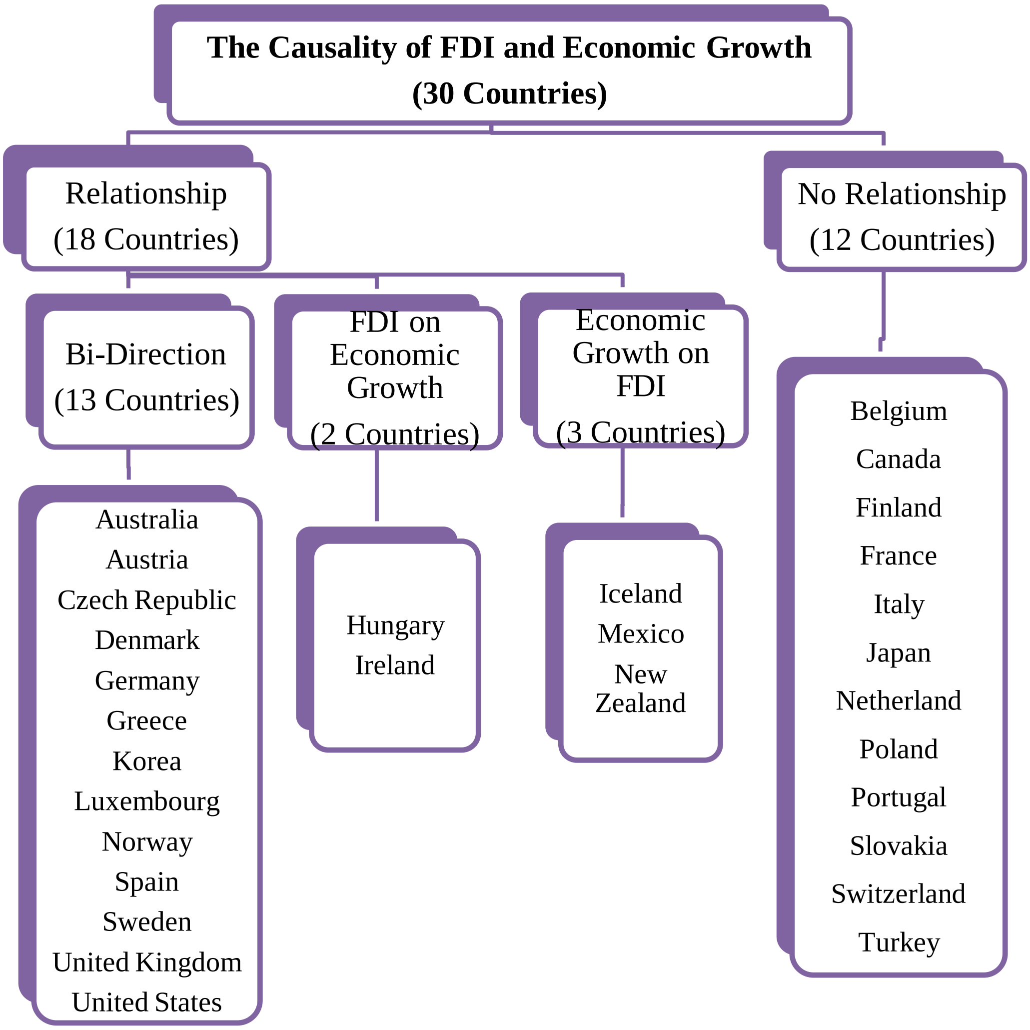
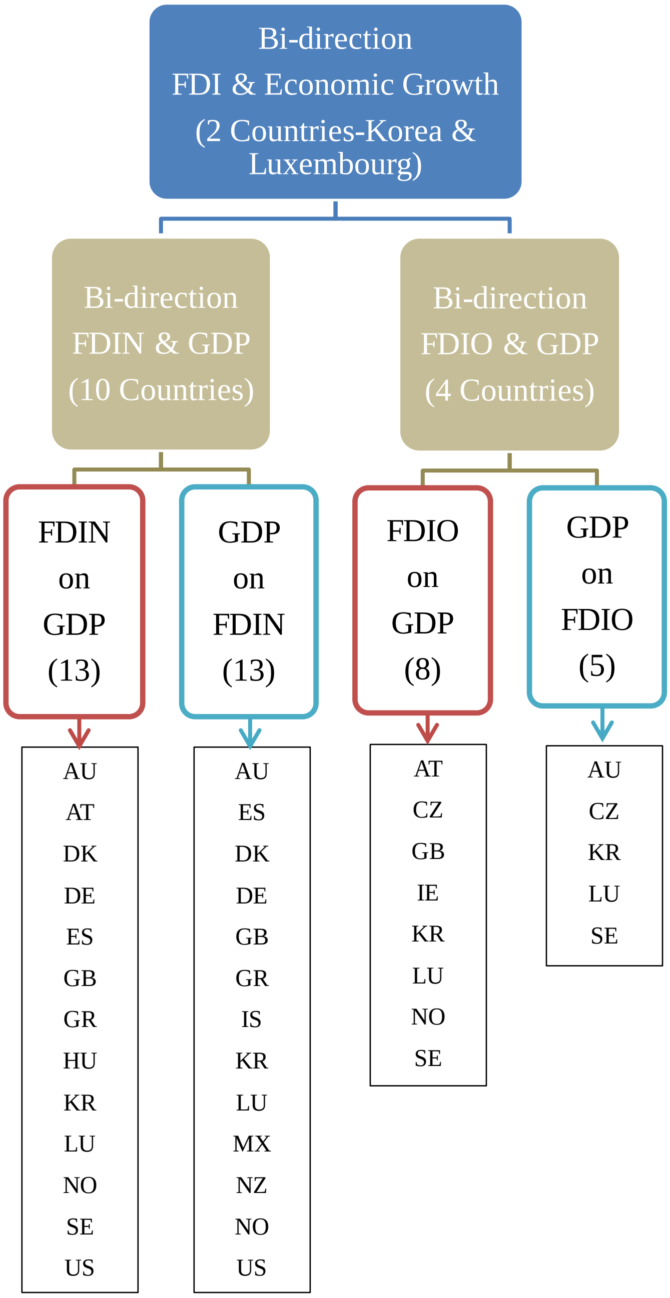


Figure 6. 2 The Relationship between FDI and Economic Growth by Countries



6.2.1 Foreign Direct Investment Inward and Economic Growth

Firstly, the first single direction from FDI inward flows to economic growth will be analysed. According to the regression result, 13 (out of 30) countries indicate that FDI influences economic growth. Australia, Germany, Korea, Luxembourg, Norway, Spain, United Kingdom, and the United States show that FDI inward flows in the current year had a significantly positive effect on economic growth. Accordingly, the FDI inward flow from abroad supports their economic growth in these six countries.

Therefore, they attract more inflow from FDI , thereby significantly improving the economy of their country. However, the remaining five countries, Austria, Denmark, Germany, Hungary, Sweden, indicted that inward foreign direct investment may not support economic growth. Therefore, they had an adverse impact on their economies. With regards to these countries, the government should reduce inward FDI to ease the harm for the economic growth.

The second single relationship in this section is the causality for economic growth affecting foreign direct investment inward flows. 13 countries exist under this relationship as well, which occupied 43.3% of the total OECD countries. Furthermore, the variable of GDP in Denmark, Germany, Iceland, Mexico, and New Zealand indicates a negative effect on outward FDI. While the remaining eight countries displayed that current GDP had a positive influence on outward FDI flow. It may confirm that with regards to most of the countries economic growth will attract more inward investment from other countries. On the contrary, the booming economy in one country maybe one of the major reasons to attract foreign investment from abroad.

6.2.2 Foreign Direct Investment Outward and Economic Growth

This section separates the bi-direction causality into two single direction relationships and analyses them one by one. The first single relationship focuses on the foreign direct investment outward flow effects on the economic growth. There are eight countries indicates in this one-way link. The regression result suggested that FDI outward has an influence on economic growth, but most of them have a positive impact, including Austria, Czech Republic, Ireland, Korea, and Sweden. Therefore, when the government conducts investment into other countries from these countries, it may enhance their economic growth. On the other hand, FDI outward lagged in the one year variable in Norway and the United Kingdom, with the current year of FDI outward variable in Luxembourg illustrating a significantly negative influence on economic growth. Only in these three countries, the regression result suggests that the more FDI outward completed in abroad, the fewer benefits are achieved for their own country.

The focus shifts to the second single direction relationship from economic growth to FDI outward flows. Five countries (out of 30) displayed that their GDP had a significant impact on FDI outward. The regression result in Luxembourg suggested that the economic rise may not support or conduct investment abroad. In other words, in case of economic growth in their countries, investment in the foreign countries reduced. However, the result of other four countries (Australia, Czech Republic, Korea, and Sweden) indicates that with increase in the economic growth of their country, they will encourage more investment in other countries. The next section will use four country profile factors, which are: FDI regulatory restriction, institutions, market sophistication, and product market regulation, analysis of the bi-direction between foreign direct investment and economic growth in more detail.

6.2.3 Stationary Test of Model

According to the lag structure test, three countries (Ireland, the Netherlands, and New Zealand) indicate that their regression result is not stationary. Therefore, the first difference of each variable will be used and the regression will be re-run. The unit-root test in each country can be found in chapter 5 (Econometric Methods) Appendix.

According to the unit-root test in Ireland, the variables of FDI inward flows, FDI outward flows, and GDP are stationary at I (1). Subsequently, the regression result suggests that FDI outward flows and economic growth had a positive influence on each other. Moreover, in the Netherlands, all of the variables were stationary at first difference, except for the FDI inward flows, which were stationary in the original time series data. Upon re-running the VAR model in this country, the regression result indicated that the lack of a relationship between foreign direct investment and economic growth. In case of New Zealand, the vector error correction model could not be performed since FDI outward flow variable is stationary in I (2), but GDP variable is stationary at I(1), and FDI inward flows is stationary at the original time series. The precondition of VECM regression is to make sure each variable is stationary at I (1). However, all the OECD countries could not be pooled together to get the general causality of FDI and economic growth. The explanation is in the following section, which compares its regression result with each of the OECD countries to find the difference between the general causality and the causality of the individual countries.

6.3 Pooling Data Analysis

The previous two subsections gave a general idea of the relationship between foreign direct investment and economic growth in each OECD country. The focus now shifts to the pooling data method to analyse the general causality in 30 OECD countries. Table 6.1 shows the regression result of pooling data analysis with 992 observations. According to the regression result, the foreign direct investment inward flows had a significant influence on economic growth in both lagged one year and lagged two years' variable. However, FDI outward flows indicated an adverse effect of economic growth in the lagged one year and lagged two years' variables. In accordance with this, if an OECD country could attract more foreign investment into their country, their economy would experience a significant rise; whereas if they conducted investment abroad at the same time, the speed of economic growth may reduce.

On the contrary, the variable of economic growth did not indicate a significant effect of foreign direct investment in both inward and outward flows. This implies that the economic growth increased in one country, but it may not influence the amount of inward and outward FDI flows. The exogenous variables export display an adverse effect for FDI inward flows, FDI outward flows, and economic growth. However, the import variable shows positive influence on these three variables. In this case, export may 'substitute' causality with FDI flows, but import had a 'complementary' causality with FDI flows. Additional details of the relationship between FDI and trade will be discussed in chapter 8.

Table 6. 1 Pooling Data Result

	FDINF	FDIOF	GDP
FDINF(-1)	0.322***	0.012	0.764**
	(0.037)	(0.045)	(0.347)
FDINF(-2)	0.094**	0.039	0.686**
	(0.037)	(0.045)	(0.348)
FDIOF(-1)	0.049*	0.503***	-1.927***
	(0.029)	(0.035)	(0.272)
FDIOF(-2)	-0.069**	-0.022	-0.704**
	(0.031)	(0.037)	(0.286)
GDP(-1)	0.001	-0.004	0.798***
	(0.003)	(0.004)	(0.031)
GDP(-2)	-0.002	-0.003	-0.114***
	(0.003)	(0.004)	(0.027)
Constant	6,479.375	24,351.968***	1,294,209.350***
	(7,662.110)	(9,321.225)	(71,770.705)
Export	-0.067***	-0.066***	-1.608***
	(0.016)	(0.020)	(0.154)
Import	0.107***	0.115***	2.848***
	(0.019)	(0.023)	(0.176)
DUMAUL	-1,355.545	-25,699.562***	-1,252,687.357***
	(8,056.905)	(9,801.507)	(75,468.738)
DUMAUS	-8,011.034	-23,811.623**	-1,346,522.213***
	(8,327.388)	(10,130.560)	(78,002.342)
DUMBEL	1,628.201	-21,397.112**	-1,444,548.247***
	(8,712.771)	(10,599.392)	(81,612.213)
DUMCAN	-2,108.377	-18,966.914*	-1,298,141.378***
	(8,222.628)	(10,003.115)	(77,021.059)
DUMCZE	-6,784.663	-27,267.875**	-1,356,111.993***
	(8,814.455)	(10,723.094)	(82,564.683)
DUMDEN	-6,751.012	-23,477.413**	-1,304,743.387***
	(8,314.789)	(10,115.233)	(77,884.332)
DUMFIN	-6,012.632	-24,077.321**	-1,295,477.982***
	(8,285.534)	(10,079.644)	(77,610.303)
DUMFRA	-10,349.547	-13,660.418	-1,185,610.290***
	(7,935.275)	(9,653.541)	(74,329.436)
DUMGER	-13,159.230	-10,931.357	-1,227,556.989***
	(9,034.778)	(10,991.125)	(84,628.441)
DUMGRE	-8,069.566	-26,193.520***	-1,356,500.861***
	(8,220.252)	(10,000.225)	(76,998.801)

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: 'FDINF' means FDI Inward Flows; 'FDIOF' means FDI Outward Flows; 'DUABC' means Dummy Variable in each Country (See Table 6.2 in Appendices).

Table 6.1 Pooling Data Result (Cont.)

	FDINF	FDIOF	GDP
DUMHUN	-6,423.399	-25,564.589**	-1,327,427.144***
	(8,388.272)	(10,204.627)	(78,572.643)
DUMICE	-6,306.481	-24,227.371**	-1,296,991.625***
	(8,315.148)	(10,115.669)	(77,887.693)
DUMIRE	-1,008.570	-20,539.551**	-1,332,044.034***
	(8,427.425)	(10,252.259)	(78,939.390)
DUMITA	-12,527.759	-23,545.325**	-1,191,563.266***
	(7,844.481)	(9,543.086)	(73,478.971)
DUMJAP	-19,173.442***	6,038.502	-414,968.526***
	(6,519.694)	(7,931.437)	(61,069.739)
DUMKOR	-10,744.892	-26,887.501***	-1,391,660.082***
	(8,281.014)	(10,074.144)	(77,567.959)
DUMLUX	3,269.329	-17,287.614*	-1,404,329.955***
	(8,620.407)	(10,487.028)	(80,747.041)
DUMMEX	-4,721.664	-26,316.552***	-1,308,658.640***
	(8,174.610)	(9,944.700)	(76,571.275)
DUMNET	-1,793.042	-20,777.587**	-1,387,382.588***
	(8,672.315)	(10,550.176)	(81,233.263)
DUMNEW	-7,455.608	-19,202.287*	-1,297,662.274***
	(8,282.806)	(10,076.324)	(77,584.748)
DUMNOR	-4,625.337	-23,521.235**	-1,245,367.436***
	(8,242.060)	(10,026.755)	(77,203.081)
DUMPOL	-6,386.526	-25,569.638**	-1,332,283.288***
	(8,311.249)	(10,110.927)	(77,851.175)
DUMPOR	-7,140.211	-25,869.715**	-1,328,533.219***
	(8,317.551)	(10,118.593)	(77,910.200)
DUMSLO	-7,008.308	-25,758.285**	-1,335,293.902***
	(8,792.453)	(10,696.328)	(82,358.590)
DUMSPA	-3,616.800	-20,458.742**	-1,276,781.897***
	(8,142.025)	(9,905.060)	(76,266.059)
DUMSWE	-3,292.210	-18,742.672*	-1,295,840.547***
	(8,270.751)	(10,061.659)	(77,471.830)
DUMSWI	-2,572.898	-13,967.583	-1,271,569.322***
	(8,483.547)	(10,320.533)	(79,465.079)
DUMTUR	-8,299.617	-25,981.387***	-1,310,026.231***
	(8,208.332)	(9,985.724)	(76,887.152)
DUMUK	4,142.731	-8,754.130	-1,244,794.509***
	(8,167.497)	(9,936.047)	(76,504.649)

*** p<0.01, ** p<0.05, * p<0.1

Notes: 'FDINF' means FDI Inward Flows; 'FDIOF' means FDI Outward Flows; 'DUABC' means Dummy Variable in each Country (See Table 6.2 in Appendices).

Table 6.1 Pooling Data Result (Cont.)

	FDINF	**FDIOF**	**GDP**
R-squared	0.705	0.638	0.993
Adj. R-squared	0.693	0.624	0.993
Obs.	992	992	992
F-statistic	61.558 (0.000)	45.408 (0.000)	3,721.819 (0.000)
Histogram-Normality	0.000	0.000	0.000
Serial Correlation	0.000	0.006	0.000
White Hetero-scedasticity	0.000	0.000	0.000

Notes: 'FDINF' means FDI Inward Flows; 'FDIOF' means FDI Outward Flows; 'DUABC' means Dummy Variable in each Country (See Table 6.2 in Appendices).

6.4 Country Profile Analysis

As mentioned in Chapter 4, the country profile helps analyse the regression result. Therefore, four factors of the country profile will be used to interpret the regression result: FDI regulatory restriction, institution, market sophistication, and product market regulation. Firstly, FDI regulatory restriction divide 30 OECD countries into two groups. Table 6.1 shows the first situation of the country having an FDI regulatory restriction, including 11 countries. Moreover, Table 6.2 indicates 19 countries in the second situation, which has no FDI regulatory restriction in the country. Subsequently, 'Y' (for Yes) and 'N' (for No) displays whether the country satisfied the other three countries profile factors.

The condition of the first situation is that it has an FDI regulatory restriction. According to Table 6.1, Australia, Austria, Korea, Norway, and the United States indicated a bi-direction relationship between foreign direct investment and economic growth. Especially Korea and Norway ranked relatively high in one of the country profile factors. The regression result shows that if there is a rise in their GDP, they may attract more FDI inward flows into the country. The reason behind this could be that Norway's institution and Korea's market environment, when compared to Austria and the United States, which had a high ranking in the institution factors. The regression result indicates that both of them had a significant positive bi-direction between FDI flows and economic growth. Therefore, the foreign investment inward may encourage economic growth and at the same time, if GDP in these two countries increased, more investment will be conducted into foreign countries.

Furthermore, three countries display a single direction from economic growth to FDI flows, including New Zealand, Iceland, and Mexico. The country profile of New Zealand indicated high-level institution with a healthy environment competitive market and comparative ease product market regulation. Thus, the regression result displayed that FDI inward flows could enhance economic growth in this country. By contrast, Iceland and Mexico had a low ranking in the market sophistication and product market regulation, implying that the regression result suggested that economic growth had a negative influence on FDI inward flows. Therefore, the country profile factors may affect the causality of FDI flows and economic growth. Moreover, no countries indicated that the other single direction of FDI flows affect economic growth in this group.

The countries in the second situation had a less strict FDI regulatory restriction or lack thereof. The bi-direction relationship included eight countries, where Denmark and the United Kingdom had a high level of country profile factors. The FDI inward flows had a positive influence on economic growth, but at the same time, the economic growth may reduce inward investment in Denmark and attract more investment in Britain. Germany, Spain, and Sweden had relatively high-ranking in two of the factors. The regression result shows that FDI inward flows had a negative effect of economic growth in Germany and Sweden, but a positive influence on Spain. On the other hand, GDP had a positive effect on FDI flows in both Spain and Sweden, but an adverse effect in Germany.

In the single direction causality, only two countries showed that FDI had a significant influence on economic growth, with no country indicating that economic growth could affect FDI flows. According to the Table below, Ireland had a better country profile as compared to Hungary, which had a high level of institutions, ease product market regulation, and friendly market competition environment. The FDI outward flows may significantly encourage the economy in Ireland. In addition, Hungary's regression result indicated that FDI inward flows may reduce the speed of economic growth, while FDI outward flows could increase GDP. The remaining six countries showed no relationship between FDI flows and economic growth. This consists of Belgium, Italy, Portugal, Slovakia, France, and Turkey.

Table 6. 2 Situation 1: If the country has an FDI Regulatory Restriction

	Institution	Market Sophistication	Product Market Regulation	Summary	Causality
Australia	Y*	Y*	Y*	3Y	Bi-direction
Austria	Y*	N*	Y*	2Y1N	Bi-direction
United States	Y*	Y	N*	2Y1N	Bi-direction
Korea, Rep.	N*	Y*	N	1Y2N	Bi-direction
Norway	Y	N*	N*	1Y2N	Bi-direction
New Zealand	Y	Y*	Y*	3Y	GDP on FDI
Iceland	Y*	N*	N*	1Y2N	GDP on FDI
Mexico	N	N	N	3N	GDP on FDI
Canada	Y	Y	Y*	3Y	None
Switzerland	Y*	Y	N*	2Y1N	None
Poland	N*	N	N*	3N	None

Notes: Y indicates the country has a high-level ranking in this country profile factor; Y indicates the country has an upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low-level ranking in this country profile factor.*

Table 6. 3 Situation 2: If the country does not have an FDI Regulatory Restriction

	Institution	Market Sophistication	Product Market Regulation	Summary	Causality
Denmark	Y	Y*	Y*	3Y	Bi-direction
United Kingdom	Y*	Y	Y	3Y	Bi-direction
Germany	Y*	N*	Y*	2Y1N	Bi-direction
Spain	N*	Y*	Y*	2Y1N	Bi-direction
Sweden	Y*	Y*	N*	2Y1N	Bi-direction
Czech Republic	N*	N*	Y*	1Y2N	Bi-direction
Luxembourg	Y*	N*	N*	1Y2N	Bi-direction
Greece	N*	N*	N*	3N	Bi-direction
Ireland	Y*	Y*	Y*	3Y	FDI on GDP
Hungary	N*	N	Y*	1Y2N	FDI on GDP
Finland	Y	Y*	Y*	3Y	None
Japan	Y*	Y*	Y*	3Y	None
Netherlands	Y*	Y*	Y	3Y	None
Belgium	Y*	N*	Y*	2Y1N	None
Italy	N*	N*	Y*	1Y2N	None
Portugal	N*	N*	Y*	1Y2N	None
Slovakia	N*	N	Y*	1Y2N	None
France	N*	N*	N*	3N	None
Turkey	N	N	N	3N	None

Notes: Y indicates the country has a high-level ranking in this country profile factor; Y indicates the country has an upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low-level ranking in this country profile factor.*

6.5 Conclusions

This chapter measured the first empirical analysis of the relationship between foreign direct investment and economic growth. In general, according to the pooling data regression result, GDP could not effect the FDI flows of both the inward and outward sides. Therefore, economic growth could not support either FDI inward flows or FDI outward flows in the OECD countries. However, the regression result suggested that FDI inward flows had a positive effect on economic growth, and FDI outward flows may have a negative influence on economic growth at the same time.

To conclude, Figure 6.3 and 6.4 show the bi-direction of FDI inward flow (or FDI outward flows) and economic growth, respectively. According to figure 6.3, ten countries show a relationship between FDI inward flows and economic growth, with nine of them having a positive effect (Australia, Denmark, Spain the United Kingdom, Greece, Korea, Luxembourg, Norway, and the United States). However, the same causality had an adverse influence on Germany. Compared to figure 6.4, only four countries came under the causality of FDI outward flows and economic growth, especially the Czech Republic, Korea, and Sweden, which showed a positive relationship, with a negative influence of this causality in Luxembourg.

Figure 6. 3 The Bi-direction of FDI Inward Flows and Economic Growth

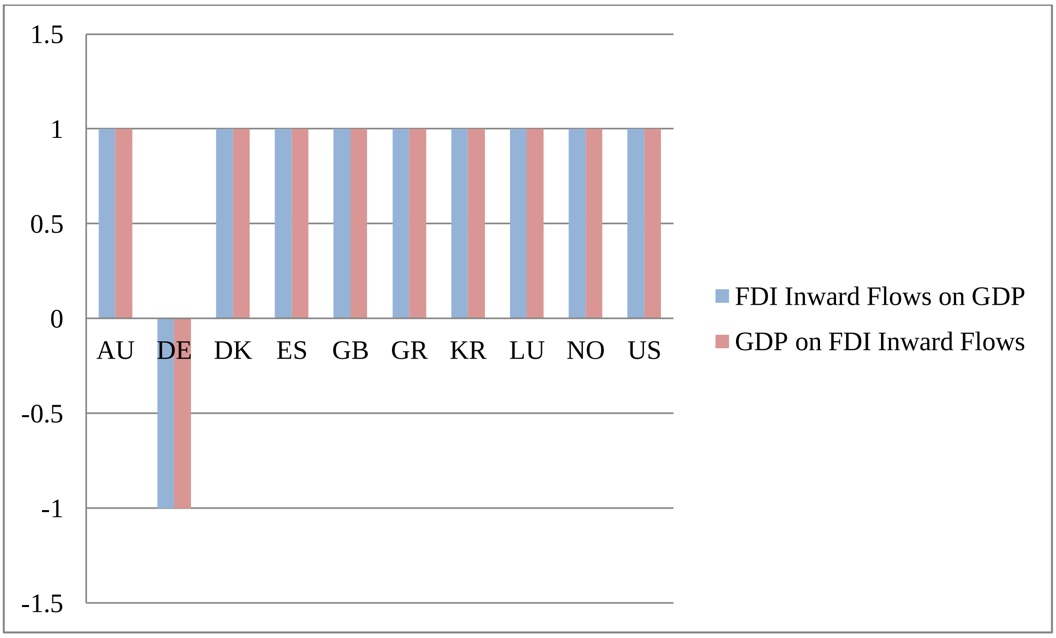
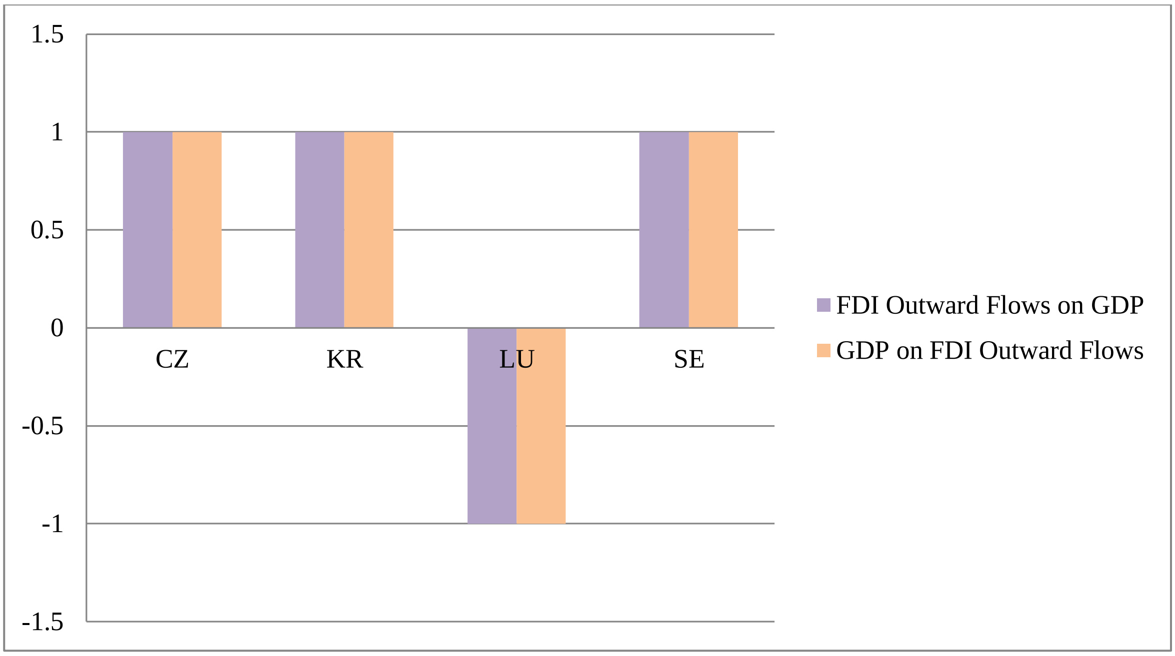


Figure 6. 4 The Bi-direction of FDI Outward Flows and Economic Growth



Moreover, figure 6.5 and 6.6 indicate two single direction causalities of FDI inward (outward) flows and economic growth. According to figure 6.5, only Ireland, in the single direction from FDI inward flows to economic growth, showed a positive effect of this relationship. By contrast, the second situation of single direction causality went from FDI outward flows on economic growth, only in Hungry, which indicated a positive influence on this relationship. Lastly, figure 6.6 indicates that three countries had another single direction relationship from GDP to FDI flows, which did not exist in the pooling data analysis. According to the Figure, economic growth had an adverse effect on FDI inward flows only in Iceland, Mexico, and New Zealand. The regression result did not show that any country had a significant effect of economic growth on FDI outward flows in this empirical study.

Figure 6. 5 The Single Direction: FDI Flows on Economic Growth

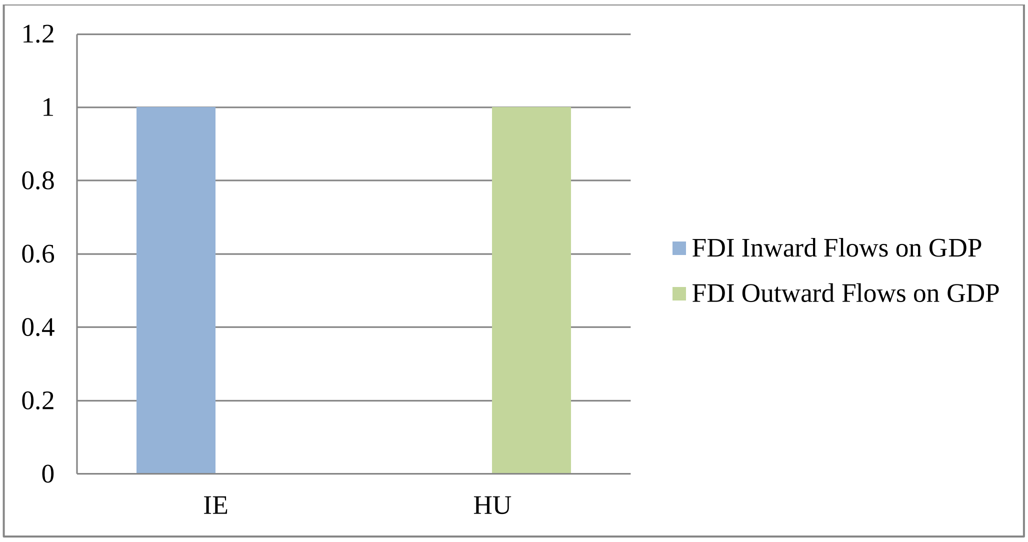
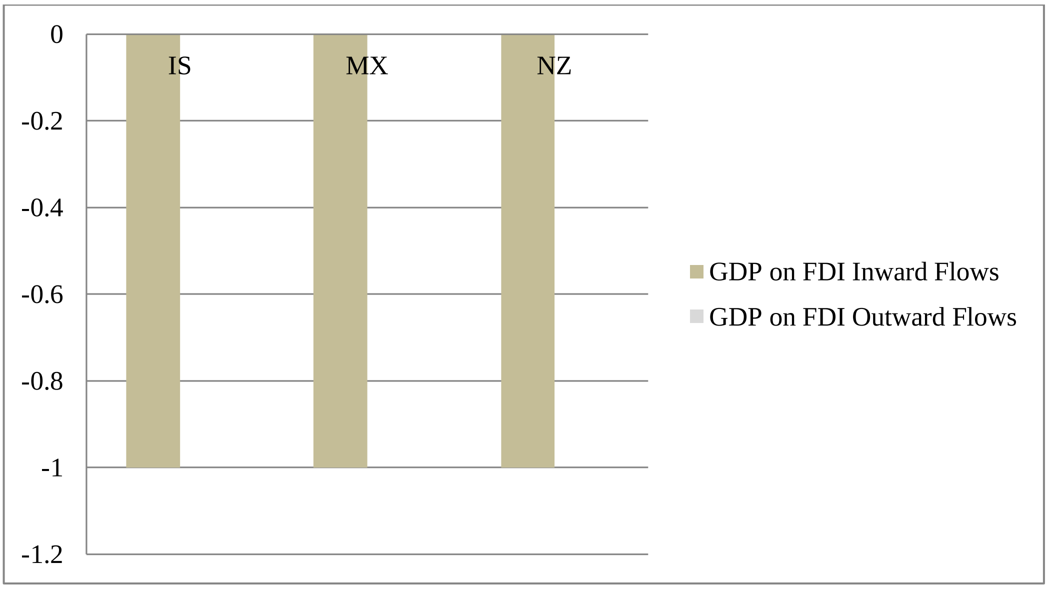


Figure 6. 6 The Single Direction: Economic Growth on FDI Flows



Chapter 7 Empirical Study 2：The Causality of FDI and Technology

7.1 Introduction

Chapter 6 discussed the relationship between foreign direct investment and economic growth in 30 OECD countries. The focus is now on the second empirical study— the causality of foreign direct investment and research and development. According to the previous empirical studies (See Chapter 3, section 3.3), few researchers focused on the relationship between FDI flows and local R and D activities. Knowledge seeking FDI and efficiency seeking FDI is an essential motivation of MNEs, which desired to conduct FDI in the foreign country. Currently, in particular, the latest technology from more than 20 or 30 years ago, like artificial intelligence (AI) is developing. This technology will change people’s lives in the future and bear the brunt of the trade and investment area. Thus, R&D and innovation are increasingly gaining importance around the globe.

The purpose of this chapter is to measure how FDI and R&D affect each other, along with analysis of the characteristics of each country. The same dataset will be used from the previous chapter, with the exception of the data of R&D in Australia, New Zealand, and Switzerland being unavailable. Therefore, total 27 countries are observation in this empirical study. The econometric method used in this chapter is the ARDL model and pooling data method. The variable in the model includes FDI inward flow, FDI outward flow, GDP and R&D. The regression result for 27 countries was displayed from page 83 to page 109 (See Appendices for Chapter 7). Since the data of R&D in some countries is not enough to measure, pooling data is used to estimate how these variables work together in total 30 countries. Moreover, the country profile factors will be used for analysis, including, FDI regulatory restriction, institutions, market sophistication, knowledge input, and knowledge and technology output.

The structure of this chapter is as follows:

- Section 7.2 discusses the causality between FDI and R&D with a stationary test of modal

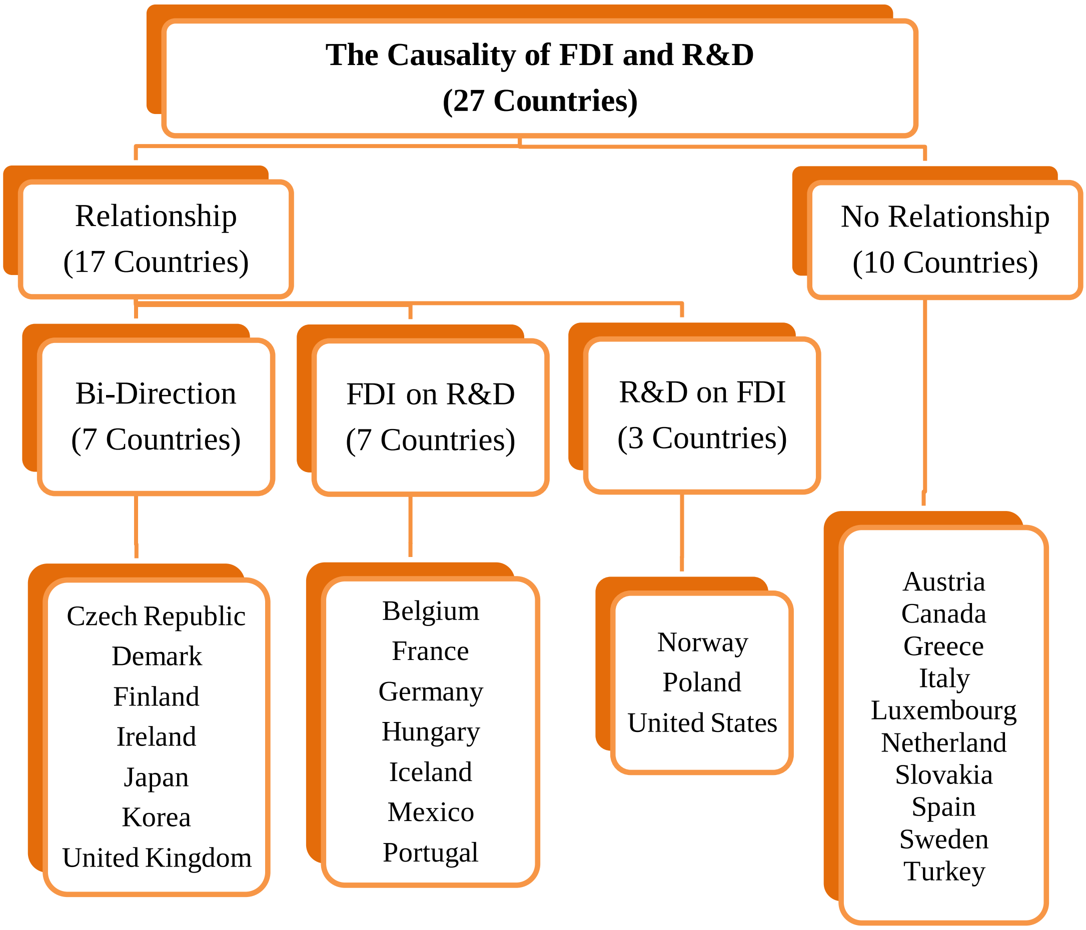
- Section 7.3 focuses on the pooling data research analysis
- Section 7.4 consists of the country profile analysis
- Section 7.5 concludes the chapter

7.2 The Causality of FDI and Research and Development

This section will explain the causality of foreign direct investment and innovation (measured by R&D). The four sub-sections include the FDI inward flows had influence R&D, the effect of R&D on foreign direct investment. Figure 7.1 indicates all the sub-relationship between FDI and R&D. Total four sub-relationships uare indicated through different colours. The single direction from FDI inward and outward flow to R&D, is in the green box, and another single direction from R&D to FDI inward and outward flow, is in the yellow box.

Consequently, the first bi-direction of FDI inward flows and R&D will be discussed in section 7.2.1. Section 7.2.2 will discuss the second bi-direction causality of FDI outward flows and R&D. The econometric part uses VAR (1) for analysis. In accordance with the previous chapter, FDI inward flow, FDI outward flows, GDP, and R&D as an endogenous variable; and trade (export and import) would be the exogenous variable. The entire regression result will be displayed at the end of this Chapter.

Figure 7. 1 Summary of the Relationship between FDI and Innovation



7.2.1 Foreign Direct Investment Inward and R&D

Firstly, the relationship between foreign direct investment inward flow and research development will be discussed. Two countries indicated that the foreign direct investment inward flows had an adverse effect on R&D, implying that if increased investment came into in France and Korea, lesser R&D they will be produced. However, in Belgium, Czech Republic, Finland, and the United Kingdom, the lag one year FDI inward flows variable had a positive influence on the current R&D. On the contrary, three countries displayed a single direction from R&D to FDI inward flow. Norway, United Kingdom, and the United States showed a positive influence of R&D to inward FDI.

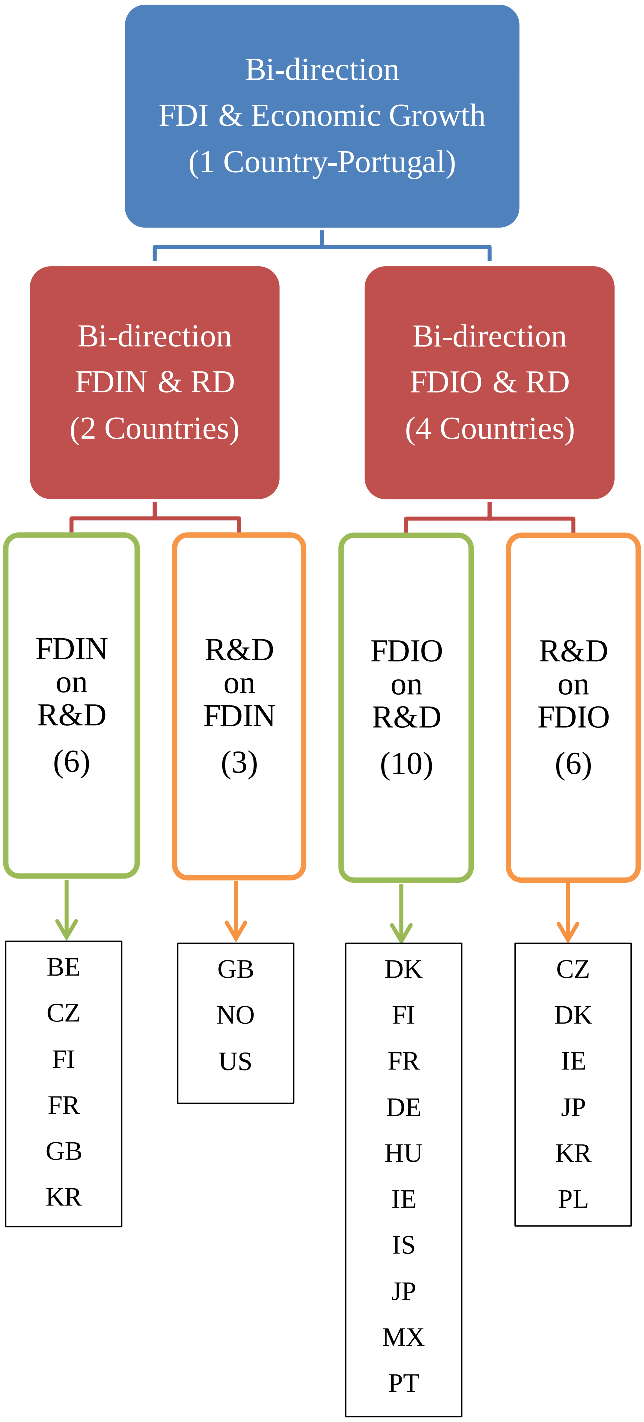
According to the regression result, the R & D and FDI inward flow had an tense relationship in most of the country. Therefore, if developed countries possess high technology, they would wish to conduct foreign investment in developing countries, thereby fuelling their efficiency seeking motivation instead of attracting foreign investment from another developed country. In this stage, developed countries had ownership comparative advantages over other countries. Subsequently, according to Vernon's product cycle model (1977), when the product is at the mature level, export to another country could maximise the return of profit.

7.2.2 Foreign Direct Investment Outward and R&D

Two single direction relationships exist under this bi-direction causality. In particular, the first one-way causality (FDI outward flows effect on R&D) includes ten countries. In terms of Denmark, France, Germany, Hungary, Iceland, Ireland, Japan, Mexico, and Portugal, the FDI outward will promote that their R&D significantly increased. The remaining country, Finland, showed an adverse influence of FDI outward flows on R&D. The reason could be that it had a high technology background, thereby proving that knowledge seeking is not their primary motivation. Thus, they do not need to use foreign investment to encourage their technology.

Moreover, the second single direction causality of R&D effects on FDI outward flows showed six countries in this relationship. Demark; in particular, indicated an increase in R&D factor and a decline in FDI outward flows. Thereofre, the government preferred spending more money on their innovation to improve their unique technology for a comparative advantage instead of conducting foreign investment in other countries. On the contrary, in Czech Republic, Ireland, Japan, Korea, and Poland, the current R&D variable had a significant positive influence on FDI outward flows. Thus, if technology improved in these countries, they might prefer to conduct investment in foreign countries.

Figure 7. 2 The Causality of Foreign Direct Investment and R&D by Country



Moreover, compared to Turkey and other OECD countries, the former turned out to be a conservative country. Tukey could not satisfy any of the six country profile factors, implying that it had a stringent market entrance policy, low level of knowledge input, and technology output. Therefore, if Turkey wanted to enhance their innovation, the better choice would be to invest in other countries and import mature products later. The country profile analysis will be displayed in section 7.4.

7.2.3 Stationary Test of Model

This section will discuss the stationary test for the VAR model. According to the inverse roots of AR characteristic polynomial of each country, eight countries are not stationary in the VAR model, when compared to the unit-root test in chapter 5. The results indicated that Iceland and Norway could not perform the VAR regression with the first different variable because the R&D variables in these two countries were not enough to pass the unit-root test. Therefore, the level of stationary in R&D variable could not be identified. However, the unit-root test of variables in Belgium, Czech Republic, Poland, and Slovakia did not have the same stationary level, thereby disallowing the VECM regression.

However, in Austria and the United Kingdom, the variables had a same stationary level after a re-run of the regression test. Subsequently, the result suggested that innovation had a positive influence on FDI inward flows in Austria. If newer technology was created in Austria, more foreign capital entered the country. Furthermore, in the United Kingdom, R&D had a significant positive effect on both inward and outward flows; whereas the FDI inward flows may reduce the speed of innovation. The next section will pool all of 30 OECD countries' data together and analyse the general relationship between foreign direct investment and innovation. Finally, the regression result will be compared in general causality and the individual countries will be able to interpret their differences.

7.3 Pooling Data Analysis

This section pools the 30 OECD countries together with FDI inward flows variable, FDI outward flows variable, and R&D variable to analyse the general relationship between foreign direct investment and technology. Table 7.31 gives information about the pooling data regression result. The regression result suggests that FDI inward flows in both lagged one-year variable and lagged two years variable did not have a significant influence on R&D variable. Therefore, regardless of the FDI inward flows in the host country, the technology or the development of R&D Department may not significantly change. However, FDI outward flows variable displayed a negative effect of R&D development in both lagged one-year variable and lagged two years' variable. Thus, if capital remove increases in a foreign country, it may be harmful to the technology development in the host country. This result may suggest that the government should focus on their technology development to get comparative ownership advantages, rather than blindly conduct investment abroad.

Contrarily, R&D lagged one-year variable had a positive influence on both inward and outward FDI flows, whereas the lagged two years of R&D variable indicated an adverse effect of FDI flows. This regression result suggested that technology should be constantly updated. For instance, when a new technology is introduced, almost every country will wish to be familiar with it. Therefore, initially, the developed countries could execute export to developing countries. However, at the end of the product life-cycle, new technology might replace the old one, and an updated product will be produced by other countries. This explains why the lagged two-year R&D had a negative influence in both FDI inward flows and outward flows, since the old technology could not profit the MNEs, nor could it bring foreign capital into their country.

Table 7. 1 Pooling Data Result

	FDINF	FDIOF	RD
FDINF(-1)	0.295***	-0.044	-0.003
	(0.045)	(0.054)	(0.009)
FDINF(-2)	0.101**	0.057	0.008
	(0.045)	(0.054)	(0.009)
FDIOF(-1)	0.045	0.531***	-0.011*
	(0.035)	(0.042)	(0.007)
FDIOF(-2)	-0.078**	-0.050	-0.028***
	(0.036)	(0.043)	(0.007)
RD(-1)	0.901**	1.926***	0.973***
	(0.402)	(0.483)	(0.078)
RD(-2)	-0.975**	-2.145***	-0.135*
	(0.401)	(0.481)	(0.077)
Constant	6,143.095	5,838.739	18,250.211***
	(8,324.650)	(9,982.530)	(1,604.606)
Export	-0.083***	-0.069***	-0.027***
	(0.019)	(0.022)	(0.004)
Import	0.125***	0.107***	0.047***
	(0.021)	(0.025)	(0.004)
DUMAUL	-1,721.658	-3,183.323	-18,334.313***
	(23,038.585)	(27,626.790)	(4,440.769)
DUMAUS	-7,342.762	-5,692.409	-19,000.397***
	(9,196.532)	(11,028.050)	(1,772.664)
DUMBEL	5,916.756	1,555.316	-21,337.699***
	(9,957.416)	(11,940.467)	(1,919.327)
DUMCAN	-693.521	-348.354	-20,056.511***
	(9,321.514)	(11,177.923)	(1,796.755)
DUMCZE	-6,467.534	-8,399.206	-19,235.458***
	(9,632.791)	(11,551.191)	(1,856.755)
DUMDEN	-6,915.012	-4,802.026	-18,953.251***
	(9,308.046)	(11,161.773)	(1,794.159)
DUMFIN	-5,425.294	-5,466.343	-18,467.921***
	(9,112.825)	(10,927.672)	(1,756.530)
DUMFRA	-9,291.138	3,059.329	-19,073.256***
	(9,103.155)	(10,916.076)	(1,754.666)
DUMGER	-9,938.404	7,721.638	-18,918.150***
	(10,347.231)	(12,407.914)	(1,994.466)
DUMGRE	-9,756.487	-11,196.733	-27,494.522***
	(10,223.724)	(12,259.810)	(1,970.659)

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: 'FDINF' means FDI Inward Flows; 'FDIOF' means FDI Outward Flows; 'DUABC' means Country's Dummy Variable (See Table 6.2 in Appendices).

Table 7.1 Pooling Data Result (Cont.)

	FDINF	FDIOF	RD
DUMHUN	-5,983.307	-7,125.997	-19,129.953***
	(9,542.356)	(11,442.746)	(1,839.323)
DUMICE	-6,075.058	-5,804.655	-18,409.994***
	(9,740.452)	(11,680.293)	(1,877.507)
DUMIRE	-2,521.914	-3,419.456	-19,137.709***
	(9,261.379)	(11,105.811)	(1,785.164)
DUMITA	-10,933.616	-6,565.363	-20,941.830***
	(9,450.313)	(11,332.372)	(1,821.581)
DUMJAP	-16,687.080**	14,890.099*	-6,895.459***
	(7,558.135)	(9,063.361)	(1,456.858)
DUMKOR	-13,192.848	-8,954.280	-16,339.785***
	(8,995.660)	(10,787.173)	(1,733.945)
DUMLUX	9,277.781	8,760.691	-18,335.508***
	(10,740.296)	(12,879.259)	(2,070.230)
DUMMEX	-3,483.795	-9,478.905	-22,182.638***
	(10,035.826)	(12,034.492)	(1,934.441)
DUMNET	-212.099	-331.642	-20,216.515***
	(9,652.249)	(11,574.525)	(1,860.505)
DUMNEW	-12,006.549	-6,723.779	-21,795.270***
	(13,506.594)	(16,196.474)	(2,603.444)
DUMNOR	-2,149.608	-2,191.628	-17,992.818***
	(9,989.794)	(11,979.292)	(1,925.568)
DUMPOL	-5,998.448	-7,854.639	-19,781.876***
	(9,550.970)	(11,453.075)	(1,840.983)
DUMPOR	-6,909.557	-7,417.431	-19,116.840***
	(9,217.874)	(11,053.642)	(1,776.778)
DUMSLO	-6,698.691	-6,973.166	-19,043.260***
	(9,638.207)	(11,557.685)	(1,857.799)
DUMSPA	-3,162.875	-3,204.915	-20,178.189***
	(9,321.887)	(11,178.370)	(1,796.827)
DUMSWE	-2,115.977	3,553.292	-19,356.681***
	(10,394.946)	(12,465.131)	(2,003.663)
DUMTUR	-8,107.839	-8,703.005	-19,712.181***
	(9,534.262)	(11,433.040)	(1,837.763)
DUMUK	8,325.777	12,217.222	-21,978.742***
	(10,022.274)	(12,018.241)	(1,931.829)

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: 'FDINF' means FDI Inward Flows; 'FDIOF' means FDI Outward Flows; 'DUABC' means Country's Dummy Variable (See Table 6.2 in Appendices).

Table 7.1 Pooling Data Result (Cont.)

	FDINF	FDIOF	RD
R-squared	0.717	0.656	0.996
Adj. R-squared	0.702	0.638	0.996
Obs.	702	702	702
F-statistic	46.900 (0.000)	35.292 (0.000)	4,737.554 (0.000)
Histogram-Normality	0.000	0.000	0.000
Serial Correlation	0.000	0.005	0.000
White Hetero-scedasticity	0.000	0.000	0.000

Notes: 'FDINF' means FDI Inward Flows; 'FDIOF' means FDI Outward Flows; 'DUABC' means Country's Dummy Variable (See Table 6.2 in Appendices).

7.4 Country Profile Analysis

This section will use four country profile factors to analyse the regression result and interpret the second causality in this thesis: the relationship between foreign direct investment and R&D. The second research question is, 'will the high technology in one country will attract MNEs to conduct investment into the host country?' since they have a comparative over other countries. Subsequently, if one country had a high technology, they might use the high-tech to invest in another country. Therefore, two more factors are added: knowledge input and knowledge and technology output, to interpret how R&D and FDI influenced each other. 30 OECD countries are divided into two groups. The first group focuses on if the country had an FDI regulatory restriction with 11 countries being a part of the group (see Table 7.32). The second group has no FDI regulatory restriction in their countries, with the remaining 19 countries (see Table 7.33).

Firstly, the first situation combines the regression result from Chapter 7. Korea indicated a bi-direction causality of FDI flows and R&D. FDI inward flows showed a negative effect of R&D, but a positive influence of R&D on FDI outward flows, implying that if higher technology is produced in Korea, more investment might be conducted in foreign countries. Moreover, in Iceland and Mexico, the regression result indicated that FDI outward flows had a positively significant influence on R&D. On the contrary, the regression result suggested that R&D had a significant effect on foreign direct investment in three countries. R&D indicated a positive effect of foreign direct investment inward flows in Norway and the United States, and showed a positive effect of FDI outward flows in Poland. Three of the remaining five countries, (Australia, New Zealand and Switzerland), did not have regression result because of a shortage in the R&D database. Two countries, (Canada and Austria), indicated no relationship between R&D and foreign direct investment.

The second situation suggested a lack of or weakness in FDI regulatory restriction of the country. 19 countries are considered in this situation. Seven of them (Netherlands, Sweden, Luxembourg, Spain, Italy, and Turkey) showed no relationship between FDI flows and R&D. The remaining 12 countries indicated that the regression result showed a bi-direction relationship and single-way causality from FDI to R&D, respectively.

Furthermore, in Denmark, Finland, Japan, Czech Republic, Ireland, and the United Kingdom, the regression result showed a bi-direction relationship between R&D and foreign direct investment. With regards to Denmark, Finland, Ireland and Japan, in particular, research and development and FDI outward flows had a positive effect on each other. Therefore, these countries might invest abroad more if they had a strong R&D department in their country. On the contrary, the United Kingdom showed that FDI inward flows and R&D had a positive influence on each other. Similarly, Finland might see improvement in R&D attract more inward investment entry into the country.

The second situation only includes a single direction relationship between FDI flows and R&D, including five countries, Germany, Belgium, France, Hungary, and Portugal. Foreign Direct Investment outward flows had a positive influence on R&D in Germany, France, Hungary, and Portugal. Therefore, outward FDI will support the government to focus more on the improvement of R&D. However, FDI inward flows showed a positive effect on R&D in Belgium as medium level of country profile factor. On the contrary, R&D had a negative effect of inward foreign direct investment in France, implying that inward FDI was not conducive to the development of R&D.

Table 7. 2 Situation 1: If the country has an FDI Regulatory Restriction

	Institutions	Market Sophistication	Knowledge Input	Knowledge and Technology Output	Summary	Relationship between FDI and R&D
Korea, Rep.	N*	Y*	N*	Y*	2Y2N	Bi-direction
Iceland	Y*	N*	N*	N*	1Y3N	FDI on R&D
Mexico	N	N	N*	N*	4N	FDI on R&D
United States	Y*	Y	Y*	Y	4Y	R&D on FDI
Norway	Y	N*	N*	N*	1Y3N	R&D on FDI
Poland	N*	N	N*	N*	4N	R&D on FDI
Canada	Y	Y	Y*	N*	3Y1N	None
Austria	Y*	N*	Y*	N*	2Y2N	None
Switzerland	Y*	Y	Y	Y	4Y	..
Australia	Y*	Y*	Y*	N*	3Y1N	..
New Zealand	Y	Y*	N*	N*	2Y2N	..

Notes: Y indicates the country has a high-level ranking in this country profile factor; Y indicates the country has an upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low-level ranking in this country profile factor.*

Table 7. 3 Situation 2: If the country does not have an FDI Regulatory Restriction

	Institutions	Market Sophistication	Knowledge Input	Knowledge and Technology Output	Summary	Relationship between FDI and R&D
Denmark	Y	Y*	Y*	Y*	4Y	Bi-direction
Finland	Y	Y*	Y	Y*	4Y	Bi-direction
Ireland	Y*	Y*	Y	Y*	4Y	Bi-direction
Japan	Y*	Y*	Y*	Y*	4Y	Bi-direction
United Kingdom	Y*	Y	Y*	Y*	4Y	Bi-direction
Czech Republic	N*	N*	N*	Y*	1Y3N	Bi-direction
Germany	Y*	N*	Y*	Y*	3Y1N	FDI on R&D
Belgium	Y*	N*	Y*	N*	2Y2N	FDI on R&D
France	N*	N*	Y*	N*	1Y3N	FDI on R&D
Hungary	N*	N	N*	N*	4N	FDI on R&D
Portugal	N*	N*	N*	N*	4N	FDI on R&D
Netherlands	Y*	Y*	Y*	Y*	4Y	None
Sweden	Y*	Y*	Y*	Y	4Y	None
Luxembourg	Y*	N*	Y	Y*	3Y1N	None
Spain	N*	Y*	N*	N*	1Y3N	None
Italy	N*	N*	N*	N*	4N	None
Turkey	N	N	N	N	4N	None
Slovakia	N*	N	N*	N*	4N	None
Greece	N*	N*	N*	N	4N	None

Notes: Y indicates the country has a high-level ranking in this country profile factor; Y indicates the country has an upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low-level ranking in this country profile factor.*

7.4 Conclusion

This chapter analysed the second research question about the relationship between foreign direct investment and technology in 30 OECD countries. According to the pooling data regression (See Table 7.1), no bi-direction relationship exists between FDI inward flows and technology. However, the technology had a diminishing effect on both FDI inward flows and outward flows, implying that the technology will support FDI flows at the current and lagged one year; while having a different influence in the following years. This could be due to the technology having timeliness and the requirement of being frequently updated, otherwise losing the ownership advantage in the global market.

By contrast, with individual countries (see Figure 7.3 to Figure 7.6), only the United Kingdom displayed bi-direction between FDI inward flows and technology, specifically that FDI inward flows and R&D had a positive influence on each other. In addition, in the bi-direction of FDI outward flows and technology, this causality in Japan had a positive influence on each other. However, Denmark showed a significantly positive effect on R&D; whereas the R&D had a negative influence on FDI outward flows.

Figure 7. 3 The Bi-direction of FDI Inward Flows and Technology

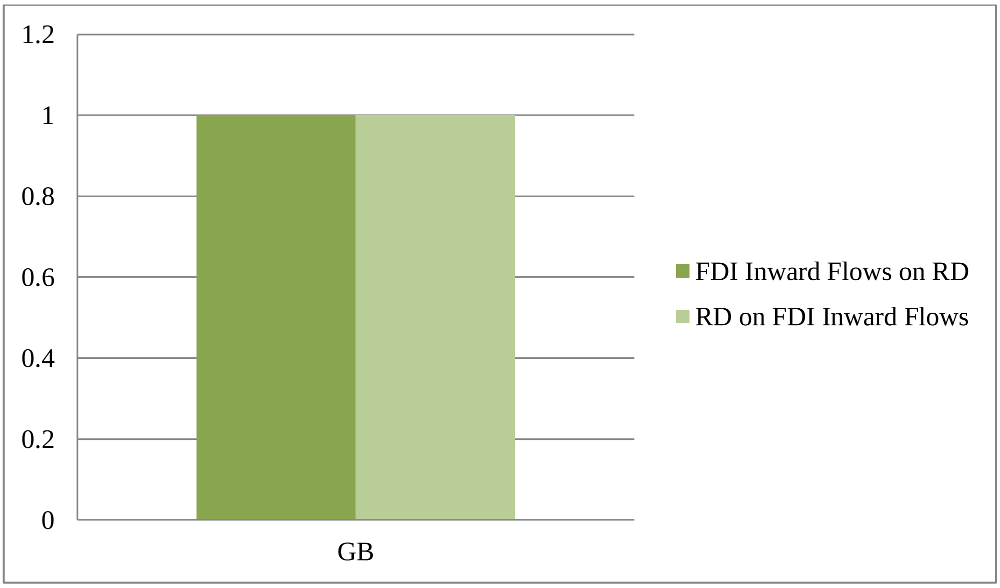
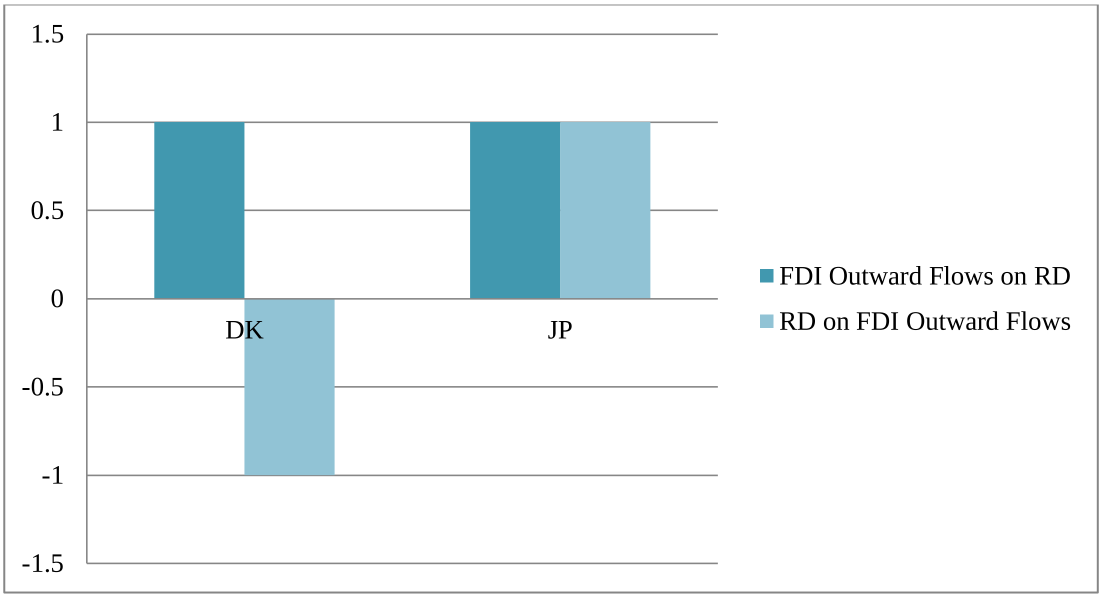


Figure 7. 4 The Bi-direction of FDI Outward and Technology



With regards to the single direction of FDI flows on technology, FDI inward flows had a positive influence on R&D in Belgium, Czech Republic, and Finland, with a negative influence on France and Korea. The remaining seven countries indicated that FDI outward flows could promote technology development (see Figure 7.5). In terms of the second single direction relationship from technology to FDI flows, for instance, Czech Republic, Ireland, Korea, and Poland showed that R&D had a positive effect of foreign direct investment inward flows. Additionally, in Norway and the United States, R&D indicated a positive influence on foreign direct investment outward flows. The pattern of the relationship between FDI and technology will be discussed further in Chapter 9, with the regression result of 27 countries attached in the Appendices of this Chapter.

Figure 7. 5 The Single Direction: FDI Flows on Technology

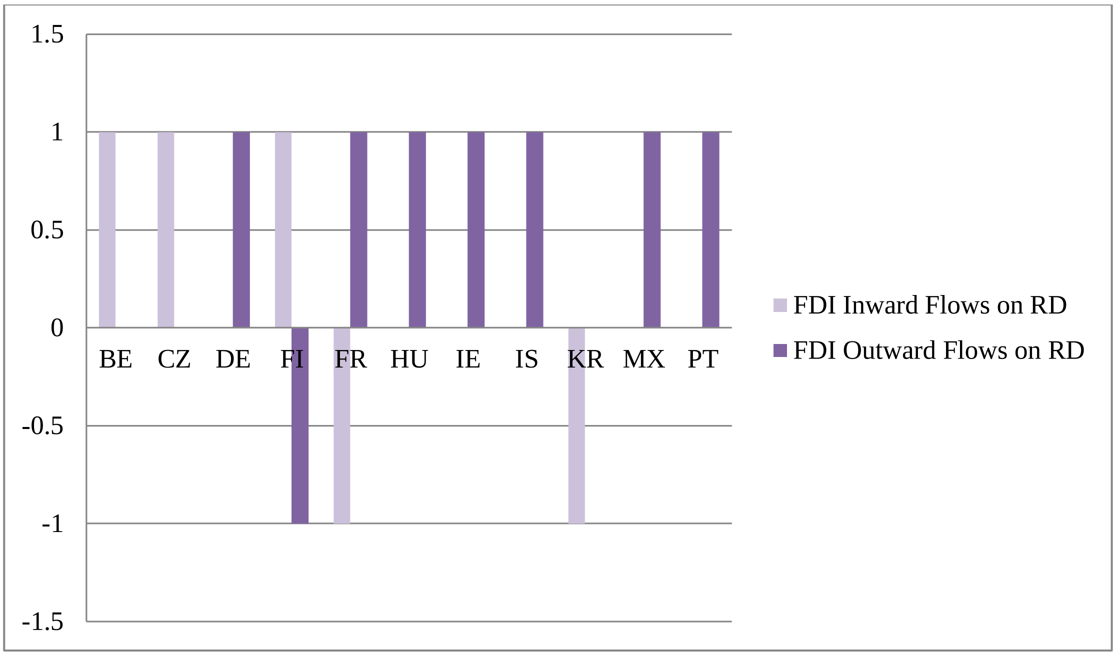
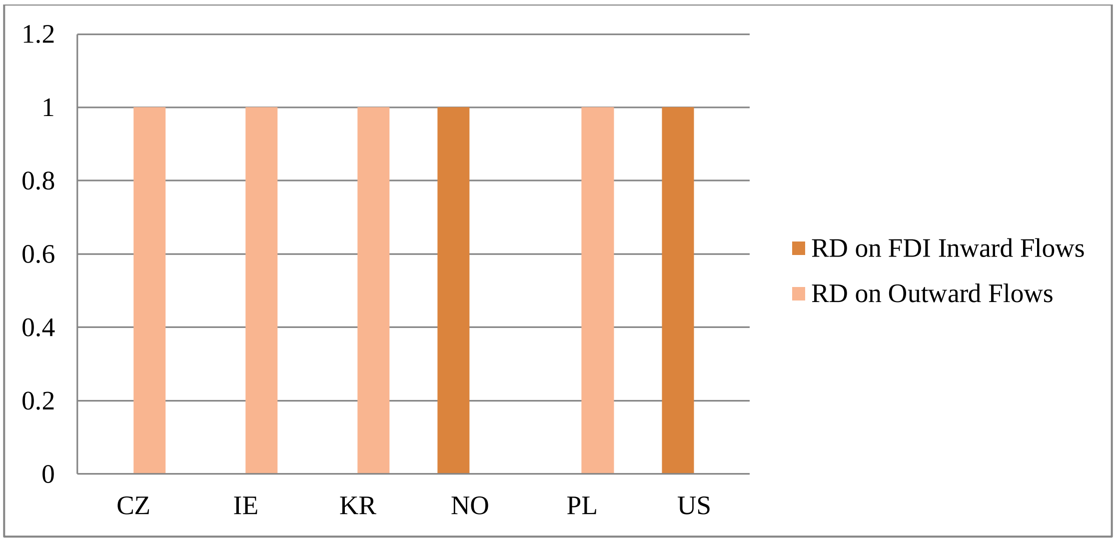


Figure 7. 6 The Single Direction: Technology on FDI Flows



Chapter 8 Empirical Study 3: The Causality of FDI and International Trade

8.1 Introduction

This chapter will talk about the last empirical study in the thesis: causality of foreign direct investment and international trade. The primary purpose of this chapter is to answer the third research question, could the FDI and trade be ‘complementary’ or is their relationship a ‘substitute’ for each other?’ The same database and vector-auto-regression model is used to analyse this research question. The regression result is in the alphabetical order and listed in Appendix. The variables of ARDL consist of FDI inward flow, FDI outward flows, and export, import.

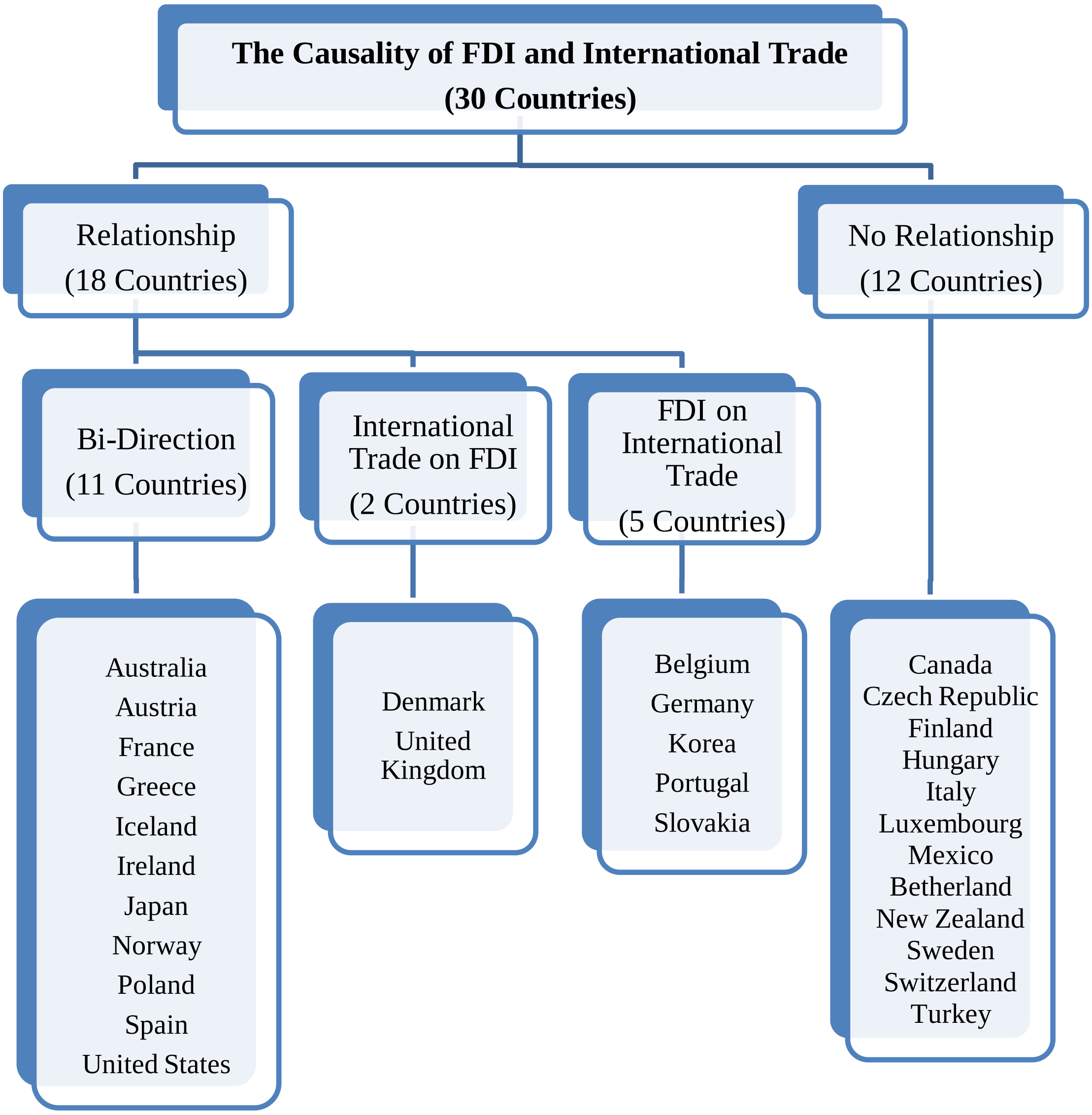
With regards to interpreting the relationship between foreign direct investment and international trade, it will be divided into into two categories: to analyse the effect of international trade on FDI, and to measure the effect of FDI on international trade. Total eight small relationships will be looked at in these two categories. However, four of them are the crucial relations and will be discussed in further detail. These four key relationships are: the effect of import on FDI inward, the effect of FDI inward on import, the effect of export on FDI outward, and the effect of FDI outward on export.

In addition, the six country profile factors will also be considered to analyse the regression result. Those factors are: FDI regulatory restriction, institutions, market sophistication, product market regulation, knowledge input, and knowledge and technology output. The characteristics of each factor are in chapter 4.

The structure of this chapter is as follows:

- Section 8.2 will explain the influence of international trade on FDI in details
- Section 8.3 will discuss the effects of FDI on international trade
- Section 8.4 will consist of the residual analysis for VAR model and the country profile analysis
- Section 8.5 will include the conclusion of the chapter

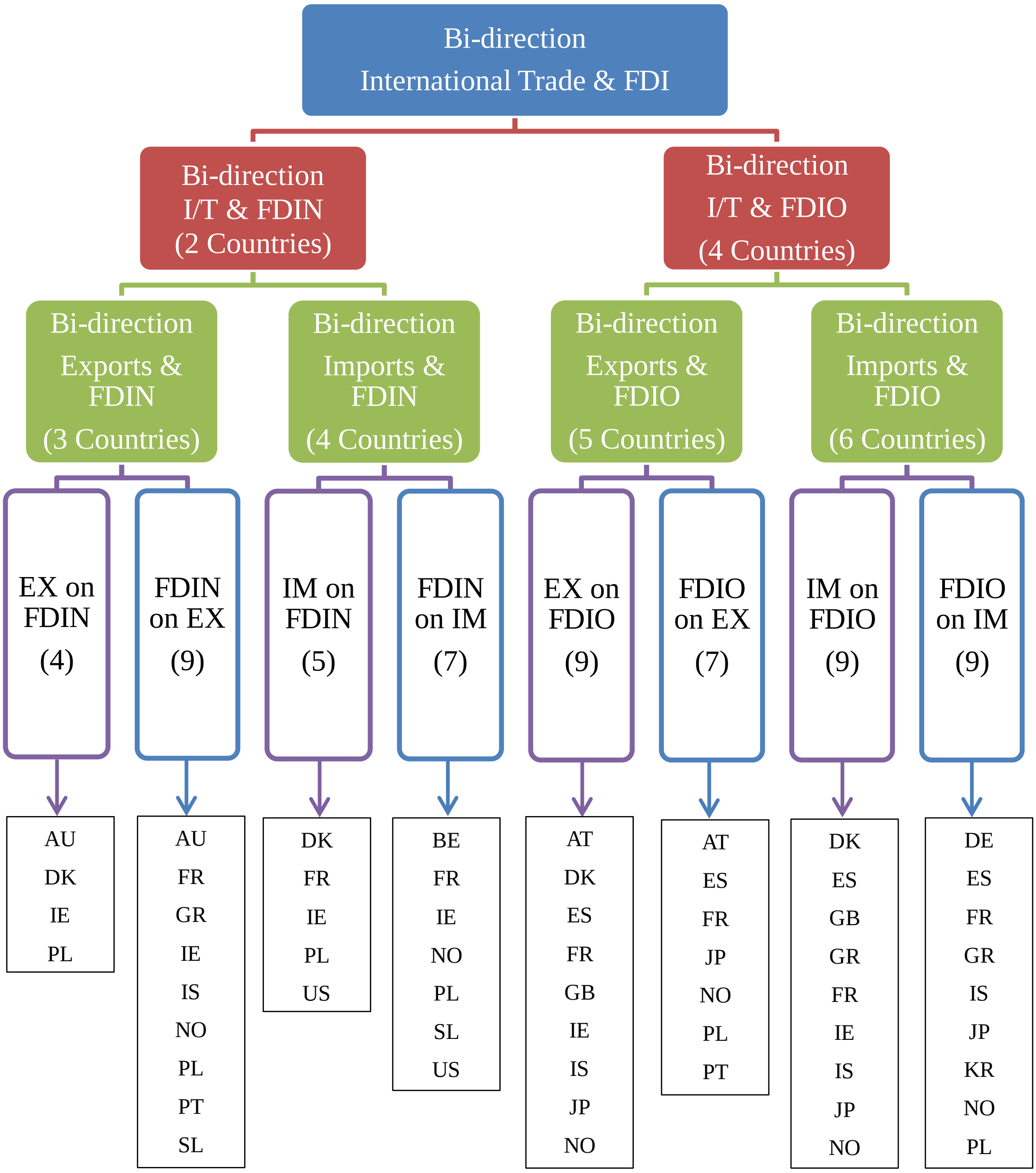
Figure 8. 1 Summary of the Relationship between FDI and International Trade



8.2 The Causality of Foreign Direct Investment and International Trade

This section will discuss the relationship between foreign direct investment and international trade, divided into two sub-sections: the effect of international trade on FDI, and the effect of FDI on international trade. Each sub-section has four more links among FDI inward, FDI outward, import, and export. In terms of econometrics, GDP will be exogenous variable and the regression result of 30 countries is attached from page 251 to page 310. Figure 8.2 indicates the details of countries in eight coloured boxes (4 in purple and 4 in blue) at the fourth level (from top to bottom), presenting different causalities of FDI and trade. The details of the F four purple boxes will be explained in section 8.2.1, followed by the details of relationship in the blue boxes in section 8.2.2. Furthermore, the Figure uses country code, the details of which will be displayed in the Appendix.

Figure 8. 2 The Relationship between FDI and Trade by Country



8.2.1 International Trade on Foreign Direct Investment

a) Exports on FDI inward flows

According to the first purple box, four countries indicate that export affects FDI inwards. In Australia and Ireland, the current year of export has a positive effect on inward FDI. In addition, the lagged one year of exports variable indicated a significant positive influence on foreign direct investment inward flows in Denmark and Poland. Therefore, the exports in these countries could attract more investment.

b) Exports of FDI outward flows

Several empirical studies analysed this relationship and the effect of FDI outwards on exports. The purpose of these studies is to find a way to explore the precise causality of exports and FDI outwards. Some of them think the exports and FDI outwards should be ‘complementary’, but others believe their relationship could also be ‘substitutes’.

This thesis found that the exports of nine countries had a relationship with FDI outward. In Australia, France, Iceland, Ireland, Norway, and Portugal, the export (current year variable or lagged one year variable) indicated that a significant positive effect on current FDI outward. However, the remaining three countries (Greece, Poland, and Slovakia) have an opposite effect on the FDI outward flow. According to the description of regression result a precise conclusion cannot be derived about the relationship between export and FDI outward. Consequently, the thesis discussed the effect of FDI outward on export in section 6.3.1 to get more information..

c) Imports on FDI inward flows

Five countries showed that imports affect FDI inwards. Out of those, four countries indicated that imports in current year or lagged one year variable had a negative influence on current FDI inwards. Furthermore, only Poland displayed that the current year variable of imports had a positive sign for inflows FDI. The remaining countries, Denmark, France, Ireland, and the United States showed opposite signs of imports at the current year and lagged one year variable.

This relationship is similar to the former one between exports and outward FDI. It is also important to consider whether the inward FDI may ‘substitute’ import or if it has a ‘complementary’ relationship with import. The relationship of inward FDI on import should be compared to get the more accurate result .

d) Imports on FDI outward flows

This relationship consists of 33.3% (3 countries out of 9) countries that indicate a negatively significant relation of imports in the current year or lagged one year variable on current FDI outwards. Only Denmark shows that imports in lagged 1 year had a positive effect on FDI outwards. The last four countries, France, Greece, Japan, and Spain showed a positive significant effect of current FDI outward flows. Iceland, in particular, indicated a positive influence on both the current year of imports variable and lagged one-year variable. It is important to compare the coefficient of these two variables and find out which variable’s influence is more advantageous for FDI outward.

8.2.2 Foreign Direct Investment on International Trade

a) FDI outward flows on exports

Seven out of four countries under this relationship showed a significantly negative effect, with three of them indicating a positively significant effect. In terms of the negative effect of this relationship, France and Spain displayed that the current year of export variables works on this influence, whereas the other two countries, Austria and Portugal, the variable of exports lagged one year. On the contrary, the current year FDI outflows variable in Norway had a positive significant influence on current exports, but in Japan and Poland, this influence made by exports lagged one-year variable.

b) FDI outward flows on imports

This relationship showed that nine countries indicated that their FDI outward had a positively significant effect on import. Greece and Iceland, in particular, showed the variable of FDI outward current year and lagged one-year variable both showed a strong positive influence, while only FDI outward at current year variable had the same effect in other countries (France and Spain). Moreover, this causality in Denmark, Korea, Norway, and Poland was negative, implying that the current year FDI outward variable or the lagged one-year FDI outward may reduce the magnitude of the current import. The sign of FDI outward current year variable and FDI lagged one-year variable were opposite in Japan. Thus, the key is to consider the coefficient.

c) FDI inward flows on exports

Nine countries are displayed in this relationship, concerning that the FDI inward (current year or lagged one-year) variable had an influence on current exports. Six countries showed significantly positive effects in the relationship: Australia displayed the effect of FDI inward current year variable; the variable of FDI inward lagged one-year in Norway and Portugal; these variables of FDI inward flows both worked on current export in France, Iceland, and Ireland. Furthermore, the remaining three countries showed a negative effect for FDI inward on exports, including Greece, Poland, and Slovakia.

d) FDI inward flows on imports

The final relationship to be discussed in this chapter is the important causality of foreign direct investment and international trade . The causality of the general idea of whether the FDI inward and import is ‘complementary’ or ‘substitute’ for each other is analysed.

Five of the seven countries indicated a significant adverse effect of FDI inward variable on current import. France and Ireland, in particular, displayed that both current year FDI inward and lagged one-year variable had a negative correlation between FDI inward and import. Therefore, the relationship between inward FDI and import may display ‘substitute’. However, the remaining two countries, Poland and Slovakia, showed a positively significant influence of this causality. Moreover, in Poland, the variable of FDI inward at current year, and FDI lagged one-year both indicated a positive effect on this relationship. Hence, the FDI inward supported the import, are ‘complementary’.

8.2.3 Pooling Data Analysis

This section will analyse the regression result of the causality of foreign direct investment and international trade with the pooling data (See Table 8.31). The regression includes FDI inward flow, FDI outward flows, export, and import as an endogenous variable, and GDP as exogenous variable. In addition, dummy variables of each country were present to control the country variable. The regression result indicated that both FDI inward flows and FDI outward flows had no significant effect in both export and import in OECD countries, except that the lagged one year of FDI outward flows had a positive significant effect on import.

On the contrary, export and import variable showed an opposite influence on FDI inward flows. The regression result displayed that export lagged one year will have an adverse effect on FDI inward flows, but import lagged one-year variable showed support for inward FDI flows. However, the export and import variables displayed that no significant impact on export. Therefore, in general, the export and FDI outward flows could not be either 'complementary' or 'substitute' causality. Consequently, no bi-direction relationship exists between FDI inward flows and import, but a single way displayed that import will be 'complementary' with FDI inward flows.

Table 8. 1 Pooling Data Regression Result

	FDINF	FDIOF	Export	Import
FDINF(-1)	0.209**	0.181***	5.153***	5.065***
	(0.094)	(0.057)	(3.332)	(3.284)
FDINF(-2)	0.155***	0.087***	2.578***	2.504***
	(0.098)	(0.059)	(3.466)	(3.416)
FDIOF(-1)	0.442***	0.450***	-0.181	-0.185
	(0.099)	(0.060)	(3.503)	(3.453)
FDIOF(-2)	0.312***	0.201***	6.932***	6.764***
	(0.115)	(0.069)	(4.049)	(3.990)
Export (-1)	-0.240***	0.190*	-22.099***	-22.401***
	(0.112)	(0.067)	(3.950)	(3.892)
Export (-2)	0.031	0.053	-0.220	-0.270
	(0.052)	(0.031)	(1.825)	(1.799)
Import (-1)	0.237***	-0.199***	22.248***	22.556***
	(0.113)	(0.068)	(4.000)	(3.942)
Import (-2)	-0.037	-0.057	0.107	0.161
	(0.052)	(0.032)	(1.848)	(1.821)
Constant	-209.790***	-55.243***	-9,344.282***	-9,223.872***
	(10.602)	(6.391)	(374.141)	(368.732)
GDP	0.217***	0.065***	9.620***	9.495***
	(0.005)	(0.003)	(0.167)	(0.164)
R-squared	0.742	0.553	0.815	0.816
Adj. R-squared	0.739	0.549	0.813	0.814
Obs.	904	904	904	904
F-statistic	286.127 (0.000)	123.184 (0.000)	437.461 (0.000)	439.799 (0.000)
Histogram-Normality	0.000	0.000	0.000	0.000
Serial Correlation	0.216	0.224	0.058	0.057
White Hetero-scedasticity	0.000	0.000	0.000	0.000

*** p<0.01, ** p<0.05, * p<0.1

Notes: 'FDINF' means FDI Inward Flows; 'FDIOF' means FDI Outward Flows.

8.3 Stationary test of Model

As mentioned in the introduction section, original data will be used to measure the model, but the unit-root for each variable in each country will be checked. The result of unit-root test is displayed in Appendix of chapter 4. According to the regression result, only five countries indicated that the model is not stationary, including Austria, Germany, Japan, Portugal, and Turkey. Subsequently, re-run of the model with first differential data in these countries was conducted, (the unit-root test indicated the variables are stationary in I (1), except Turkey), the regression result of which, is displayed in the Appendix (Section 8.3). Each country has a graph of inverse roots of the AR characteristic polynomial, and a table that shows the residual correlation matrix of each variable. The results for Turkey could not be interpreted because the FDI is stationary at I (2), but GDP, import, and export are stationary at I (1). Thus, Turkey is not discussed under this Model. The details of each country will be discussed below.

The variable of changing export in Austria both lagged one year and in lagged two years, with the variable of changing import lagged in one year or in lagged two years, having no significant effect on the current changing FDI inward and changing FDI outward variable. However, the changing FDI outward lagged two-years variable showed a negatively significant effect on changing international trade. Moreover, the changing FDI inward lagged one-year variable also showed significant but positive effect on changing of export variable at the current time.

In Germany, the evolution of exports lagged one-year variable had an adverse effect on changing current FDI. However, the changing FDI outward lagged one year had a significantly positive force on current export and import at changing level. Furthermore, the import lagged one-year variable in changing level also indicated a significant positive effect on current FDI inward at changing level.

In Japan, the export lagged one year at changing level had a negative effect on current FDI at changing level. Furthermore, in the relationship between export and FDI outward, Japan displayed significant, but positive force on export lagged one year on FDI outward, and adverse effect of FDI outward lagged one year on export. Under the causality of FDI inward on import at a changing level, the lagged two-years variable of FDI inward had a negative effect on current changing import variable.

In Portugal, no significant signal indicated that the FDI at changing level affects international trade at changing level. However, some necessary force on international commerce exists on FDI. For instance, the lagged variable of changing export and import showed a negative influence of current FDI inward variable at the changing level. Simultaneously, the lagged one year and lagged two-years variable had an opposite effect on changing the level of FDI outward variable.

8.4 Country Profile Analysis

The first research question addressed the relationship between foreign direct investment and international trade. The conclusion part, will use all the six country profile factors to define the pattern flows of FDI and international trade in 30 OECD countries. The regression result is shown in Chapter 8. The six factors are: FDI regulatory restriction, institutions, market sophistication, product market regulation, knowledge input, and knowledge and technology output.

We divided 30 countries into two situations: the first situation focuses on the country having an FDI regulatory restriction including 11 countries (See Table 8.2). The second situation discusses if the country does not have an FDI regulatory restriction with the remaining 19 countries under this condition (See Table 8.3). The table uses ‘Y’ to indicate if one country has a strong comparative advantage in this sector; ‘N’ indicates if a country has a comparative weakness advantage over other OECD countries. Moreover, ‘Y*’ indicates that the country has a relatively strong comparative advantage (the score above the average), and ‘N*’ indicates that it has a relative weakness comparative advantage (the score below the average).

The condition of the first situation is that the country has an FDI regulatory restriction, with five countries (Australia, Austria, Iceland, Norway, and the United States) indicating a bi-direction relationship between FDI and international trade, which occupied 45% (5 out of 11 countries). Australia and the United States, in particular satisfied any four country profile factors, implying that they had a comparative advantage in the institution's environment with a flexible local market and a relatively friendly competition environment. The United States showed that import and inward FDI flow had a positive bi-direction relationship. Therefore, the import and inward FDI flow could be ‘complementary’. Furthermore, FDI inward flows had a positive effect on each other, thereby proving that when inward FDI flows increased in Canada, the amount of international trade may also increase.

However, a positive sign was observed over the relationship between FDI outward flows and exports in Norway and Austria. As a result, this relationship could be ‘complementary’. Iceland, showed a positive sign between imports and FDI outward flows, which indicated that when increased export flow moves on to another country, the inward FDI flow will increase to Iceland but decrease the amount of FDI outflows. Therefore, imports and FDI inward flows could become ‘substitute’ in Iceland.

Three of the remaining six countries in the first situation, (Canada, Switzerland, and Mexico) showed no relationship between FDI and international trade, whereas the other three countries (Korea and Poland) indicated that FDI had an impact on international trade. FDI outward flows in Austria had an adverse effect on import flow. Thus, increased investment into another country may reduce the number of trade flows. In Poland, where FDI outward will support export, the relationship could be ‘complementary’, but at the same time, FDI inward flows will have a weakening negative effect on export. The same situation exists in FDI inward flows and import, which had a positive influence between these two variables. As a result, they are ‘complementary’. However, the lagged one-year of FDI outward flows indicated a negative effect of import flows in Poland.

The second situation indicated no FDI regulatory restriction in a country. According to Table 9.6, five of the 19 countries had a bi-direction relationship between FDI and international trade, and eight countries showed no relationship, which occupied 26.3% and 42.1%, respectively. For instance, both import flow in Ireland and Japan support FDI outward flow in their country. Therefore the export (import) and FDI outward could have a ‘complementary’ relationship. Furthermore, in Greece, export and FDI inward flow had a positive bi-direction relationship that could become ‘complementary’.

On the contrary, the regression result in Spain suggested that export had a negative support to FDI outward flow, and at the same time, FDI inward flow showed a decrease in export. Therefore, it is a ‘substitute’ relationship. By contrast, FDI inward flows and imports had a positive effect on each other. Greece had a bi-direction causality, with import and FDI inward flow having a positive effect on each other. Therefore, the import and FDI inward flow in Italy could be ‘complementary’.

Furthermore, in the single direction, three countries (Belgium, Germany and Portugal) showed that FDI had an influence on trade. Three other countries (Denmark, Slovakia and the United Kingdom) satisfied a one-way relationship from trade to FDI. The first single direction will be discussed in detail for Belgium, where FDI inward flows had a negative effect on imports. Therefore, FDI inward flow in this country had a ‘substitute’ relationship. In Portugal, the FDI inward flow and outward flow only worked on the export; and the regression result indicated that the FDI inward flow had an increased effect on export, but at the same time, FDI outward flow will experience a decrease of influence. Thus, the FDI outward flow and export in Portugal could be ‘substitute’. Moreover, in Germany, the regression result showed that FDI outward flows indicated a positive influence on imports, implying a ‘complementary’ causality between these two variables. Lastly, in Slovakia, foreign direct investment inward flows had a positive influence on import, and a negative effect on exports. It could not be identified whether they were ‘complementary’ or ‘substitute’.

On the contrary, the second single direction is that the trade affects foreign direct investment. In both Denmark and the United Kingdom, export flows showed a negative effect on foreign direct investment outward flows, but the imports indicated a positive influence on FDI outward flows. It could not be observed whether a ‘complementary’ or ‘substitute’ relationship exists in these two countries.

Table 8. 2 Situation 1: If the country has an FDI Regulatory Restriction

	Institutions	Market Sophistication	Product Market Regulation	Knowledge Input	Knowledge and Technology Output	Summary	Relationship between FDI and International Trade
Australia	Y*	Y*	Y*	Y*	N*	4Y1N	Bi-direction
United States	Y*	Y	N*	Y*	Y	4Y1N	Bi-direction
Austria	Y*	N*	Y*	Y*	N*	3Y2N	Bi-direction
Iceland	Y*	N*	N*	N*	N*	1Y4N	Bi-direction
Norway	Y	N*	N*	N*	N*	1Y4N	Bi-direction
Korea, Rep.	N*	Y*	N	N*	Y*	2Y3N	FDI on Trade
Poland	N*	N	N*	N*	N*	5N	FDI on Trade
Canada	Y	Y	Y*	Y*	N*	4Y1N	None
Switzerland	Y*	Y	N*	Y	Y	4Y1N	None
New Zealand	Y	Y*	Y*	N*	N*	3Y2N	None
Mexico	N	N	N	N*	N*	5N	None

Notes: Y indicates the country has a high-level ranking in this country profile factor; Y indicates the country has an upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low-level ranking in this country profile factor.*

Table 8. 3 Situation 2: If the country does not have an FDI Regulatory Restriction

	Institutions	Market Sophistication	Product Market Regulation	Knowledge Input	Knowledge and Technology Output	Summary	Relationship between FDI and International Trade
Ireland	Y*	Y*	Y*	Y	Y*	5Y	Bi-direction
Japan	Y*	Y*	Y*	Y*	Y*	5Y	Bi-direction
Spain	N*	Y*	Y*	N*	N*	2Y3N	Bi-direction
France	N*	N*	N*	Y*	N*	5N	Bi-direction
Greece	N*	N*	N*	N*	N	5N	Bi-direction
Germany	Y*	N*	Y*	Y*	Y*	4Y1N	FDI on Trade
Belgium	Y*	N*	Y*	Y*	N*	3Y2N	FDI on Trade
Portugal	N*	N*	Y*	N*	N*	1Y4N	FDI on Trade
Slovakia	N*	N	Y*	N*	N*	1Y4N	FDI on Trade
Denmark	Y	Y*	Y*	Y*	Y*	5Y	Trade on FDI
United Kingdom	Y*	Y	Y	Y*	Y*	5Y	Trade on FDI
Finland	Y	Y*	Y*	Y	Y*	5Y	None
Netherlands	Y*	Y*	Y	Y*	Y*	5Y	None
Luxembourg	Y*	N*	N*	Y	Y*	3Y2N	None
Sweden	Y*	Y*	N*	Y*	Y	3Y2N	None
Czech Republic	N*	N*	Y*	N*	Y*	2Y3N	None
Hungary	N*	N	Y*	N*	N*	1Y4N	None
Italy	N*	N*	Y*	N*	N*	1Y4N	None
Turkey	N	N	N	N	N	5N	None

Notes: Y indicates the country has a high-level ranking in this country profile factor; Y indicates the country has an upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low-level ranking in this country profile factor.*

8.5 Conclusion

This chapter analysed the causality of foreign direct investment and international trade. The main findings are displayed in Figure 8.2, which shows the summary of 30 OECD countries under different relationships. According to Figure 8.2, 12 countries displayed no relationship between foreign direct investment and international trade. However, 18 countries indicated a one-way or bi-direction causality of FDI and international trade. Out of these 18 countries, 11 indicated bi-direction links between FDI and commerce, while three showed that international trade had a one-way direction to FDI and the remaining four countries displayed the FDI affects international trade.

As mentioned in the introduction part, four significant links will be focused on in this chapter, the details of which will be discussed in section 8.2. In the conclusion section, these links are combined into two bi-directions relationships, consisting of the relationship between FDI inward flow and import (Figure 8.3), and the relationship between FDI outward and export (Figure 8.4). Additionally, it includes information on two different single direction ties: the single direction of trade on FDI (Figure 8.5), and another single direction of FDI on trade (Figure 8.6).

The bi-direction of FDI inward and import consists of four countries (France, Ireland, Poland, and the United States) under this relationship. For instance, in Poland and the United States, both the FDI inward and import indicated a positive effect on each other. As a result, increased FDI inward will attract more import. Therefore, FDI inward and import indicated a ‘complementary’ relationship with each other. On the contrary, the FDI inward and import both had an adverse effect on each other. Thus, a ‘substitute’ link exists between FDI inward and import in France and Ireland.

Five countries including Austria, France, Japan, Norway, and Spain come under the relationship of bi-direction of FDI outward and export. According to Figure 8.4, only France and Spain indicated that the FDI outward and export are ‘complementary’. The actual causality between FDI outward and export of the remaining countries, could not be identified.

Figure 8. 3 The Bi-direction of FDI Inward Flows and Import

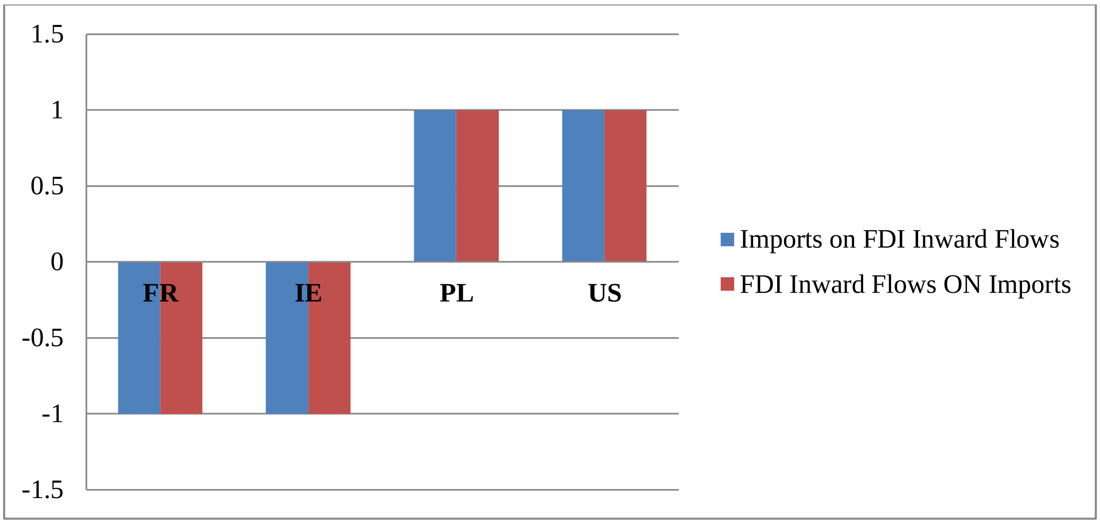
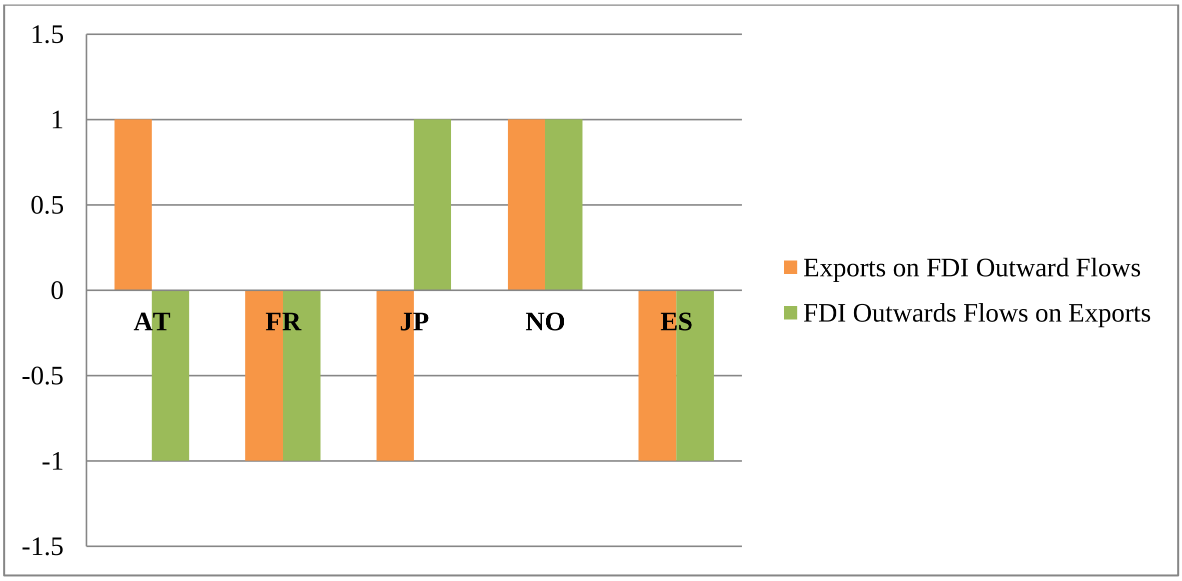


Figure 8. 4 The Bi-direction of FDI Outward Flows and Export



Two more single directions are displayed in figure 8.5 and 8.6. Under the first one-way direction, both export and import in Denmark and the United Kingdom had an opposite effect on FDI. They indicated that export had a positive influence on FDI, but an adverse effect of import. Finally, figure 8.6 indicates a single direct effect of FDI on trade, and only one country indicates that both FDI inward and FDI outward had an adverse effect on trade. Moreover, FDI inward flows had a negative influence on trade in Belgium and Slovakia, and a negative effect of FDI outward flows on trade in Denmark and Korea.

Figure 8. 5 The Single Direction: Trade on FDI Flows

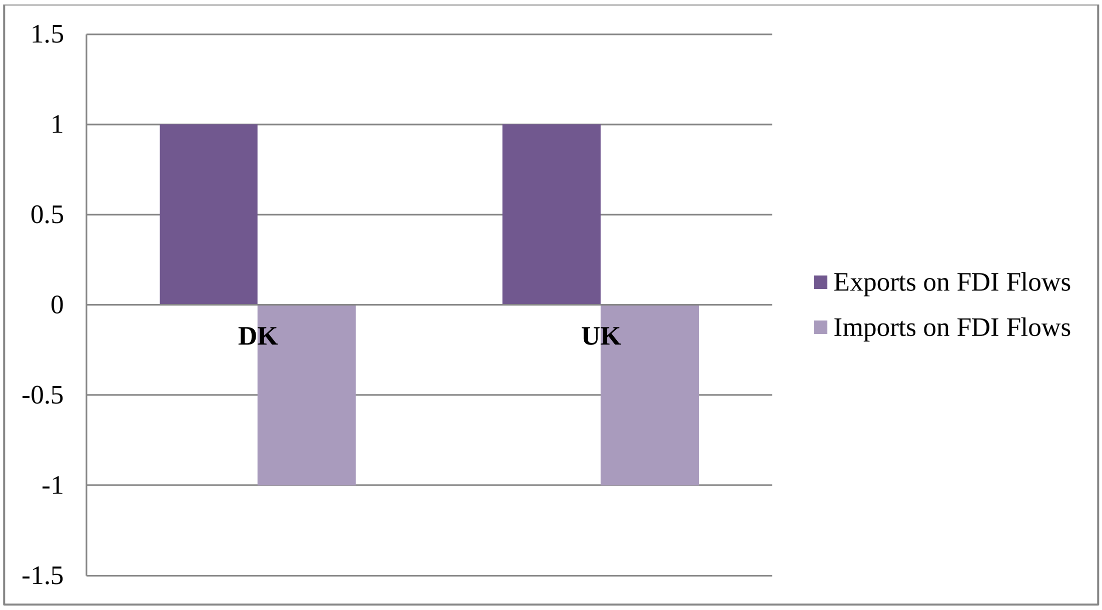
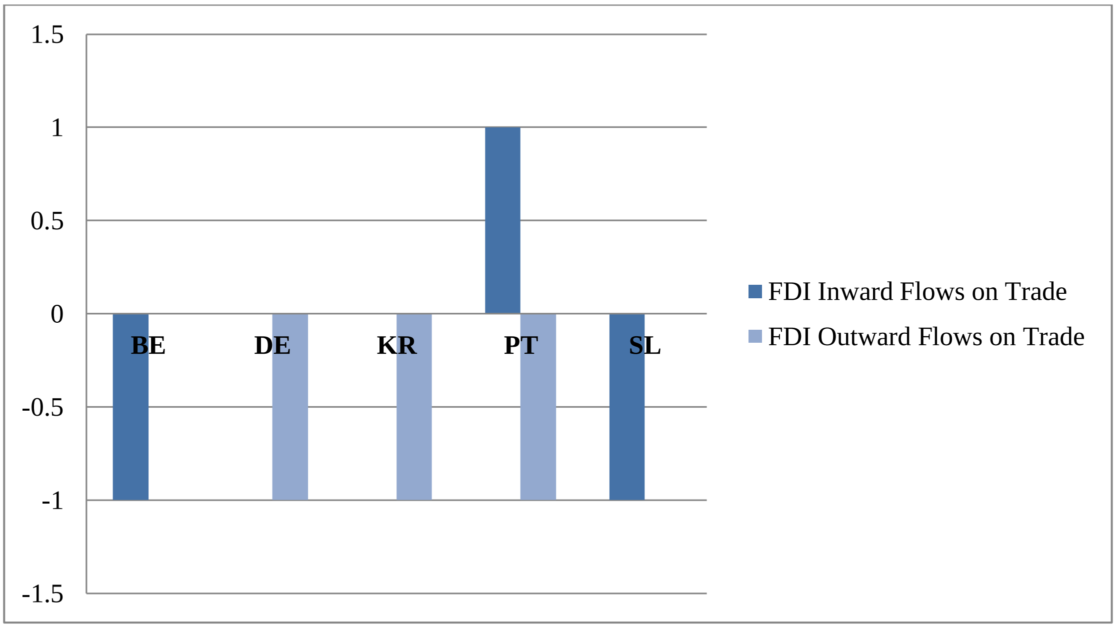


Figure 8. 6 The Single Direction: FDI Flows on Trade



Chapter 9: Conclusions

9.1 Thesis Summary

The thesis began with the motivations to investigate the interplay of international trade, technology, economic growth, and foreign direct investment (See Chapter 1). Subsequently three research questions analysed three causalities among four factors. The value was added in this thesis using time series data to analyse 30 OECD countries with their country characteristics, since no scholars paid enough attention to this type of study in recent years. Chapter 2 reviewed several theories of foreign direct investment development in the international business sector. For example, Dunning's work in 1958 provided background knowledge, alongside Hymer's FDI theory (1976), Dunning's OLI theory (1977), Kojima's FDI location theory (1978), Dunning's IDP theory, and Vernon's product life-cycle model (1966).

Chapter 3 reviewed many empirical studies from other researchers to get more information about the current research status in the foreign direct investment area. Gaps and weakness emerged from these previous studies, thereby providing material for analysis in this thesis. Groups of countries in the OECD organisation were chosen to analyse whether the causalities have changed in the last 35 years. The data description of FDI, trade, R&D and economic growth in each country can be found in Chapter 4. The econometric method used in this thesis includes VAR (vector auto-regression) model ARDL (autoregressive distributed lag) model, Engle-Granger method, and pooling data analysis method, which provided a complete picture of the connection in each factor (See Chapter 5).

The following three chapters included three empirical studies. Chapter 6 measured the causality of foreign direct investment and economic growth. The relationship between foreign direct investment and local R&D activities are presented in chapter 7. The final empirical study is displayed in chapter 8 to interpret the link between foreign direct investment and international trade. The structure of this final chapter is as follows:

- Section 9.2 will interpret the main findings in three subsections
- Section 9.3 will discuss the limitation of this thesis
- The final section will focus on and the implication of future research

9.2 Overview of Main Findings

This section will discuss the main findings from empirical studies, and try to answer the three research questions stated in Chapter 1. Initially, we restate the classification of the country profile to have a clear understanding of the findings. Firstly the FDI regulatory restriction factor will divide 30 OECD countries into two categories (See Table 9.1). The definition of these factors is displayed in Chapter 4 (Data Description). Therefore, the first category is named: the first situation, which presents if the country has an FDI regulatory restriction of 11 countries. The second category is situation 2,indicating that the country does not have an FDI regulatory restriction in the remaining 19 countries.

Table 9. 1 Countries in Two Situations

Situation 1: The Country has an FDI Regulatory Restriction	Situation 2: The country does not have an FDI Regulatory Restriction
Australia	Belgium
Austria	Czech Republic
Canada	Denmark
Iceland	Finland
Korea, Rep.	France
Mexico	Germany
New Zealand	Greece
Norway	Hungary
Poland	Ireland
Switzerland	Italy
United States	Japan
Total Numbers of Countries in Situation 1: 11 Countries	Luxembourg
	Netherlands
	Portugal
	Slovakia
Total Numbers of Countries in Situation 2: 19 Countries	Spain
	Sweden
	Turkey
	United Kingdom

Each situation has four levels of country profile, including high level, upper average level, lower average level, and low level. A different number of country profile factors are used to analyse the regression result in all the empirical studies. Thus, the summary of factors is different. Table 9.2 shows the classification of country profile factors in three empirical studies.

Table 9. 2 Classification of Country Profile

Empirical Study 1: Causality of FDI and Economic Growth	**Empirical Study 2: Causality of FDI and R&D**	**Empirical Study 3: Causality of FDI and International Trade**	**Country Profile Level**
No. of Country Profile Factors: 3	No. of Country Profile Factors: 4	No. of Country Profile Factors: 5	
3Y	4Y	5Y	**High Level**
2Y1N	3Y1N 2Y2N	4Y1N 3Y2N	**Upper Average**
1Y2N	1Y3N	2Y3N 1Y4N	**Lower Average**
3N	4N	5N	**Low Level**

Notes: 'Y' indicates the country has a high ranking in the country profile factor; 'N' indicates the country has a low ranking in the country profile factor.

For example, the condition of the high-level country profile is that the country satisfied all the country profile factors given in the empirical studies. In the first empirical study, three country factors are considered: institution, market sophistication, and product market regulation. For instance, if the country ranked high in these three factors, '3Y' is put in that country (See Chapter 6, Table 6.2, Example: Canada). Similarly, four and five country profile factors exist in the second and the third empirical study, separately. Thus, '4Y' and '5Y' indicate that the country has a high-level country profile. The example can be found in the empirical studies, such as the United States in Chapter 7 (See Table 7.2) and Ireland in Chapter 8 (See Table 8.3). The same method measures the remaining levels of the country profile. The following three subsections will discuss the main findings of each empirical study, with more details of country profile levels for each country in the subsections.

9.2.1 The Causality of FDI and Economic Growth

1) What is the relationship between FDI and economic growth?

This is the first research question in the thesis, which discussed the causality of foreign direct investment and economic growth. In all levels of the country profile, most countries have a significant bi-direction relationship, regardless of the country having a strict FDI regulatory restriction(See Table 9.3 and Table 9.4). Moreover, a single direction from GDP to FDI flows in the first situation; while another single direction (FDI flows influence on GDP) only exists in the section situation. This could be since less restriction exists for FDI flows in the second group.

The example countries are: New Zealand, Iceland, Mexico, Ireland, and Hungary. In addition, the countries with less FDI regulatory restriction showed that their FDI had a significant effect on economic growth. However, the countries that displayed no relationship in this causality also had an increase, which occupied 40%, especially in the lower average level and low level of country profile. To conclude, most OECD countries show a bi-direction causality (13 countries), including two countries that indicate that FDI influences GDP. Four countries indicate that GDP had an impact on FDI flows, and a large number of countries (12 countries) showed no significant causality between FDI flows and economic growth.

Table 9. 3 Situation 1: If the country has an FDI Regulatory Restriction

	Summary	**Relationship between FDI and Economic Growth**	**Country Profile Level**
Australia	3Y	Bi-direction	High Level
New Zealand	3Y	GDP on FDI	
Canada	3Y	None	
Austria	2Y1N	Bi-direction	Upper Average
United States	2Y1N	Bi-direction	
Iceland	1Y2N	GDP on FDI	
Switzerland	2Y1N	None	
Korea, Rep.	1Y2N	Bi-direction	Lower Average
Norway	1Y2N	Bi-direction	
Mexico	3N	GDP on FDI	Low Level
Poland	3N	None	

Notes: 'Y' indicates the country has a high ranking in the country profile factor; 'N' indicates the country has a low ranking in the country profile factor.

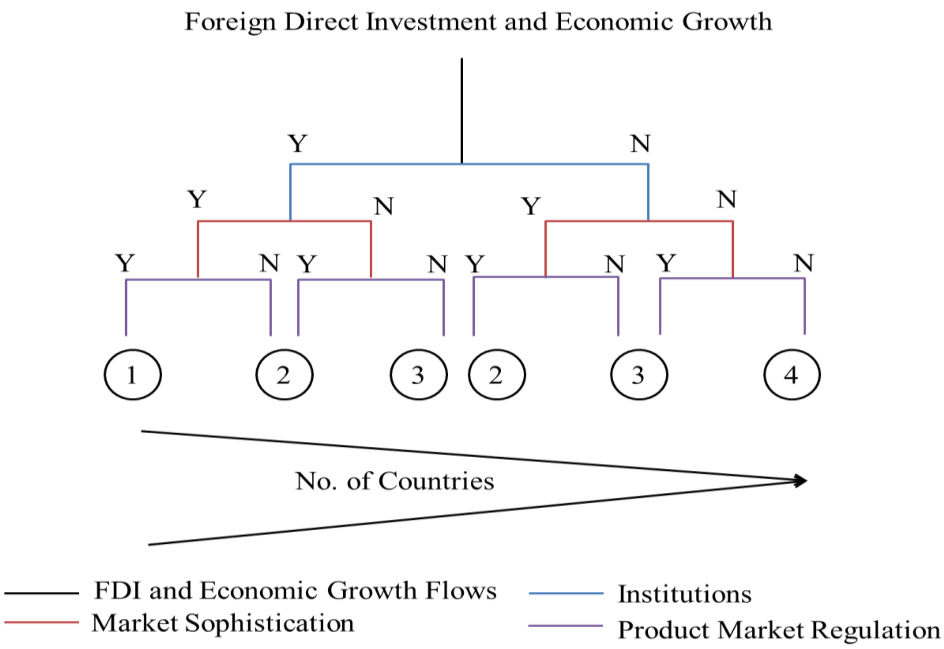
Table 9. 4 Situation 2: If the country does not have an FDI Regulatory Restriction

	Summary	**Relationship between FDI and Economic Growth**	**Country Profile Level**
Denmark	3Y	Bi-direction	High Level
United Kingdom	3Y	Bi-direction	
Ireland	3Y	FDI on GDP	
Finland	3Y	None	
Japan	3Y	None	
Netherlands	3Y	None	
Germany	2Y1N	Bi-direction	Upper Average
Spain	2Y1N	Bi-direction	
Sweden	2Y1N	Bi-direction	
Belgium	2Y1N	None	
Czech Republic	1Y2N	Bi-direction	Lower Average
Luxembourg	1Y2N	Bi-direction	
Hungary	1Y2N	FDI on GDP	
Italy	1Y2N	None	
Portugal	1Y2N	None	
Slovakia	1Y2N	None	
Greece	3N	Bi-direction	Low Level
France	3N	None	
Turkey	3N	None	

Notes: 'Y' indicates the country has a high ranking in the country profile factor; 'N' indicates the country has a low ranking in the country profile factor.

The patterns of the relationship between foreign direct investment and economic growth are considered. Figure 9.1 indicates four patterns in this relationship. Most OECD countries had a bi-direction, located in the pattern 1 and pattern 2, implying that they have a high or upper average level of country profile. By contrast, a single direction relationship exists in pattern three and pattern four (See Figure 9.2). The countries with no relationship between FDI and economic growth appear in pattern one and three.

Figure 9. 1 Patterns of Causality of FDI and Economic Growth



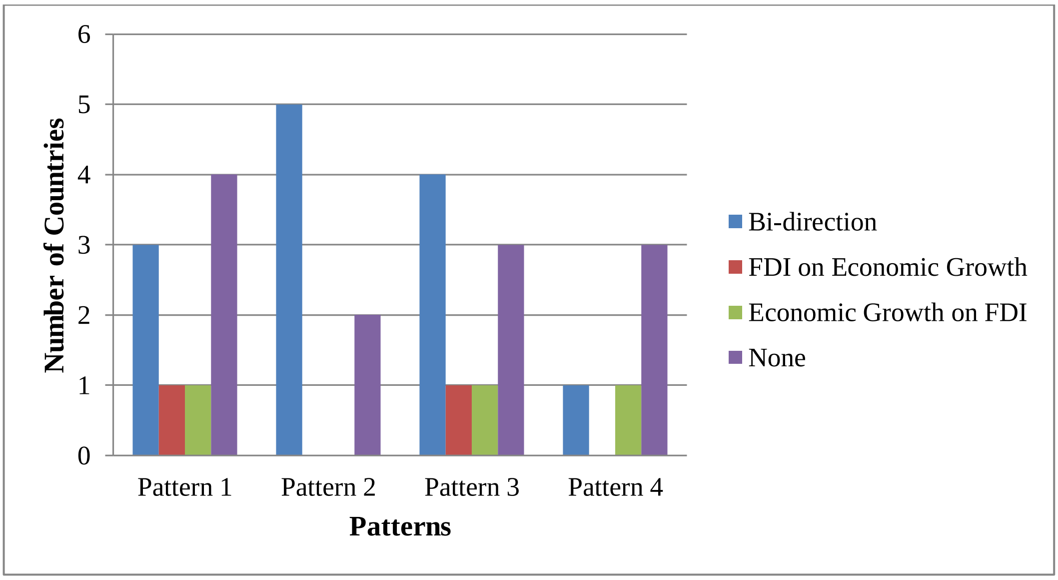
The first pattern shows that the country has a high rank in institution factor, market sophistication factor, and factor of product market regulation. Therefore, in situation 1, Australia shows a positive significant bi-direction between FDI flows and economic growth, whereas in New Zealand, the economic growth has a negative influence on FDI inward flows. Moreover, no sign of this causality can be found in New Zealand despite it satisfying all the country profile factors. In situation 2 of this pattern, Denmark and the United Kingdom indicate a bi-direction between FDI flows and economic growth. Therefore, in this country, the economic growth could either attract more FDI inward flows from other countries, or encourage more MNEs to conduct investment in the foreign countries. Consequently, a significant effect of FDI on GDP exists in Ireland, but the regression result suggested that inward FDI flows had an adverse effect on GDP. On the contrary, Denmark, Japan, and Netherlands, the regression result shows no relationship between FDI and economic growth.

The second pattern in this relationship indicates that the country at least has two high ranks in the country profile factors. Subsequently, in the first situation, four countries exist in this pattern. Austria and the United States indicate a bi-direction of FDI flows and GDP; and Iceland indicates that economic growth has a negative effect of FDI inward flows. Moreover, in the second situation, four additional countries exist in this pattern, and three of them (Germany, Spain, and Sweden) show a bi-direction relationship from FDI to GDP, while the remaining country (Belgium) displays no relationship.

The third pattern described that the country had a high ranking in one of three country profile factors. Therefore, in situation 1, the regression result suggested that Korea and Norway had a bi-direction relationship between FDI and economic growth, in that economic growth has a positive effect on FDI inward flows. At the same time, both FDI inward and outward flow shows an increase in GDP. On the contrary, in the second situation, Czech Republic and Luxembourg indicated a single way relationship, a single direction from FDI flows to GDP. Furthermore, Portugal and Slovakia showed no causality of FDI and economic growth.

The final pattern is of a low ranking in all country profile factors. Therefore, in the strict FDI regulatory restriction (situation 1), Mexico and Poland show that the economic growth had a positive effect on FDI outward flows. However, FDI flows had an adverse influence on GDP growth in Mexico. By contrast, no significant effect for this relationship exists in Poland. In the second situation, Greece shows a positive bi-direction of causality of FDI inward flows and economic growth; while France and Turkey show no relationship between FDI and economic growth.

Figure 9. 2 Patterns of Relationship between FDI and Economic Growth by Number of Countries



To summarise, figure 9.2 indicates the number of countries in different relationships in the four patterns. The result shows that countries with a high level ranking of country profiles indicate a bi-direction relationship. This phenomenon becomes more significant in pattern 2 (if the country has high rankings in any two country profile factors), indicating that FDI flows and economic growth affected each other. Pattern 3 has four and three countries in pattern 1 under this causality. In the country that had a lower ranking in the country profile factors, the bi-direction relationship becomes weak, and more countries display no relationship between FDI flows and economic growth.

Therefore, this figure suggests that the country with low ranking country profile needs FDI inward flows to promote economy, at the same time, the economy sees vast improvement, thereby encouraging the local companies abroad to conduct investment into other countries. However, the countries with high level of country profile have a bi-direction relationship because of a high economic background. For example, the only thing the United States wish to do is find a new investment opportunity in other countries to get more profits, meanwhile, they also require inward investment to promote economic growth.

9.2.2 Main Findings of the Relationship between FDI and Technology

2) What is the relationship between FDI and local R&D activities?

The second research question is whether the high technology in one country attracts inward flow FDI because the country has a comparative advantage over other countries. The observation included discovering whether a country has a high technology, and if it uses that to invest in another country. Chapter 7 uses GERD (government expenditure on research and development) to measure the R&D activities in each country. R&D had a positive effect on FDI flows if a less FDI regulatory restriction exists in a country. Table 9.5 and Table 9.6 indicate the causality in each country (notice that country has different country profile level).

Table 9. 5 Situation 1: If the country has an FDI Regulatory Restriction

	Summary	Relationship between FDI and R&D	Country Profile Level
United States	4Y	R&D on FDI	High Level
Switzerland	4Y	..	
Canada	3Y1N	None	Upper Average
Australia*	3Y1N	..	
Korea, Rep.	2Y2N	Bi-direction	
Austria	2Y2N	None	
New Zealand*	2Y2N	..	
Iceland	1Y3N	FDI on R&D	Lower Average
Norway	1Y3N	R&D on FDI	
Mexico	4N	FDI on R&D	Low Level
Poland	4N	R&D on FDI	

Notes: 'Y' indicates the country has a high ranking in the country profile factor; 'N' indicates the country has a low ranking in the country profile factor; Country with '' means the R&D data unavailable.*

Most countries display single direction causality, either from FDI flows to R&D or from R&D to FDI flows in the first situation, especially in the lower average and low-level country profile. Iceland and Mexico indicate that FDI flows had a significant effect of R&D, while Norway and Poland show that R&D influence FDI flows. On the contrary, only Korea shows a bi-direction causality of FDI flows and R&D. In this case, the regression result suggested that R&D encourage FDI outward flows in this country. Moreover, in the second situation, most countries showed a bi-direction in the high-level country profile and a single way from FDI to R&D in the upper average and low level of country profile.

Table 9. 6 Situation 2: If the country does not have an FDI Regulatory Restriction

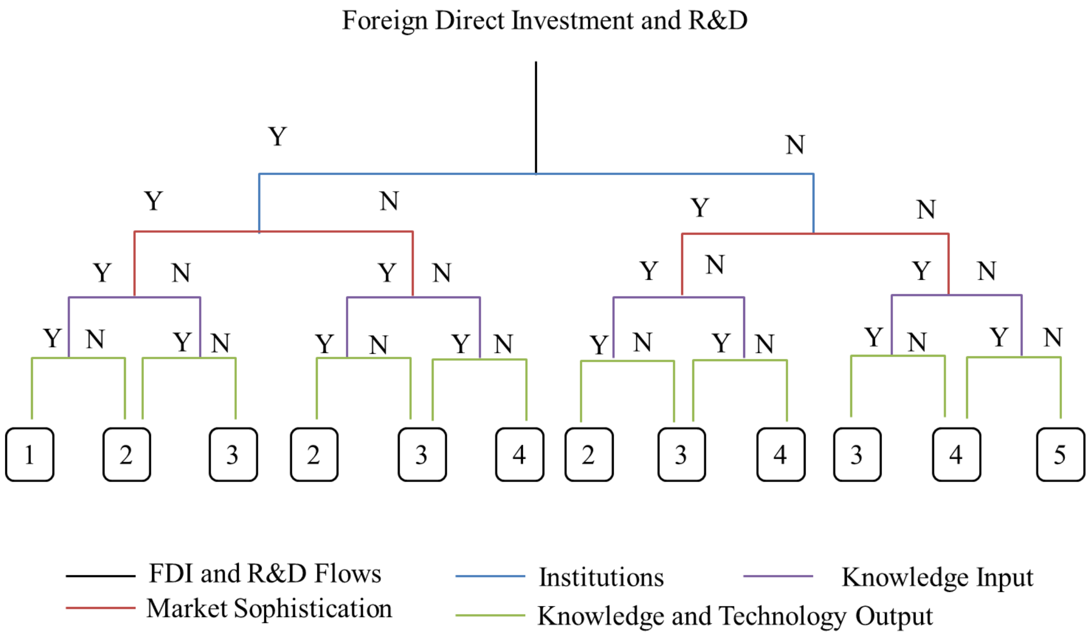
	Summary	Relationship between FDI and R&D	Country Profile Level
Finland	4Y	Bi-direction	High Level
Ireland	4Y	Bi-direction	
United Kingdom	4Y	Bi-direction	
Japan	4Y	Bi-direction	
Denmark	4Y	None	
Netherlands	4Y	None	
Sweden	4Y	..	
Belgium	2Y2N	FDI on R&D	Upper Average
Germany	3Y1N	FDI on R&D	
Luxembourg	3Y1N	None	
Czech Republic	1Y3N	Bi-direction	Lower Average
France	1Y3N	FDI on R&D	
Spain	1Y3N	None	
Hungary	4N	FDI on R&D	Low Level
Portugal	4N	FDI on R&D	
Slovakia	4N	None	
Italy	4N	None	
Turkey	4N	None	
Greece	4N	None	

Notes: 'Y' indicates the country has a high ranking in the country profile factor; 'N' indicates the country has a low ranking in the country profile factor; Country with '' means the R&D data unavailable.*

In the countries with lower average level and low level country profile, Czech Republic, France, Hungary, and Portugal, for example, showed a bi-direction relationship between foreign investment and innovation. Moreover, no country indicated that R&D has a significant effect of FDI flows, and eight countries display no causality in the low-level country profile.

Later on, the patterns of relationship between FDI and R&D will be discussed. As shown in Figure 9.3, five patterns of this relationship exist. The first pattern indicates that the country has a high ranking in all of the countries profile factors and nine countries are included in this pattern, occupying 30% in total OECD countries. Bi-direction is the most common relationship in this pattern is, for example Finland, Ireland, Japan, and the United Kingdom. Subsequently, the single direction from R&D to FDI flows, including the United States, had a positive effect of FDI inward flows.

Figure 9. 3 Patterns of Relationships between FDI and R&D

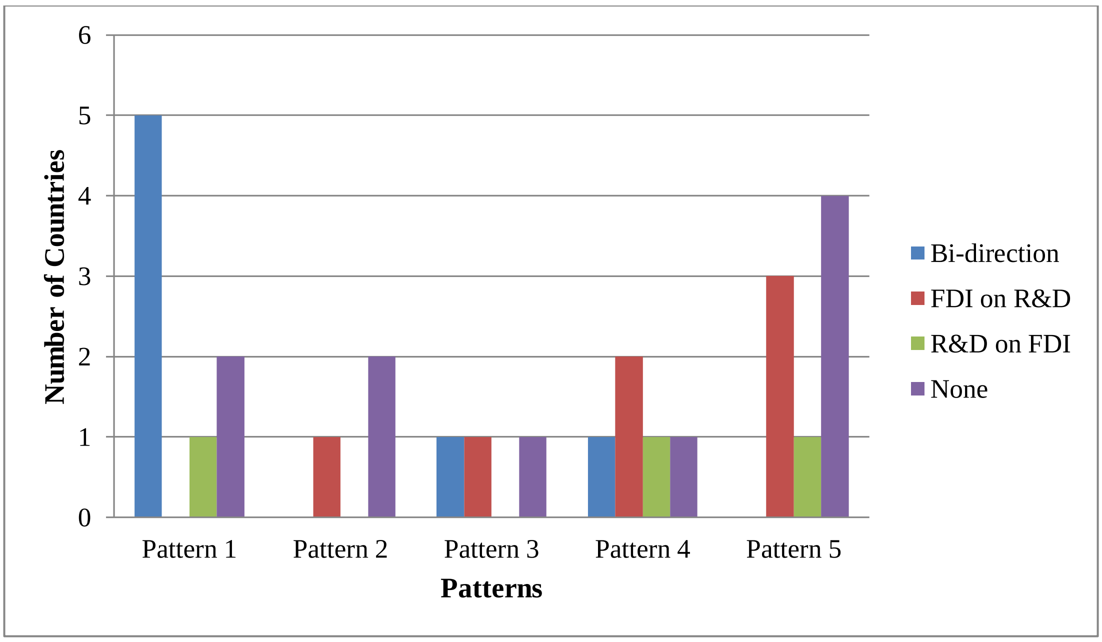


The second and third pattern show that if countries had a low ranking in any one or two country profile factors, the regression result suggested that the most country in these two patterns indicated a single relationship from FDI to R&D, such as Belgium and Germany. In these two countries, FDI flows had a positive effect on R&D, thereby proving that the more FDI is conducted in these countries, the more innovation will be produced. The fourth pattern presented the countries that had a low ranking in any three country profile factors for example, Iceland, Norway, Spain, Czech Republic and France. According to the regression result, no relationship exists between FDI and R&D in Spain; and in Iceland and France, a single negative direction from FDI to R&D exists along with a positive single direction from R&D to FDI in Norway. Furthermore, the result suggests that FDI outward flows can support R&D improvement in the Czech Republic.

Finally, eight countries in the fifth pattern indicated a low ranking in each country profile factor. In particular, none of them had a bi-direction relationship between FDI flow and R&D. Moreover, in Hungary, Portugal, and Mexico, the FDI outward flows displayed a positive effect on R&D. Therefore, these three countries could use new technology to conduct investment in the other countries. As another single direction from R&D to FDI flows, Poland showed that R&D had a positive effect on FDI outward flows. To conclude, figure 9.4 gives information about the patterns of relationship between FDI and R&D by numbers of countries. According to the figure, it is clear that the single direction of FDI flow to R&D is a strong causality that exists in each pattern, especially in pattern three and four. By contrast, the bi-direction relationship is stronger in pattern 1 and very weak in other four patterns.

Therefore, the pattern graph suggested that countries prefer to do both investment and R&D in a country with high level of country profile (pattern1). This could be because they have more comparative advantages over other countries, regardless of the capital or the level of latest technology. Thus, they presented interest in selling their new technology to other countries to get more foreign capitals back to their home country; or because they had enough capital and therefore could invest abroad to learn new technology. However, countries with a low ranking in all country profile factors (if they were rich and had enough capital) were interested in buying new technology or new products from other countries (the countries with high technology). For example, the Arabic countries can use crude to exchange new technology from the United States. Therefore, it would be a beneficial strategy in resource seeking (the United States) and knowledge (or efficiency) seeking (the Arabic countries).

Figure 9. 4 Patterns of Relationship between FDI and R&D by Number of Countries



In addition, the countries of pattern 2 and 3 have only one or two country profile factors with a low ranking. According to these patterns, FDI flows had significant flow on R&D, since these countries may have high technology, they could attract more inward FDI flows, or enough capital to buy or conduct investment in the foreign countries.

9.2.3 Main Findings of the Link between FDI and International Trade

3) What is the relationship between Foreign Direct Investment and International Trade?

This is the last research question in the thesis, which addressed the relationship between foreign direct investment and international trade. It was discovered that if the country has more high-level country profile factors in less FDI regulatory restriction, said country will have a bi-direction relationship between FDI and international trade (See Table 9.7 and Table 9.8).

Table 9. 7 Situation 1: If the country has an FDI Regulatory Restriction

	Summary	Relationship between FDI and International Trade	Country Profile Level
Australia	4Y1N	Bi-direction	Upper Average
United States	4Y1N	Bi-direction	
Canada	4Y1N	None	
Switzerland	4Y1N	None	
Austria	3Y2N	Bi-direction	
New Zealand	3Y2N	None	
Korea, Rep.	2Y3N	FDI on Trade	Lower Average
Iceland	1Y4N	Bi-direction	
Norway	1Y4N	Bi-direction	
Poland	5N	Bi-direction	Low Level
Mexico	5N	None	

Notes: 'Y' indicates the country has a high ranking in the country profile factor; 'N' indicates the country has a low ranking in the country profile factor.

To begin with, it is clear that most countries displayed a bi-direction relationship between foreign direct investment and international trade in the above average and lower average level of country profile, which occupied 55.5%. Moreover, with a single direction relationship, FDI flows had a significant effect on trade flows in

Korea. By contrast, with the second situation, more countries displayed a bi-direction causality, which may be because of low FDI regulatory restriction in these countries. They ranked at the high level and lower average level of country profile. Denmark and the United Kingdom represented that trade had significant effects on FDI flows. While four countries indicate FDI flows had a significant influence on trade: Germany, Belgium, Portugal, and Slovakia.

Table 9. 8 Situation 2: If the country does not have an FDI Regulatory Restriction

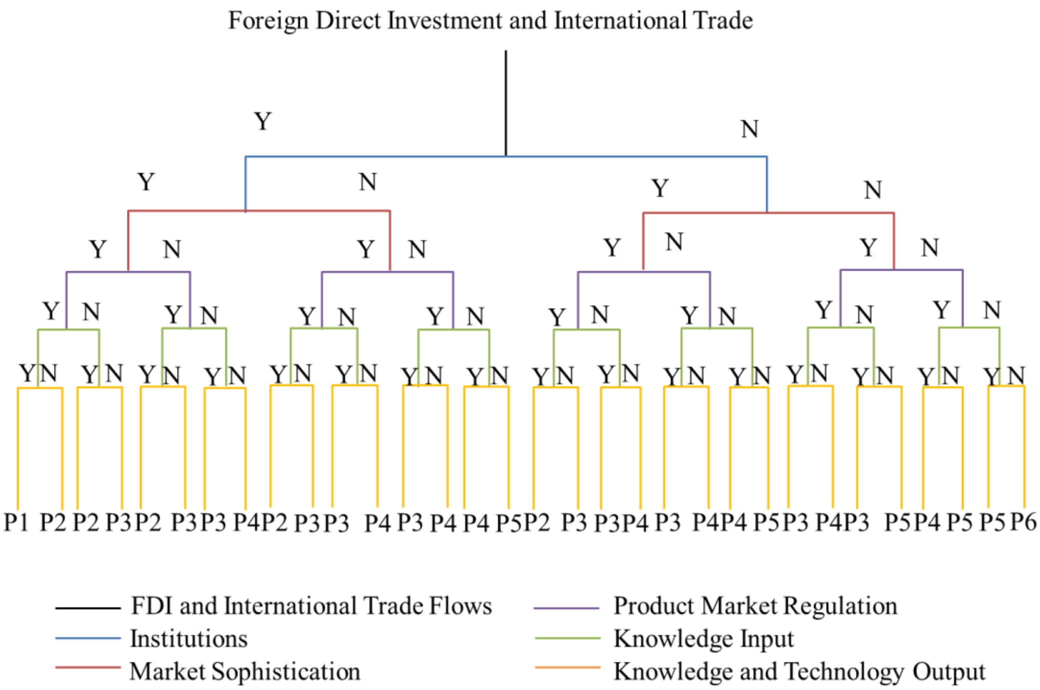
	Summary	Relationship between FDI and International Trade	Country Profile Level
Ireland	5Y	Bi-direction	High Level
Japan	5Y	Bi-direction	
Denmark	5Y	Trade on FDI	
United Kingdom	5Y	Trade on FDI	
Finland	5Y	None	
Netherlands	5Y	None	
Germany	4Y1N	FDI on Trade	Upper Average
Belgium	3Y2N	FDI on Trade	
Luxembourg	3Y2N	None	
Sweden	3Y2N	None	
Spain	2Y3N	Bi-direction	Lower Average
Czech Republic	2Y3N	None	
Portugal	1Y4N	FDI on Trade	
Slovakia	1Y4N	FDI on Trade	
Hungary	1Y4N	None	
Italy	1Y4N	None	
France	5N	Bi-direction	Low Level
Greece	5N	Bi-direction	
Turkey	5N	None	

Notes: 'Y' indicates the country has a high ranking in the country profile factor; 'N' indicates the country has a low ranking in the country profile factor.

The following context will discuss the patterns of the relationship between FDI and international trade. In this empirical study, six patterns were found under this relationship, due to a total of five country profile factors adding to help interpret the regression result (See Figure 9.5). The first pattern indicated that the country has a high-level ranking in all of the country profile factors.

Thus, the regression result suggested that most countries in the pattern 1 and 2 could perform both FDI flows and trade together. The example country is including Ireland, Japan, Australia, and the United States. Moreover, the single way causality from trade to FDI flows becomes more significant in pattern 2. However, no countries display that trade ha a significant influence on FDI in this pattern. The second pattern indicates that the country has a high ranking in any four country profile factors. In this pattern, the FDI flows had a stronger influence on trade compared to pattern 1.

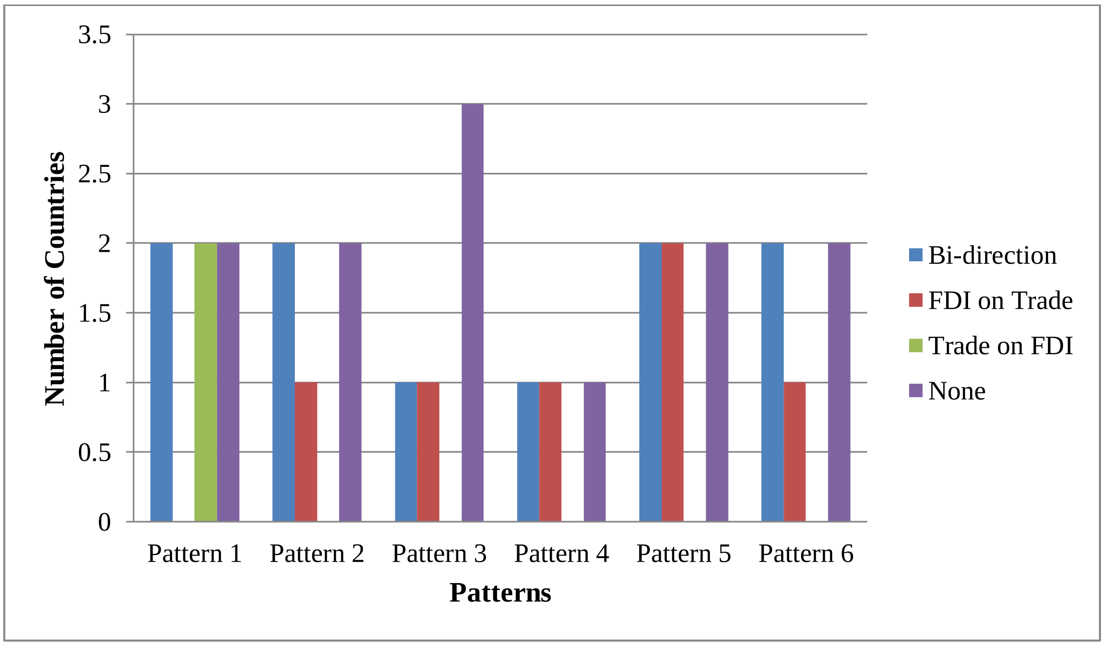
Figure 9. 5 Patterns of Flow for FDI and International Trade



The third pattern shows that countries had a high-level ranking in any three out of five country profile factors. In this pattern, Austria shows a bi-direction relationship between FDI flows and trade, and a single direction in either FDI flows influence on trade in Belgium. The fourth pattern displays that the country has a high-ranking level only one country profile factor. Three countries fall under this pattern, including Czech Republic, Korea, and Spain, none of which indicate causality, a single relationship and bi-direction relationship, separately.

In the final pattern, countries with a low level in each country profile factors are: France, Greece, Poland, Mexico, and Turkey. The former three countries indicate a bi-direction relationship between FDI and international trade. The final pattern indicates countries that do not satisfy any of these three factors. In this pattern, according to the regression result, countries prefer to do more trade instead of foreign direct investment. For instance, France and Poland had a bi-direction relatioship between outward FDI and export, implying that they conduct investment in another country to support trade.

Figure 9. 6 Patterns of the Relationship between FDI and International Trade by Number of Countries



To conclude, figure 9.6 shows the number of countries in each pattern of the link between foreign direct investment and international trade. According to this figure, the pattern of FDI and international trade flows in situation 2 had a more flexible than situation 1. Therefore, said country has less restriction on FDI and more impact on international trade. A bi-direction relationship exists in the most of patterns, except for pattern 3. The number of countries in bi-direction causality is around three or four. If compared to pattern three and four, only one country includes a bi-direction relationship, and two in other patterns under this causality. Single causality only exists in high-level country profile factors from trade on FDI flows. Therefore, trade has a more significant influence on FDI flows when the country has a good trade environment.

9.3 Limitation of the Research

Four limitations of this thesis are to be discussed in this section. First: limited run of annual data. The period examined in the empirical study is 35 years (from 1981 to 2015). Since the annual data was used current data could not be obtained before the official website was published. However, this question was later answered with more data. Second: the observations of aggregate across the section over time. The quarterly data by section would be ideal, but it was unavailable in the R&D database. Third: the assumption of fixed parameters estimated is timely within countries, which is difficult to avoid. The final limitation of this thesis lacks standardised data of good quality in institutional characteristics likely to influence foreign direct investment. Therefore, most of these limitations are unavoidable. The basic pattern in the available data is summarised by mean, variance, and covariance, and the VAR model being a useful method of interpreting theses within a causal framework.

9.4 Contribution of the Thesis

In this thesis, several respects of contributions have been developed, including recent data to analysis of 30 OECD countries individually. The reason is because that each country has their characteristics. Additionally, three econometrics methods are used (VAR model, ARDL model, and Engle-Granger method) to estimate these countries and to make sure the result is robust. Three causalities are measured, including FDI flows and economic growth; FDI flows and R&D; and FDI flows and international trade.

Moreover, six types of countries profile factors were added to the group of 30 OECD countries to estimate how the links of these causalities changed in the different level country profile. A significant bi-direction of these three causalities was found in case the country has a high level or upper average level of country profile factors. Dunning's IDP theory suggested that when a country has developed into the knowledge economy, substantial inward and outward investment occurs in the county.

(Dunning, 2002). Compared to our empirical studies, when a country has a high level of country profile factors (as this country has good institutions, open market, less restriction of foreign direct investment, and lower trade barriers), a positive bi-direction can exist between FDI and economic growth. Moreover, this country will attract more FDI flows due to a high-ranking in the knowledge input and output factor.

9.5 Implications for Future Research

Two major directions of focus in the future research are: a better link between micro and macro level of FDI theory is required. Since Hymer (1976) put forward a micro-level FDI theory, more researches on disaggregated industries or sectors took place along with appropriate disaggregation of region, city, and industrial destination.

The first research question is, can country characteristics could attract more FDI flows into host country? The same country profile is used quantify them as a dummy variable. Subsequently, different numbers rank indicates different levels in each country characteristics. For example, in this thesis, six country profile factors with four different levels are considered. Therefore, accurate influence of country characteristics on patterns relationships between FDI, trade, and economic growth could be found. The second direction of future research placed emphasis on the sweeping generation and heterogeneity. For example, what ‘groups’ should be distinguished. These groups include, but are not limited to, developing countries, BRICS country, Western European, Asian, deregulated countries, and highly regulated countries. Subsequently, the same group countries could be considered in a different period. Each period could be 20 years or 30 years, followed by the regression test for each period group for comparison of the result. This could provide some ideas about whether the developing countries have a massive change in foreign direct investment. To expand this research question, adding country profile factors in the regression could help find out whether the country profiles have positive or negative externalities of FDI flows.

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Appendices for Chapter 1 Introduction

1.1 Classification of Country Profile Factors in 30 OECD Countries

Table 1. 1 Situation 1: If the country has a FDI Regulatory Restriction

	Institution	Market Sophistication	Product Market Regulation	Knowledge Input	Knowledge and Technology Output	Summary	Country Profile Level
Australia	Y*	Y*	Y*	Y*	N*	4Y1N	Upper Average
Austria	Y*	N*	Y*	Y*	N*	4Y1N	
Canada	Y	Y	Y*	Y*	N*	4Y1N	
Switzerland	Y*	Y	N*	Y	Y	4Y1N	
United States	Y*	Y	N*	Y*	Y	4Y1N	
New Zealand	Y	Y*	Y*	N*	N*	3Y2N	
Korea, Rep.	N*	Y*	N	N*	Y*	2Y3N	Lower Average
Iceland	Y*	N*	N*	N*	N*	1Y4N	
Norway	Y	N*	N*	N*	N*	1Y4N	
Mexico	N	N	N	N*	N*	5N	Low
Poland	N*	N	N*	N*	N*	5N	

Notes: Y indicates the country has a high level ranking in this country profile factor; Y indicates the country has a upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low level ranking in this country profile factor.*

Table 1. 2 Situation 2: If the country does not have a FDI Regulatory Restriction

	Institution	Market Sophistication	Product Market Regulation	Knowledge Input	Knowledge and Technology Output	Summary	Country Profile Level
Denmark	Y	Y*	Y*	Y*	Y*	5Y	High Level
Finland	Y	Y*	Y*	Y	Y*	5Y	
Ireland	Y*	Y*	Y*	Y	Y*	5Y	
Japan	Y*	Y*	Y*	Y*	Y*	5Y	
Netherlands	Y*	Y*	Y	Y*	Y*	5Y	
United Kingdom	Y*	Y	Y	Y*	Y*	5Y	
Germany	Y*	N*	Y*	Y*	Y*	4Y1N	Upper Average
Sweden	Y*	Y*	N*	Y*	Y	4Y1N	
Belgium	Y*	N*	Y*	Y*	N*	3Y2N	
Luxembourg	Y*	N*	N*	Y	Y*	3Y2N	
Czech Republic	N*	N*	Y*	N*	Y*	2Y3N	Lower Average
Spain	N*	Y*	Y*	N*	N*	2Y3N	
France	N*	N*	N*	Y*	N*	1Y4N	
Hungary	N*	N	Y*	N*	N*	1Y4N	
Italy	N*	N*	Y*	N*	N*	1Y4N	
Portugal	N*	N*	Y*	N*	N*	1Y4N	
Slovakia	N*	N	Y*	N*	N*	1Y4N	
Greece	N*	N*	N*	N*	N	5N	Low
Turkey	N	N	N	N	N	5N	

Notes: Y indicates the country has a high level ranking in this country profile factor; Y indicates the country has a upper average level ranking in this country profile factor; N indicates the country has a lower average level ranking in this country profile factor; N*indicates the country has a low level ranking in this country profile factor.*

Appendices for Chapter 3 Empirical Background

3.1 Previous Empirical Study 1: Relationship between FDI and Economic Growth

Table 3. 1 Previous Studies of the Relationship between FDI and Economic Growth

Author/Year	Sample Size/Time Period	Econometric Methods	Data Source	Variables (Dependent/Independent)
Adeniyi, O. Omisakin, O. Egwaikhide, F.O. (2012)	Cote d'Ivoire, Gambia. Ghana, Nigeria, and Sierra Leone 1970-2005	Granger Causality; Vector Error Correction (VEC)	International Financial Statistics; World Development Indicators	De: Difference in economic growth; Difference in FDI; Difference in banking credit to the private sector In: DEG (lagged 1year, lagged 2 years); DFDI (lagged 1 year, lagged 2 years); DBCPS (lagged 1 year, lagged 2 years)
Akoto, W. (2016)	South Africa 2008-2009	Vector Error Correction Model; Granger Causal	World Bank	De: Export In: GDP lagged one year; Export lagged one year; FDI lagged one year
Belloumi, M. (2014)	Tunisia 1970-2008	Bounds Testing-ARDL Approach	International Financial Statistics Yearbook; World Development Indicators; Tunisia Central Bank	De: Real GDP per capita (Y), Total sum of exports and imports/GDP (T), Volume of the total labour force (L), Real value of gross fixed capital formation (K) In: Lagged 1 year of dependent variables

Table 3.1 Previous Studies of the Relationship between FDI and Economic Growth (Cont.)

Author/Year	Sample Size/Time Period	Econometric Methods	Data Source	Variables (Dependent/Independent)
Carkovic, M. Levine, R. (2002)	72 Countries 1965-1995	OLS, Pooled OLS, GMM	World Bank Database (averaged over each the seven-5 year periods); International Monetary Funds	De: Rate of real per capita GDP growth In: Initial income per capita, Average years of schooling, Inflation, Government size, Openness to trade, Black market premium, Private sector credit, FDI; FDI*Schooling; FDI*Income per capita; FDI*Credit; FDI*Trade
Choong, C. (2012)	95 Developed and Developing Countries 1983-2006	Generalised Method of Moments (GMM)	World Bank Database	De: Real GDP per capita growth rate (RGDPGR) In: First Indicator: Liquid Liabilities (LIQUID); Second Indicator: Deposit money bank domestic assets plus central bank domestic assets (DEPOSIT); Third Indicator: Ratio of credits provided by financial intermediaries to the private sector to GDP (CREDIT)
Cieslik, A. Tarsalewska, M. (2011)	97 Developing Countries 1974-2006	Static and Dynamic Panel Data	World Development Indicators	De: Real GDP per capita growth rate In: GDP lagged one year, FDI, Trade, Conditioning set
Omri, A. (2014)	13 MENA Countries 1990-2010	Generalised Method of Moments (GMM)	World Development Indicators	De: Economic growth, Domestic capital, Foreign direct investment In: Growth of GDP/L, Growth of K/L, Growth of FDI/L, Growth of HCP (the growth rate of the real spending on higher education), CPI, OPENS (openness of the economy) CRD/GDP (total credit of the private sector as a percentage of GDP), GE/GDP (government expenditure as a share of GDP), RER (real exchange rate), Growth of GDP, Growth of GDP/L lagged 1 year
Pegkas, P. (2015)	Eurozone Countries 2002-2012	Fully Modified OLS; Dynamic OLS	AMECO Database	De: GDP at 2005 constant price In: Log FDI, Dummy (Eurozone membership impact on economic growth)

Table 3.1 Previous Studies of the Relationship between FDI and Economic Growth (Cont.)

Author/Year	Sample Size/Time Period	Econometric Methods	Data Source	Variables (Dependent/Independent)
Tahir, M. Khan, I. Shah, A. (2015)	Pakistan Economy 1977-2013	Time Series Econometric Techniques	World Development Indicators; the State Bank of Pakistan	De: Log of real GDP In: Log of foreign remittances, Log of foreign direct investment, Log of imports
Tekin, R. (2012)	18 Least Developed Countries 1970-2009	Potential Granger Causality	UNCTAD	De: GDP; Export; FDI In: GDP lagged one year; Export lagged one year; FDI lagged one year
Temiz, D. Gokmen, A. (2014)	Turkey 1992-2007	OLS	Electronic Data Distribution System of the Central Bank of the Republic of Turkey	De: DLGDP (first difference log GDP) In: DLGDP (lagged one year, lagged two years, lagged three years, lagged four years), DLFDI, DLFDI (lagged one year, lagged two years, lagged three years, lagged four years)
Turkcan, B. Duman, A. Yetkiner, I. (2008)	23 OECD countries 1975-2004	Simultaneous Equation, OLS, TSLS, 3SLS, GMM	World Development Indicator Online Database; Penn World Table	Eq.1: De: Growth rate of FDI In: Growth rate of GDP, Growth rate of exports, One year lagged of FDI growth rate Eq.2: De: Growth rate of GDP In: Growth rate of FDI, Growth rate of exports, One year lagged of GDP growth rate
Vu, T.B. Noy, I. (2009)	Denmark, Germany, Netherlands, Spain, United Kingdom, and the United States 1980-2003	Feasible Generalized Least Squares (FGLSs)	OECD Structural Statistic Analysis (STAN); OECD International Direct Investment Statistical Yearbook	De: the Growth rate of value added In: Log of labour, Log of FDI, Interaction term between FDI and the log of labour, Log of capital, the (other) variables either in log forms or levels

3.2 Previous Empirical Study 2: Relationship between FDI and R&D

Table 3. 2 Previous Studies of the Relationship between FDI and R&D

Author/Year	Sample Size/Time Period	Econometric Methods	Data Source	Variables (Dependent/Independent)
Annan-Diab, F; Filippaios, F (2017)	98 Multinational Companies in Ireland 2003-2009	Qualitative Nature	fdi Markets Database	22 Companies from the Software and IT Sector; 16 Companies from the Financial Services Sector
Barrell, R; Pain, N (1997)	A number of OECD Countries 1980-1992	Dynamic Model	Survey of Current Business	FDI (stock); Output; Patents; Labour Cost; Gearing; Profitability; Growth rate of real equity prices
Walz, U (1997)	Developed Country with High-technology Sector	A Dynamic General Equilibrium Model with Endogenous Technological Change	..	..
Pradhan, R; Arvin, M; Bahmani, S; Bennett, S (2017)	32 OECD Countries 1970-2016	Granger Causality Test; Panel Cointegration Techniques	World Development Indicator from World Bank	PAR; PAN; PAT; R&D Expenditure; Researchers in R&D; Innovation; Per Capita Economic Growth; Government Consumption Expenditure; Gross Capital Formation; Trade Openness; FDI; Macroeconomic Variables; ICT Indicators

3.3 Previous Empirical Study 3: Relationship between FDI and International Trade

Table 3. 3 Previous Studies of the Relationship between FDI and International Trade

Author/Year	Sample Size/Time Period	Econometric Methods	Data Source	Variables (Dependent/Independent)
Harding, T. Javorcik, B.S. (2012)	105 Countries 1984-2000	OLS	Four-digit SITC; World Development Indicators; International Financial Statistics	De: Unit Value: is the unit value (value of exports/quantity of exports) of product p expected by country c at time t In: Sector targeted, Lagged one year ST, Lagged two years ST, Lagged three years ST, Lagged one-year export value, Lagged one year GDP per capita, Population, Inflation
Markusen, J. Svensson, L (1985)	..	Develop a general model of trade by international differences in production technology	..	Purpose is to find a relationship between the direction of trade and the differences in technology
Pain, N. Wakelin, K. (1998)	11 OECD Countries 1970-1992	OLS	WTO; UNCTAD	De: Total volume of manufactured exports from country In: World demand, Relative price of home country exports, Product quality, Constant price stocks of outward and inward FDI
Rana, A. Kebewar, M. (2014)	122 Developing Countries 1970-2005	Fixed Effects Estimator	UNCTAD’S Handbook of Statistics; WTO; Penn world Table	De: FDI In: FTA-CU lagged one year, PSA lagged one year, Polity lagged one year, BIT (bilateral investment treaties) lagged one year, GATT-WTO (membership in international organisations--General Agreement on Tariffs and Trade-World Trade Organization) lagged one year, FTA-CU*Polity lagged one year, PSA*Polity lagged one year

Table 3.3 Previous Studies of the Relationship between FDI and International Trade (Cont.)

Author/Year	Sample Size/Time Period	Econometric Methods	Data Source	Variables (Dependent/Independent)
Wacker, K.M. (2015)	More than 50 Developing Countries 1980-2008	Robust Dynamic Panel Data	World Bank's World Development Indicators; IMF	De: Log NBTT (Net barter terms of trade) In: Log NBTT lagged 1 year; FDI stock/GDP lagged 1 year; FDI/GDP; South Asia lagged 1 year; Agricultural and raw material export; Current account balance (% of GDP); Current account balance lagged 1 year; Real GDP per capita; Industry value added (% of GDP); Inflation (annual %); Labour participation rate; Manufacturing exports (%); Real interest rate; Services value added (% of GDP); Growth deviation; Growth Deviation lagged 1 year; Unemployment rate; Trade/GDP; Exchange rate; RTA

3.4 Previous Empirical Study 4: Relationship between FDI and Other Factors

Table 3. 4 Previous Studies of the Relationship between FDI and Other Factors

Author/Year	Sample Size/Time Period	Econometric Methods	Data Source	Variables (Dependent/Independent)
Alsadiq, A. (2013)	121 Developing and Transition Economics 1990-2010	Generalised Method of Moments (GMM)	IMF's World Economic Outlook Database; World Development Indicators; International Country Risk Guide; UNCTAD's World Investment Report	De: Domestic Investment/ GDP In: Eq.1: FDI outflows/GDP, FDI inflows/GDP, Saving/GDP; RGDPG, Openness, Inflation; M2/GDP Eq.2: Lagged (Dependent Variable), FDI outflows/GDP, FDI inflows/GDP, Openness, RGDPG, M2/GDP, Inflation, Saving/GDP Time dummies
Kahouli, B; Omri, A (2017)	14 Home Countries and 39 Host Countries for 6 Regional Trade Agreements 1990-2011	Static and Dynamic Gravity Model	..	De: Trade; FDI In: GDP; POP; DIFGDP; SIML; RER; FDI; CO2; DIST; LANG; BORD; EU(15); NAFTA; Mercosur
Chintraka, P. Herzer, D. Nunnenkamp, P. (2012)	United States 1977-2001	Panel Cointegration Techniques	Bureau of Economic Analysis	De: TopDecile (a commonly used measure of income inequality in the United States the percentage income share of the top 10% of income earners In: FDI/GSP (FDI in percent of gross state product)
Luiz, R. De Mello, Jr. (1999)	32 Countries (15 Countries in OECD; 17 Countries in non-OECD)	Time Series, Panel Data	..	De: Output/ Capital accumulative/ TFP In: FDI, One year lagged output; one year lagged capital; One year lagged TFP

Appendices for Chapter 4 Data Description

4.1 Foreign Direct Investment Variable

Table 4.1. 1 FDI Statistics Standard Components

Transactions Data	a) Direct Investment Income	1) Income on Equity
		2) Reinvested Earnings and Undistributed Branch Profits
		3) Income on Debt
	b) Direct Investment Financial Flows	1) Equity Capital
		2) Reinvested Earnings
		3) Other Capital
Position Data	Direct Investment Positions	1) Equity and Reinvested Earnings
		2) Other Capital

Source: Foreign Direct Investment Statistics, IMF, 2001

Table 4.1.2 Data Resources of Foreign Direct Investment Flows in 30 OECD Countries

Country	National Institution Reporting FDI	Reporting System Used	Valuation System Used	Data Sources Used in the Report
Australia	Australian Bureau of Statistics	Surveys	Current Price	Australian Bureau of Statistics
Austria	Austrian National Bank	..	..	Austrian National Bank
Belgium	National Bank of Belgium	a) Data on equity and other capital are based on ITRS b) Data on reinvested earnings are based on surveys	Current Price	National Bank of Belgium
Canada	Statistics Canada	..	..	Statistics Canada
Czech Republic	Czech National Bank	Surveys	Market Price	a) Inflows: Czech National Bank b) Outflows: Estimate for 1992 and the national institution thereafter
Denmark	National Bank of Denmark	..	..	IMF for 1980–1984 and the national institution thereafter
Finland	Bank of Finland and Statistics Finland	Enterprise surveys	Current Price.	Bank of Finland and Statistics Finland and Data for 2015 are estimated
France	Banque de France	..	Market Price	Banque de France
Germany	Deutsche Bundesbank	..	..	Deutsche Bundesbank

Sources: World Investment Report 2016: Methodological Note

Table 4.1.2 Data Resources of Foreign Direct Investment Flows in 30 OECD Countries (Cont.)

Country	National Institution Reporting FDI	Reporting System Used	Valuation System Used	Data Sources Used in the Report
Greece	Bank of Greece	ITRS and Surveys	Current Price	a) Inflows: IMF for 1980–1989 and the national institution thereafter b) Outflows: Proxy for 1987–1997 and the national institution thereafter
Hungary	Central Bank of Hungary	Surveys	..	a) Inflows: Central Bank of Hungary b) Outflows: IMF for 1992–1994 and the national institution thereafter
Iceland	Central Bank of Iceland	..	..	a) Inflows: IMF for 1980–1987 and the national institution thereafter b) Outflows: IMF for 1986–1987 and the national institution thereafter
Ireland	Central Statistics Office of the Republic of Ireland	Surveys	Market value	a) Inflows: IMF for 1980–1985 and the national institution thereafter b) Outflows: Proxy for 1987–1989 and the national institution thereafter
Italy	Banca d'Italia	..	..	IMF for 1980–1988 and the national institution thereafter
Japan	Bank of Japan	For flows, data on equity and other capital are based on ITRS whereas data on reinvested earnings are based on surveys, which were started from 1996.	Current Price	Bank of Japan

Sources: World Investment Report 2016: Methodological Note

Table 4.1.2 Data Resources of Foreign Direct Investment Flows in 30 OECD Countries (Cont.)

Country	National Institution Reporting FDI	Reporting System Used	Valuation System Used	Data Sources Used in the Report
Kora, Republic of	Ministry of Trade, Industry & Energy (MOTIE) and Bank of Korea	..	..	Ministry of Trade, Industry & Energy (MOTIE) and Bank of Korea
Luxembourg	Service Central de la Statistique et des Etudes Economique du Luxembourg (STATEC) Banque Centrale du Luxembourg	Surveys	..	The national institutions Data for 2002–2012 are on an asset/liability basis
Mexico	Banco de México; Ministry of Economy	Surveys	Current price	a) Inflows: The national institutions b) Outflows: Proxy for 1980–1991 and the national institutions thereafter
Netherlands	De Nederlandsche Bank	..	..	De Nederlandsche Bank
New Zealand	Statistics New Zealand	Surveys	Market prices	Statistics New Zealand
Norway	Statistics Norway	ITRS	Current Price	IMF for 1980 and the national institutions thereafter
Poland	National Bank of Poland	..	..	a) Inflows: IMF for 1980–1989 and the national institution thereafter. b) Outflows: IMF for 1980–1985, proxy based on investments reported by Belgium and Luxembourg, France and the United States for 1990, and the national institution for 1986–1989 and 1991–2015

Sources: World Investment Report 2016: Methodological Note

Table 4.1.2 Data Resources of Foreign Direct Investment Flows in 30 OECD Countries (Cont.)

Country	National Institution Reporting FDI	Reporting System Used	Valuation System Used	Data Sources Used in the Report
Portugal	Banco de Portugal	ITRS and Surveys	Current Price	Banco de Portugal
Slovakia	National Bank of Slovakia	..	..	National Bank of Slovakia
Spain	Banco de España	..	Current Price	IMF for 1980–1989 and the national institution thereafter
Sweden	Statistics Sweden	Surveys	Current Price	Statistics Sweden
Switzerland	Swiss National Bank	Surveys	Current Price	Swiss National Bank 2015 data are estimated.
Turkey	Central Bank of the Republic of Turkey	ITRS and Surveys.	..	Central Bank of the Republic of Turkey
United Kingdom	Office for National Statistics.	..	..	a) Inflows: IMF for 1980–1984 and the national institution thereafter b) Outflows: The national institution
United States	Bureau of Economic Analysis, United States Department of Commerce	Surveys	Market Value	Bureau of Economic Analysis, United States Department of Commerce.

Sources: World Investment Report 2016: Methodological Note

Table 4.1.3 Data Reported to International Organizations: Transaction Data

Country	Inward Transactions Data					Outward Transactions Data				
	Direct Investment Income			Direct Investment Financial Flows		Direct Investment Income			Direct Investment Financial Flows	
	Income on Equity	Reinvested Earnings	Income on Debt	Equity Capital	Other Capital	Income on Equity	Reinvested Earnings	Income on Debt	Equity Capital	Other Capital
Australia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Austria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Belgium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Canada	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Czech Republic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Denmark	X	X	X	✓	✓	X	X	X	✓	✓
Finland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
France	✓	✓	X	✓	✓	✓	✓	X	✓	✓
Germany	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Greece	✓	X	✓	✓	✓	✓	X	✓	✓	✓
Hungary	✓	X	✓	✓	✓	✓	X	✓	✓	✓
Iceland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ireland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.3 Data Reported to International Organizations: Transaction Data (Cont.)

Country	Inward Transactions Data					Outward Transactions Data				
	Direct Investment Income			Direct Investment Financial Flows		Direct Investment Income			Direct Investment Financial Flows	
	Income on Equity	Reinvested Earnings	Income on Debt	Equity Capital	Other Capital	Income on Equity	Reinvested Earnings	Income on Debt	Equity Capital	Other Capital
Italy	✓	✓	X	✓	✓	✓	✓	X	✓	✓
Japan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Belgium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Canada	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Korea	✓	X	✓	✓	✓	✓	✓	✓	✓	✓
Luxembourg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mexico	✓	✓	✓	✓	✓	X	X	X	X	X
Netherlands	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
New Zealand	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Norway	✓	✓	✓	✓	✓	✓	✓	X	✓	✓
Poland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Portugal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.3 Data Reported to International Organizations: Transaction Data (Cont.)

Country	Inward Transactions Data					Outward Transactions Data				
	Direct Investment Income			Direct Investment Financial Flows		Direct Investment Income			Direct Investment Financial Flows	
	Income on Equity	Reinvested Earnings	Income on Debt	Equity Capital	Other Capital	Income on Equity	Reinvested Earnings	Income on Debt	Equity Capital	Other Capital
Slovak Republic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spain	✓	X	✓	✓	✓	✓	X	✓	✓	✓
Sweden	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Switzerland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Turkey	✓	✓	X	✓	X	✓	X	X	✓	X
United Kingdom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
United States	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1. 4 Data Reported to International Organizations: Position Data

Country	Inward Position Data		Outward Position Data	
	Equity Capital and Reinvested Earnings	Other Capital	Equity Capital and Reinvested Earnings	Other Capital
Australia	✓	✓	✓	✓
Austria	✓	✓	✓	✓
Belgium	✓	✓	✓	✓
Canada	✓	✓	✓	✓
Czech Republic	✓	✓	✓	✓
Denmark	✓	✓	✓	✓
Finland	✓	✓	✓	✓
France	✓	✓	✓	✓
Germany	✓	✓	✓	✓
Greece	✓	✓	✓	✓
Hungary	✓	✓	✓	✓
Iceland	✓	✓	✓	✓
Ireland	X	X	X	X
Italy	✓	✓	✓	✓
Japan	✓	✓	✓	✓
Korea	X	X	X	X
Luxembourg	✓	✓	✓	✓
Mexico	✓	✓	X	X

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.4 Data Reported to International Organizations: Position Data (Cont.)

Country	Inward Position Data		Outward Position Data	
	Equity Capital and Reinvested Earnings	Other Capital	Equity Capital and Reinvested Earnings	Other Capital
Netherlands	✓	✓	✓	✓
New Zealand	✓	✓	✓	✓
Norway	✓	✓	✓	✓
Poland	✓	✓	✓	✓
Portugal	✓	✓	✓	✓
Slovak Republic	✓	✓	✓	✓
Spain	✓	✓	✓	✓
Sweden	✓	✓	✓	✓
Switzerland	✓	✓	✓	✓
Turkey	X	X	X	X
United Kingdom	✓	✓	✓	✓
United States	✓	✓	✓	✓

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1. 5 Primary Data Sources: Most Timely Transactions Data Disseminated

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Australia	✓	✓	X	X	X	X	X	X	✓	✓
Austria	✓	✓	✓	✓	X	X	X	X	X	X
Belgium	X	X	✓	✓	X	X	X	X	X	X
Canada	✓	✓	X	X	X	X	X	X	X	X
Czech Republic	X	X	X	X	✓	✓	X	X	X	X
Denmark	✓	✓	✓	✓	X	X	X	X	X	X
Finland	✓	✓	X	X	X	X	X	X	X	X
France	X	X	✓	✓	X	X	X	X	X	X
Germany	X	X	✓	✓	X	X	X	X	X	X
Greece	X	X	✓	✓	X	X	X	X	X	X
Hungary	X	X	✓	✓	X	X	X	X	X	X
Iceland	X	X	X	X	X	X	X	X	✓	✓
Ireland	✓	✓	X	X	X	X	X	X	X	X
Italy	✓	✓	✓	✓	X	X	X	X	X	X
Japan	✓	✓	✓	✓	X	X	X	X	X	X
Korea	X	X	X	X	✓	✓	X	X	X	X

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.5 Primary Data Sources: Most Timely Transactions Data Disseminated (Cont.)

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Luxembourg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mexico	X	NA	X	NA	✓	NA	X	NA	X	NA
Netherlands	✓	✓	✓	✓	X	X	X	X	X	X
New Zealand	✓	✓	X	X	X	X	X	X	X	X
Norway	✓	✓	✓	✓	X	X	X	X	X	X
Poland	X	X	✓	✓	X	X	X	X	X	X
Portugal	✓	✓	✓	✓	X	X	X	X	X	X
Slovak Republic	✓	✓	X	X	X	X	X	X	✓	✓
Spain	X	X	✓	✓	X	X	X	X	X	X
Sweden	X	X	✓	✓	X	X	X	X	✓	✓
Switzerland	✓	✓	X	X	X	X	X	X	X	X
Turkey	X	X	✓	✓	X	X	X	X	X	X
United Kingdom	✓	✓	X	X	X	X	X	X	X	X
United States	✓	✓	X	X	X	X	X	X	X	X

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1. 6 Primary Data Sources: Most Comprehensive Transactions Data Disseminated

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Australia	✓	✓	X	X	X	X	X	X	X	X
Austria	✓	✓	X	X	X	X	X	X	X	X
Belgium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canada	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Czech Republic	✓	✓	X	X	X	X	X	X	X	X
Denmark	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Finland	✓	✓	X	X	X	X	X	X	X	X
France	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Germany	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Greece	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hungary	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iceland	✓	✓	X	X	X	X	X	X	X	X
Ireland	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Italy	✓	✓	✓	✓	✓	✓	X	X	X	X
Japan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Korea	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.6 Primary Data Sources: Most Comprehensive Transactions Data Disseminated (Cont.)

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Luxembourg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mexico	✓	NA	X	NA	X	NA	X	NA	X	NA
Belgium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canada	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Czech Republic	✓	✓	X	X	X	X	X	X	X	X
Netherlands	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
New Zealand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Norway	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Poland	✓	✓	X	X	X	X	X	X	X	X
Portugal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovak Republic	✓	✓	X	X	X	X	X	X	X	X
Spain	X	NA	✓	NA	✓	NA	X	NA	✓	NA
Sweden	✓	✓	X	X	X	X	X	X	X	X
Switzerland	✓	✓	X	X	X	X	X	X	X	X

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.6 Primary Data Sources: Most Comprehensive Transactions Data Disseminated (Cont.)

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Turkey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
United Kingdom	✓	✓	X	X	X	X	X	X	X	X
United States	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1. 7 Primary Data Sources: Most Timely Position Data Disseminated

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)		Use of Perpetual Inventory Method	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Australia	✓	✓	X	X	X	X	X	X	X	X	X	X
Austria	✓	✓	✓	✓	X	X	X	X	X	X	✓	✓
Belgium	X	X	✓	✓	X	X	X	X	X	X	✓	✓
Canada	✓	✓	X	X	X	X	X	X	X	X	X	X
Czech Republic	X	X	X	X	✓	✓	X	X	X	X	✓	✓
Denmark	✓	✓	✓	✓	X	X	X	X	X	X	✓	✓
Finland	✓	✓	X	X	X	X	X	X	X	X	✓	✓
France	X	X	✓	✓	X	X	X	X	✓	X	✓	✓
Germany	✓	✓	X	X	X	X	X	X	X	X	X	X
Greece	✓	✓	X	X	X	X	X	X	X	X	✓	✓
Hungary	X	X	✓	✓	X	X	X	X	✓	X	✓	✓
Iceland	X	X	X	X	X	X	X	X	✓	✓	X	X
Ireland	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Italy	X	X	✓	✓	X	X	X	X	X	X	✓	✓
Japan	✓	✓	X	X	X	X	X	X	X	X	X	X
Korea	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Luxembourg	✓	✓	X	X	X	X	X	X	X	X	X	X
Mexico	✓	NA	X	NA	X	NA	X	NA	X	NA	X	NA

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.7 Primary Data Sources: Most Timely Position Data Disseminated (Cont.)

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)		Use of Perpetual Inventory Method	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Netherlands	✓	✓	✓	✓	X	X	X	X	X	X	✓	✓
New Zealand	✓	✓	X	X	X	X	X	X	X	X	X	X
Norway	✓	✓	X	X	X	X	X	X	X	X	X	X
Poland	✓	✓	X	X	X	X	X	X	X	X	X	X
Portugal	✓	✓	✓	✓	X	X	X	X	X	X	✓	✓
Slovak Republic	✓	✓	X	X	X	X	X	X	X	X	X	X
Spain	X	X	✓	✓	X	X	X	X	✓	✓	✓	✓
Sweden	✓	✓	X	X	X	X	X	X	X	X	✓	✓
Switzerland	✓	✓	X	X	X	X	X	X	X	X	X	X
Turkey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
United Kingdom	✓	✓	X	X	X	X	X	X	X	X	✓	✓
United States	✓	✓	X	X	X	X	X	X	X	X	✓	✓

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1. 8 Primary Data Sources: Most Comprehensive Position Data Disseminated

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)		Use of Perpetual Inventory Method	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Australia	✓	✓	X	X	X	X	X	X	X	X	X	X
Austria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Belgium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canada	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Czech Republic	✓	✓	X	X	X	X	X	X	X	X	X	X
Denmark	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Finland	✓	✓	X	X	X	X	X	X	X	X	X	X
France	✓	✓	X	X	X	X	X	X	✓	✓	X	X
Germany	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Greece	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hungary	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iceland	✓	✓	X	X	X	X	X	X	X	X	X	X
Ireland	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Italy	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Japan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Korea	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Luxembourg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mexico	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1.8 Primary Data Sources: Most Comprehensive Position Data Disseminated (Cont.)

Country	Enterprise Survey		International Transactions Reporting System		Exchange Control or Investment Approval Authorities		Bilateral Sources		Other (Published Sources, Press Reports, etc.)		Use of Perpetual Inventory Method	
	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward	Inward	Outward
Netherlands	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
New Zealand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Norway	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Poland	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portugal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovak Republic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Spain	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sweden	✓	✓	X	X	X	X	X	X	X	X	X	X
Switzerland	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turkey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
United Kingdom	✓	✓	X	X	X	X	X	X	X	X	X	X
United States	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: Foreign Direct Investment Statistics, IMF, 2003

Table 4.1. 9 Global Innovation Index 2017 Rankings (30 OECD Countries)

Country	Region	Score (0-100)	Rank	Income	Rank	Innovation Efficiency Ratio	Rank
Switzerland	EUR	67.69	1	HI	1	0.95	2
Sweden	EUR	63.82	2	HI	2	0.83	12
Netherlands	EUR	63.36	3	HI	3	0.93	4
United States	NAC	61.40	4	HI	4	0.78	21
United Kingdom	EUR	60.89	5	HI	5	0.78	20
Denmark	EUR	58.70	6	HI	6	0.71	34
Finland	EUR	58.49	8	HI	8	0.70	37
Germany	EUR	58.39	9	HI	9	0.84	7
Ireland	EUR	58.13	10	HI	10	0.85	6
Korea, Rep.	SEAO	57.70	11	HI	11	0.82	14
Luxembourg	EUR	56.40	12	HI	12	0.97	1
Iceland	EUR	55.76	13	HI	13	0.86	5
Japan	SEAO	54.72	14	HI	14	0.67	49
France	EUR	54.18	15	HI	15	0.71	35
Canada	NAC	53.65	18	HI	18	0.64	59
Norway	EUR	53.14	19	HI	19	0.66	51
Austria	EUR	53.10	20	HI	20	0.69	41
New Zealand	SEAO	52.87	21	HI	21	0.65	56
Australia	SEAO	51.83	23	HI	22	0.60	76
Czech Republic	EUR	50.98	24	HI	23	0.83	13
Belgium	EUR	49.85	27	HI	26	0.67	47
Spain	EUR	48.81	28	HI	27	0.70	36
Italy	EUR	46.96	29	HI	28	0.73	31
Portugal	EUR	46.05	31	HI	30	0.71	33
Slovakia	EUR	43.43	34	HI	33	0.75	25
Poland	EUR	41.99	38	HI	35	0.67	48
Hungary	EUR	41.74	39	HI	36	0.73	30
Turkey	NAWA	38.90	43	UM	5	0.84	9
Greece	EUR	38.85	44	HI	39	0.56	87
Mexico	LCN	35.79	58	UM	11	0.61	74

Source: The Global Innovation Index, 2017

4.2 Country Profile Factors

Table 4.2. 1 Institutions in Categories

Political Environment			**Regulatory Environment**			**Business Environment**		
Country	**2015**		**Country**	**2015**		**Country**	**2015**	
Finland	1	98.9	Denmark	2	98.3	Canada	1	93.7
Norway	3	94.4	New Zealand	3	98.3	Finland	2	91.8
New Zealand	4	94.3	Norway	4	97.3	Korea, Rep.	4	90.2
Switzerland	5	94.2	Netherlands	5	97	Norway	5	90.2
Sweden	6	92.3	Finland	7	96.9	Denmark	7	90
Denmark	7	91.1	Austria	8	95.9	Ireland	8	88.7
Luxembourg	8	91.1	United Kingdom	9	95.4	Netherlands	9	88.2
Austria	9	90.5	Canada	10	94.9	United Kingdom	10	87.9
Netherlands	10	90.5	Switzerland	11	94.5	United States	11	87.4
Canada	11	89.5	Australia	12	93.8	Australia	12	86.8
Iceland	12	88.4	Sweden	13	93.1	New Zealand	13	86.5
Australia	13	87.3	United States	14	92.5	Portugal	14	86.1
Japan	16	86.5	Japan	16	90.6	Iceland	16	84.9
Belgium	17	85.6	Iceland	17	90	Sweden	17	84.7
Germany	18	84.8	Ireland	18	89.5	Belgium	18	84.2
OECD Average Score	**..**	**80.3**	**OECD Average Score**	**..**	**84.8**	**OECD Average Score**	**..**	**82.6**
World Average Score	**..**	**53.6**	**World Average Score**	**..**	**64.6**	**World Average Score**	**..**	**68.2**

Source: The Global Innovation Index, 2015

Table 4.2.1 Institutions in Categories (Cont.)

Political Environment			Regulatory Environment			Business Environment		
Country	**2015**		**Country**	**2015**		**Country**	**2015**	
Ireland	19	83.4	France	19	87	Germany	19	83.4
United States	22	80.6	Luxembourg	22	83.9	Japan	21	82.4
United Kingdom	24	78.6	Germany	26	81.5	France	26	80.3
Portugal	25	78.5	Italy	27	81.4	Switzerland	28	80.2
France	26	77.9	Belgium	30	80.2	Spain	30	79.7
Czech Republic	27	77.6	Hungary	33	78.1	Austria	31	79.5
Slovakia	30	76.9	Spain	35	77.4	Mexico	34	77.5
Poland	35	74.1	Portugal	37	77	Poland	39	76.3
Hungary	37	71.1	Czech Republic	40	75.6	Slovakia	41	76.2
Korea, Rep.	38	70.9	Poland	42	75.4	Czech Republic	43	75.9
Spain	41	68.5	Greece	45	73.1	Luxembourg	44	75.6
Italy	48	65.2	Slovakia	46	72.2	Greece	47	75
Greece	55	56.4	Korea, Rep.	66	67.4	Italy	49	74.9
Mexico	76	47.8	Mexico	88	59.2	Hungary	60	71
Turkey	88	43.0	Turkey	101	55.7	Turkey	67	68.9
OECD Average Score	**..**	**80.3**	**OECD Average Score**	**..**	**84.8**	**OECD Average Score**	**..**	**82.6**
World Average Score	**..**	**53.6**	**World Average Score**	**..**	**64.6**	**World Average Score**	**..**	**68.2**

Source: The Global Innovation Index, 2015

Table 4.2. 2 Market Sophistication in Categories

Credit			Investment			Trade and Competition		
Country	**2015**		**Country**	**2015**		**Country**	**2015**	
United States	1	79.2	United States	2	76.7	Japan	3	92.7
New Zealand	3	73.8	Switzerland	4	71.6	United Kingdom	5	90.4
Denmark	5	67.9	Canada	5	71.5	Belgium	6	90.4
Australia	6	65.5	United Kingdom	6	69.5	Germany	7	89.2
United Kingdom	8	63	Korea, Rep.	9	59.9	Netherlands	9	88.9
Canada	9	62.8	Finland	14	57.9	Australia	10	88.5
Ireland	10	62.6	Sweden	15	56.5	United States	11	88.5
Spain	14	58.3	Denmark	22	52.5	Austria	12	88.5
Switzerland	15	57.8	Luxembourg	27	50.9	Czech Republic	13	87.8
Japan	16	56	Spain	28	50.3	Switzerland	14	87.6
Korea, Rep.	17	54.5	France	32	48.1	Turkey	18	86.3
Netherlands	18	54.3	Ireland	35	46.2	Canada	20	86.2
Portugal	21	50.4	Australia	36	46.1	France	21	85.9
Germany	23	49.9	Japan	43	44.1	Slovakia	22	85.8
Sweden	25	49.6	New Zealand	44	43.5	Norway	23	85.7
OECD Average Score	**..**	**49.5**	**OECD Average Score**	**..**	**44.8**	**OECD Average Score**	**..**	**85.4**
World Average Score	**..**	**33.0**	**World Average Score**	**..**	**38.1**	**World Average Score**	**..**	**52.5**

Source: The Global Innovation Index, 2015

Table 4.2.2 Market Sophistication in Categories (Cont.)

Credit			Investment			Trade and Competition		
Country	**2015**		**Country**	**2015**		**Country**	**2015**	
Finland	27	48.3	Norway	47	42.5	Spain	24	85.6
Austria	28	48.1	Netherlands	48	42.2	New Zealand	25	85.5
Greece	33	44.9	Turkey	51	39.7	Sweden	28	85
Iceland	35	44.7	Germany	59	38.5	Denmark	30	84.6
Czech Republic	37	43.5	Belgium	61	37.5	Hungary	31	84.6
France	38	43	Italy	63	36.2	Poland	33	83.9
Italy	42	41.5	Portugal	78	32.9	Luxembourg	34	83.7
Norway	43	41.3	Austria	79	32.8	Italy	36	83.2
Slovakia	45	39.2	Iceland	80	32.6	Ireland	37	83.1
Belgium	50	36.8	Poland	84	32	Portugal	38	82.9
Luxembourg	55	34.1	Mexico	96	30.2	Greece	41	82.1
Poland	69	31	Greece	110	26.7	Iceland	49	80.8
Hungary	73	30.2	Slovakia	112	26.2	Mexico	50	80.7
Mexico	75	30	Czech Republic	118	25.8	Finland	60	78.3
Turkey	104	22.4	Hungary	132	23.3	Korea, Rep.	76	75.5
OECD Average Score	**..**	**49.5**	**OECD Average Score**	**..**	**44.8**	**OECD Average Score**	**..**	**85.4**
World Average Score	**..**	**33.0**	**World Average Score**	**..**	**38.1**	**World Average Score**	**..**	**52.5**

Source: The Global Innovation Index, 2015

Table 4.2. 3 Knowledge Input in Categories

Knowledge Works			Knowledge Absorption		
Country	**2015**		**Country**	**2015**	
Sweden	2	76.8	Luxembourg	4	61.7
Finland	3	74.8	Netherlands	7	55.5
Switzerland	4	73	Finland	9	52.7
Ireland	5	70.6	Ireland	11	51.8
Denmark	6	70.3	Mexico	13	50.4
Belgium	8	68.9	Switzerland	14	50.1
Iceland	9	67	United States	15	49.6
Australia	10	66.7	Sweden	16	48.5
United States	11	65.5	Czech Republic	24	46
France	12	64.7	France	29	44.7
United Kingdom	13	63.8	United Kingdom	30	43.6
Japan	16	62.8	Germany	33	42.2
Norway	17	62.1	Japan	34	41.8
Luxembourg	18	61.5	Canada	35	41.6
Netherlands	19	61.3	Austria	37	41.3
Korea, Rep.	22	59.9	New Zealand	38	40.9
Germany	24	59.4	Belgium	39	40.8
Austria	27	56.1	Hungary	40	40.3
Canada	28	56	Denmark	46	38.5
New Zealand	29	55.1	Italy	50	37.5
Spain	30	54.4	Iceland	54	36.9
Czech Republic	32	53.7	Poland	60	35.6
Italy	44	45.6	Korea, Rep.	61	35.6
Poland	45	45.3	Australia	63	34.4
Portugal	47	45.1	Slovakia	66	33.7
Slovakia	48	45	Norway	71	32.4
Hungary	60	40.9	Portugal	75	32.2
Mexico	72	37	Spain	79	31.6
Greece	78	35.5	Greece	95	29.3
Turkey	85	32.6	Turkey	127	22.9
OECD Average Score	**..**	**57.7**	**OECD Average Score**	**..**	**41.5**
World Average Score	**..**	**38.7**	**World Average Score**	**..**	**35.1**

Source: The Global Innovation Index, 2015

Table 4.2. 4 Knowledge and Technology Outputs in Categories

Knowledge Creation			Knowledge Impact			Knowledge Diffusion		
Country	2015		Country	Country		2015	Country	
Korea, Rep.	1	78.6	United Kingdom	2	58.7	Switzerland	1	90.3
Sweden	2	70.6	Switzerland	5	57.8	Ireland	2	84.8
Switzerland	3	69.2	United States	8	56	Luxembourg	4	67.2
United States	4	68.5	Italy	10	54.4	Netherlands	5	64.5
Germany	5	64.7	Ireland	12	53.9	Sweden	6	63
United Kingdom	7	58.6	Spain	17	51.8	Finland	10	54.2
Finland	8	57.5	Slovakia	19	50.9	Japan	14	50
Japan	10	56.3	Czech Republic	21	49.6	Austria	16	49.9
Netherlands	11	55.2	Norway	22	49.1	United States	18	49.5
New Zealand	12	54.8	Hungary	24	48.4	Korea, Republic of	19	49.1
Czech Republic	16	48	Netherlands	26	48.1	Germany	20	49
Denmark	17	45.3	Sweden	28	47.7	Mexico	22	47.5
Canada	18	45	Portugal	29	47.3	United Kingdom	23	47.5
Iceland	19	43.3	Germany	31	46.6	Denmark	24	46.7
Belgium	22	39	Australia	32	46.2	France	25	44.9
OECD Average Score	**..**	**42.3**	**OECD Average Score**	**..**	**45.7**	**OECD Average Score**	**..**	**44.3**
World Average Score	**..**	**18.7**	**World Average Score**	**..**	**35.5**	**World Average Score**	**..**	**30.5**

Source: The Global Innovation Index, 2015

Table 4.2.4 Knowledge and Technology Outputs in Categories (Cont.)

Credit			Investment			Trade and Competition		
Country	**2015**		**Country**	**2015**		**Country**	**2015**	
Austria	23	37.9	Denmark	33	46.1	Iceland	27	44.2
Luxembourg	25	37	New Zealand	35	45.8	Czech Republic	29	42.4
Australia	26	34.9	France	39	44.4	Canada	33	41
Norway	27	34.5	Finland	42	44	Spain	38	36.6
France	29	33.9	Luxembourg	44	43.1	Italy	39	36.6
Italy	31	32.6	Korea, Rep.	47	42.4	Hungary	41	34.4
Spain	33	31.3	Belgium	50	41.9	Norway	43	33.9
Ireland	35	28.4	Austria	51	41.3	Portugal	55	30.3
Turkey	36	26	Canada	56	39.7	Slovakia	69	27.5
Poland	40	24.4	Japan	59	39.4	Belgium	70	27.3
Slovakia	42	22.8	Greece	66	37.7	New Zealand	84	25.4
Portugal	44	21.9	Poland	81	35.7	Poland	89	24.9
Hungary	45	21.4	Turkey	83	35.3	Australia	99	23.2
Greece	51	18.2	Iceland	85	34.7	Greece	103	22.1
Mexico	83	8.4	Mexico	96	32.4	Turkey	108	20.4
OECD Average Score	**..**	**42.3**	**OECD Average Score**	**..**	**45.7**	**OECD Average Score**	**..**	**44.3**
World Average Score	**..**	**18.7**	**World Average Score**	**..**	**35.5**	**World Average Score**	**..**	**30.5**

Source: The Global Innovation Index, 2015

Appendices for Chapter 5 Econometric Method

5.1 Unit-root in 30 OECD Countries

Table 5. 1 Australia

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	..	..

Table 5. 2 Austria

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 3 Belgium

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 4 Canada

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 5 Czech Republic

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 6 Denmark

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 7 Finland

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 8 France

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 9 Germany

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 10 Greece

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 11 Hungary

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Reject
GDP	Accept	Accept
Export	Accept	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 12 Iceland

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 13 Ireland

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 14 Italy

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 15 Japan

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 16 Korea

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Accept	Accept

Table 5. 17 Luxembourg

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Accept	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 18 Mexico

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 19 Netherlands

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 20 New Zealand

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Accept	Accept
GDP	Reject	Accept
Export	Accept	Accept
Import	Reject	Accept
R&D	..	..

Table 5. 21 Norway

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 22 Poland

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Accept	Accept

Table 5. 23 Portugal

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 24 Slovakia

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Accept	Accept

Table 5. 25 Spain

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Accept	Accept

Table 5. 26 Sweden

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Reject
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 27 Switzerland

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	..	..

Table 5. 28 Turkey

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Accept	Accept

Table 5. 29 United Kingdom

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Reject
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 30 United States

Variables	With Intercept	
	I (2) vs I (1)	I (1) vs I (0)
FDI Inward (Flow)	Reject	Accept
FDI Outward (Flow)	Reject	Accept
GDP	Reject	Accept
Export	Reject	Accept
Import	Reject	Accept
R&D	Reject	Accept

Table 5. 31 Summary of Unit-root Test for 30 OECD Countries

Variables	Australia	Austria	Belgium	Canada	Czech Republic	Denmark	Finland	France	Germany	Greece
FDI Inward (Flow)	I (1)	I (1)	I (0)	I (1)	I (0)	I (0)	I (0)	I (0)	I (0)	I (0)
FDI Outward (Flow)	I (0)	I (1)	I (1)	I (1)	I (0)	I (0)	I (1)	I (0)	I (1)	I (1)
GDP	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
Export	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
Import	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
R&D	..	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)

Table 5. 32 Summary of Unit-root Test for 30 OECD Countries (Cont.)

Variables	Hungary	Iceland	Ireland	Italy	Japan	Korea	Luxembourg	Mexico	Netherland	New Zealand
FDI Inward (Flow)	I (0)	I (0)	I (1)	I (0)	I (0)	I (1)	I (1)	I (1)	I (1)	I (0)
FDI Outward (Flow)	I (0)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (2) at least
GDP	I (2) at least	I (1)	I (1)	I (1)	I (1)	I (1)	I (2) at least	I (1)	I (1)	I (1)
Export	I (2) at least	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (2) at least
Import	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
R&D	I (1)	I (1)	I (1)	I (1)	I (1)	I (2) at least	I (1)	I (1)	I (1)	..

Table 5. 33 Summary of Unit-root Test for 30 OECD Countries (Cont.)

Variables	Norway	Poland	Portugal	Slovakia	Spain	Sweden	Switzerland	Turkey	United Kingdom	United States
FDI Inward (Flow)	I (0)	I (1)	I (0)	I (0)	I (0)	I (0)	I (1)	I (1)	I (1)	I (1)
FDI Outward (Flow)	I (1)	I (1)	I (0)	I (0)	I (1)	I (0)	I (1)	I (1)	I (0)	I (1)
GDP	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
Export	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
Import	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
R&D	I (1)	I (2)	I (1)	I (2)	I (2)	I (1)	..	I (2)	I (1)	I (1)

Table 5.34 Engle-Granger Two Step Method (Four Types of Countries)

Type A	Type B	Type C	Type D	Type E
Australia United Kingdom	Austria Canada Ireland Mexico Netherland United States Korea Poland Switzerland Turkey	Belgium Finland Germany Greece Iceland Italy Japan Norway Spain	Czech Republic Denmark France Portugal Sweden	Hungary Luxembourg New Zealand

Table 5.35 Type A: United Kingdom (Engle-Granger Test)

Dependent	tau-statistic	z-statistic
FDIOF	-4.989*	-54.631***
FDIOF	-4.920*	-52.122***
GDP	-2.577	-10.049
X	-1.758	-6.763
M	-1.775	-6.657
RD	-3.688	-18.749

*** p<0.01, ** p<0.05, * p<0.1

Table 5.36 Type B: United States (Engle-Granger Test)

Dependent	tau-statistic	z-statistic
FDIOF	-2.774	-12.663
FDIOF	-4.413	-25.322
GDP	-2.408	-12.672
X	-3.079	-285.260***
M	-2.479	-9.988
RD	-2.557	-10.895

*** p<0.01, ** p<0.05, * p<0.1

Table 5.37 Type C: Japan (Engle-Granger Test)

Dependent	tau-statistic	z-statistic
FDIOF	-4.186	-23.073
FDIOF	-2.483	-9.941
GDP	-2.140	-7.818
X	-3.047	-16.671
M	-2.496	-10.350
RD	-3.919	-21.811

*** p<0.01, ** p<0.05, * p<0.1

Table 5.38 Type D: France (Engle-Granger Test)

Dependent	tau-statistic	z-statistic
FDIOF	-6.628***	-39.279***
FDIOF	-3.494	-21.284
GDP	-2.335	-10.596
X	-3.483	-17.968
M	-2.663	-20.679
RD	-4.635	16.415

*** p<0.01, ** p<0.05, * p<0.1

Table 5.39 Type A: United Kingdom (Cointegrating Regressions)

	FDINF
FDIOF	0.544***
	(0.134)
DLGDP	-269,529.418
	(214,470.119)
DLGX	326,172.233
	(331,322.122)
DLGM	-102,846.486
	(374,735.685)
DLGRD	67,612.859
	(360,840.488)
Constant	14,233.661
	(16,771.919)
R-squared	0.520
Adj. R-squared	0.406
No. obs.	27
Histogram-Normality	0.005

*** p<0.01, ** p<0.05, * p<0.1

Table 5.40 Type B: United States (Cointegrating Regressions)

	DFDINF
DFDIOF	0.288***
	(0.086)
DGDP	-0.185**
	(0.077)
DX	-0.169
	(0.215)
DM	0.523***
	(0.167)
DRD	-2.065
	(1.313)
Constant	-28,466.272
	(24,918.788)
R-squared	0.651
Adj. R-squared	0.579
No. obs.	30
Histogram-Normality	0.120

*** p<0.01, ** p<0.05, * p<0.1

Table 5.41 Type C: Japan (Cointegrating Regressions)

	FDINF
DFDIOF	-0.302**
	(0.149)
DLGDP	0.006
	(0.006)
DLGX	-0.094
	(0.061)
DLGM	0.078
	(0.068)
DLGRD	-1.219
	(0.570)
Constant	8,701.565
	(2,682.583)
R-squared	0.263
Adj. R-squared	0.115
No. obs.	31
Histogram-Normality	0.248

*** p<0.01, ** p<0.05, * p<0.1

Table 5.42 Type D: France (Cointegrating Regressions)

	FDINF
FDIOF	0.431***
	(0.053)
DLGDP	-0.010
	(0.016)
DLGX	-1.220***
	(0.268)
DLGM	1.068***
	(0.237)
DLGRD	-0.137
	(1.823)
Constant	-1,583.583
	(3,549.119)
R-squared	0.691
Adj. R-squared	0.629
No. obs.	31
Histogram-Normality	0.566

*** p<0.01, ** p<0.05, * p<0.1

Table 5.43 Type A: United Kingdom (Error Correction Model)

	DFDINF	DFDIOF	DLGDP	DLGX	DLGM
CointEq1	0.383***	0.764***	0.000**	0.000	0.000***
	(0.161)	(0.173)	(0.000)	(0.000)	(0.000)
DFDINF(-1)	-0.458	-0.830***	-0.000	0.000	0.000
	(0.291)	(0.313)	(0.000)	(0.000)	(0.000)
DFDINF(-2)	-0.084	0.989***	0.000	0.000	0.000
	(0.271)	(0.291)	(0.000)	(0.000)	(0.000)
DFDIOF(-1)	0.221	0.521**	0.000	0.000	0.000
	(0.188)	(0.202)	(0.000)	(0.000)	(0.000)
DFDIOF(-2)	0.238	-0.192	-0.000	-0.000	-0.000
	(0.190)	(0.204)	(0.000)	(0.000)	(0.000)
DLGDP(-1)	152,313.445	293,412.006	0.765**	0.276	0.811**
	(229,720.811)	(246,916.346)	(0.368)	(0.410)	(0.368)
DLGDP(-2)	162,090.306	-92,076.739	-0.388	-0.085	-0.202
	(164,459.805)	(176,770.289)	(0.264)	(0.293)	(0.264)
DLGX(-1)	-293,719.795	-740,279.120	-0.546	-0.609	-1.103**
	(289,124.181)	(310,766.300)	(0.463)	(0.516)	(0.464)
DLGX(-2)	-490,753.042	-815,755.724**	-1.659***	-0.906	-1.634***
	(348,065.671)	(374,119.800)	(0.558)	(0.621)	(0.558)
DLGM(-1)	284,748.873	425,424.292	0.147	0.451	0.454
	(305,811.154)	(328,702.360)	(0.490)	(0.545)	(0.490)
DLGM(-2)	322,642.985	987,826.518***	1.866***	0.891	1.608***
	(320,974.853)	(345,001.123)	(0.514)	(0.572)	(0.515)
Constant	-2,469,332.914**	-4,696,530.030***	-2.766	-1.660	-4.258**
	(1,093,219.311)	(1,175,051.214)	(1.752)	(1.949)	(1.753)
LGRD	241,923.897**	460,702.823***	0.276	0.169	0.425**
	(107,576.471)	(115,629.007)	(0.172)	(0.192)	(0.173)
R-squared	0.424	0.826	0.752	0.630	0.727
Adj. R-squared	-0.007	0.696	0.565	0.353	0.522
F-statistic	0.983	6.341	4.032	2.275	3.544
No. obs.	29	29	29	29	29

*** p<0.01, ** p<0.05, * p<0.1

Table 5.44 Type B: United States (Error Correction Model)

	D(FDINF)	D(FDIOF)	D(GDP)	D(X)	D(M)
CointEq1	0.257**	0.360***	0.305	0.410***	0.469**
	(0.102)	(0.132)	(0.312)	(0.141)	(0.236)
DFDINF(-1)	0.314	0.351	0.946	0.197	-0.180
	(0.325)	(0.421)	(0.990)	(0.448)	(0.750)
DFDINF(-2)	0.223	0.203	-0.744	0.798	1.027
	(0.361)	(0.467)	(1.099)	(0.497)	(0.833)
DFDIOF(-1)	1.083**	1.052	0.606	1.629**	2.046
	(0.500)	(0.647)	(1.522)	(0.689)	(1.154)
DFDIOF(-2)	0.748***	0.419	0.364	0.594*	0.657
	(0.257)	(0.332)	(0.782)	(0.354)	(0.592)
DGDP(-1)	0.170	-0.361	1.522**	0.195	0.627
	(0.195)	(0.252)	(0.594)	(0.269)	(0.450)
DGDP(-2)	-0.257	0.133	-1.058**	-0.440*	-0.812**
	(0.167)	(0.216)	(0.509)	(0.230)	(0.386)
DX(-1)	-0.131	-0.807	0.684	1.026	0.345
	(0.575)	(0.743)	(1.748)	(0.791)	(1.324)
DX(-2)	0.302	0.075	-1.067	-0.441	-0.284
	(0.569)	(0.736)	(1.731)	(0.784)	(1.312)
DM(-1)	-0.807*	-0.355	-2.304	-1.451**	-1.523
	(0.471)	(0.608)	(1.432)	(0.648)	(1.085)
DM(-2)	-0.373	-0.503	1.253	-0.171	-0.114
	(0.366)	(0.473)	(1.112)	(0.503)	(0.843)
DRD(-1)	3.258	9.625**	-3.924	-1.282	-1.125
	(2.922)	(3.776)	(8.886)	(4.022)	(6.734)
DRD(-2)	-3.821	-6.988**	2.279	0.609	-0.119
	(2.441)	(3.154)	(7.423)	(3.360)	(5.625)
Constant	116,850.726	167,892.074	351,338.050	247,588.529*	277,506.102
	(94,076.444)	(121,580.524)	(286,118.601)	(129,511.611)	(216,836.393)
R-squared	0.717	0.778	0.762	0.780	0.763
Adj. R-squared	0.473	0.586	0.556	0.589	0.558
F-statistic	2.930	4.053	3.693	4.082	3.720
No. obs.	29	29	29	29	29

*** p<0.01, ** p<0.05, * p<0.1

Table 5.45 Type C: Japan (Error Correction Model)

	D(FDINF)	D(FDIOF)	D(LGDP)	D(LGX)	D(LGM)
CointEq1	0.682	-1.580	-0.000	-0.000	0.000
	(0.682)	(1.094)	(0.000)	(0.000)	(0.000)
DFDINF(-1)	-0.997	1.799*	0.000	0.000	-0.000
	(0.624)	(1.002)	(0.000)	(0.000)	(0.000)
DFDINF(-2)	-1.077**	-0.960	0.000	-0.000	-0.000**
	(0.534)	(0.857)	(0.000)	(0.000)	(0.000)
DFDIOF(-1)	0.102	0.094	-0.000	-0.000***	-0.000**
	(0.129)	(0.207)	(0.000)	(0.000)	(0.000)
DFDIOF(-2)	0.268	-0.031	-0.000	-0.000	0.000
	(0.197)	(0.316)	(0.000)	(0.000)	(0.000)
DLGDP(-1)	-65,161.379*	25,469.658	0.656	0.589*	0.261
	(34,864.228)	(55,940.229)	(0.497)	(0.327)	(0.453)
DLGDP(-2)	-15,700.790	66,674.798*	0.197	-0.269	-0.234
	(24,090.056)	(38,652.891)	(0.343)	(0.226)	(0.313)
DLX(-1)	82,805.075	43,054.492	-0.647	-1.075*	-0.053
	(58,897.050)	(94,501.286)	(0.839)	(0.552)	(0.766)
DLX(-2)	51,206.835	-80,533.402	0.167	0.416	0.857
	(45,163.150)	(72,465.018)	(0.644)	(0.424)	(0.587)
DLM(-1)	-32,939.502	4,241.515	0.017	0.875**	0.327
	(43,798.441)	(70,275.319)	(0.624)	(0.411)	(0.570)
DLM(-2)	-59,763.481	61,251.185	-0.217	-0.292	-0.915
	(45,446.561)	(72,919.756)	(0.648)	(0.426)	(0.591)
DLRD(-1)	17,586.830	-103,055.322	-0.085	-0.361	0.363
	(61,779.856)	(99,126.796)	(0.881)	(0.579)	(0.804)
DLRD(-2)	126,153.914*	-205,573.886*	-0.304	-0.106	0.183
	(65,731.016)	(105,466.499)	(0.937)	(0.616)	(0.855)
Constant	-7,135.885	14,713.393*	0.076	0.083*	0.020
	(4,967.524)	(7,970.474)	(0.071)	(0.047)	(0.065)
R-squared	0.508	0.826	0.611	0.814	0.714
Adj. R-squared	0.108	0.684	0.295	0.663	0.482
F-statistic	1.271	5.830	1.931	5.390	3.076
No. obs.	30	30	30	30	30

*** p<0.01, ** p<0.05, * p<0.1

Table 5.46 Type D: France (Error Correction Model)

	D(FDINF)	D(FDIOF)	D(LGDP)	D(LGX)	D(LGM)
CointEq1	0.746**	1.050	0.000*	0.000**	0.000**
	(0.318)	(0.814)	(0.000)	(0.000)	(0.000)
DFDINF(-1)	-0.886**	0.285	-0.000	-0.000	-0.000
	(0.380)	(0.973)	(0.000)	(0.000)	(0.000)
DFDINF(-2)	-0.267	0.482	-0.000	-0.000**	-0.000*
	(0.339)	(0.868)	(0.000)	(0.000)	(0.000)
DFDIOF(-1)	0.413*	0.505	0.000	0.000*	0.000**
	(0.251)	(0.645)	(0.000)	(0.000)	(0.000)
DFDIOF(-2)	0.490**	0.486	0.000*	0.000**	0.000**
	(0.203)	(0.520)	(0.000)	(0.000)	(0.000)
DLGDP(-1)	31,766.344	161,572.236	0.454	0.508	0.885*
	(58,703.590)	(150,486.956)	(0.476)	(0.443)	(0.470)
DLGDP(-2)	148,861.660**	251,502.664	0.752	1.155**	1.432**
	(71,667.861)	(183,720.931)	(0.581)	(0.541)	(0.574)
DLX(-1)	339,591.959***	443,913.350	-0.919	-0.740	-1.206
	(130,655.983)	(334,937.287)	(1.060)	(0.987)	(1.047)
DLX(-2)	-171,414.752	-139,691.801	0.646	-0.458	-0.963
	(140,063.236)	(359,052.828)	(1.136)	(1.058)	(1.122)
DLM(-1)	-288,848.856**	-484,538.288*	0.947	0.564	0.708
	(112,928.749)	(289,493.430)	(0.916)	(0.853)	(0.905)
DLM(-2)	21,663.870	-124,277.232	-1.387*	-0.712	-0.638
	(96,049.532)	(246,223.472)	(0.779)	(0.725)	(0.770)
DLRD(-1)	425,276.736**	502,046.549	2.158	2.070	2.724*
	(181,890.322)	(466,276.780)	(1.475)	(1.373)	(1.458)
DLRD(-2)	-62,463.389	-247,417.709	2.636***	2.163**	1.999**
	(120,994.031)	(310,168.823)	(0.981)	(0.914)	(0.970)
Constant	-20,449.564	-15,956.800	-0.211	-0.159	-0.172*
	(13,045.915)	(33,443.271)	(0.106)	(0.099)	(0.105)
R-squared	0.646	0.483	0.510	0.473	0.507
Adj. R-squared	0.359	0.062	0.111	0.044	0.106
F-statistic	2.249	1.148	1.280	1.104	1.265
No. obs.	30	30	30	30	30

*** p<0.01, ** p<0.05, * p<0.1

Appendices for Chapter 6 Empirical Study 1

Table 6. 4 Country Code

30 Countries in OECD	Country Code
Australia	AU
Austria	AT
Belgium	BE
Canada	CA
Czech Republic	CZ
Denmark	DK
Finland	FI
France	FR
Germany	DE
Greece	GR
Hungary	HU
Iceland	IS
Ireland	IE
Italy	IT
Japan	JP
Korea	KR
Luxembourg	LU
Mexico	MX
Netherland	NL
New Zealand	NZ
Norway	NO
Poland	PL
Portugal	PT
Slovakia	SK
Spain	ES
Sweden	SE
Switzerland	CH
Turkey	TR
United Kingdom	GB
United States	US

Table 6. 5 Dummy Variable

Dummy Variable for Countries	Representation
DUMAUL	Dummy Variable of Australia
DUMAUS	Dummy Variable of Austria
DUMBEL	Dummy Variable of Belgium
DUMCAN	Dummy Variable of Canada
DUMCZE	Dummy Variable of Czech Republic
DUMDEN	Dummy Variable of Denmark
DUMFIN	Dummy Variable of Finland
DUMFRA	Dummy Variable of France
DUMGER	Dummy Variable of Germany
DUMGRE	Dummy Variable of Greece
DUMHUN	Dummy Variable of Hungary
DUMICE	Dummy Variable of Iceland
DUMIRE	Dummy Variable of Ireland
DUMITA	Dummy Variable of Italy
DUMJAP	Dummy Variable of Japan
DUMKOR	Dummy Variable of Korea
DUMLUX	Dummy Variable of Luxembourg
DUMMEX	Dummy Variable of Mexico
DUMNET	Dummy Variable of Netherland
DUMNEW	Dummy Variable of New Zealand
DUMNOR	Dummy Variable of Norway
DUMPOL	Dummy Variable of Poland
DUMPOR	Dummy Variable of Portugal
DUMSLO	Dummy Variable of Slovakia
DUMSPA	Dummy Variable of Spain
DUMSWE	Dummy Variable of Sweden
DUMSWI	Dummy Variable of Switzerland
DUMTUR	Dummy Variable of Turkey
DUMUK	Dummy Variable of United Kingdom
DUMUS	Dummy Variable of the United States

Regression Result in 30 OECD Countries

Table 6. 6 Australia

	FDINF	FDIOF	GDP
FDINF	..	0.362***	65.877***
	..	(0.309)	(8.741)
FDINF(-1)	0.183	-0.293*	1.337
	(0.178)	(0.406)	(14.641)
FDIOF	0.705***	..	-10.516
	(0.228)	..	(21.142)
FDIOF(-1)	0.076	-0.583	-17.398
	(0.241)	(0.420)	(19.156)
GDP	0.010***	-0.001	..
	(0.001)	(0.002)	..
GDP(-1)	-0.005***	0.005***	0.181
	(0.002)	(0.002)	(0.207)
Constant	6.899**	1.372	-478.334*
	(3.474)	(2.645)	(284.675)
R-squared	0.864	0.610	0.809
Adj. R-squared	0.839	0.541	0.775
F-statistic	35.511	8.769	23.794
	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.774	0.813	0.504
Serial Correlation	0.008	0.762	0.048
White Hetero-scedasticity	0.043	0.352	0.001

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 7 Austria

	FDINF	FDIOF	GDP
FDINF	..	0.965***	-2.571
	..	(0.153)	(1.875)
FDINF(-1)	-0.411**	0.462**	-3.410*
	(0.175)	(0.225)	(1.856)
FDIOF	0.607***	..	3.063**
	(0.096)	..	(1.424)
FDIOF(-1)	0.058	0.181	1.204
	(0.125)	(0.154)	(1.265)
GDP	-0.024	0.046**	..
	(0.018)	(0.021)	..
GDP(-1)	0.008	-0.027	0.558***
	(0.014)	(0.017)	(0.099)
Constant	22.262*	-21.424	427.021***
	(12.291)	(15.864)	(105.931)
R-squared	0.682	0.807	0.629
Adj. R-squared	0.625	0.773	0.563
F-statistic	12.001	23.472	9.500
	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.375	0.953	0.890
Serial Correlation	0.079	0.850	0.284
White Hetero-scedasticity	0.109	0.446	0.823

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 8 Belgium

	FDINF	FDIOF	GDP
FDINF	..	0.724***	0.025
	..	(0.081)	(0.467)
FDINF(-1)	0.098	-0.076	0.455
	(0.196)	(0.163)	(0.460)
FDIOF	1.042***	..	-0.232
	(0.116)	..	(0.558)
FDIOF(-1)	-0.183	0.283	-0.453
	(0.228)	(0.184)	(0.542)
GDP	0.004	-0.028	..
	(0.082)	(0.068)	..
GDP(-1)	0.036	-0.041	0.384***
	(0.053)	(0.044)	(0.104)
Constant	-30.668	71.839	620.122***
	(69.966)	(56.804)	(144.687)
R-squared	0.822	0.859	0.460
Adj. R-squared	0.788	0.832	0.356
F-statistic	24.045	31.758	4.436
	(0.000)	(0.000)	(0.005)
No. obs.	32	32	32
Histogram-Normality	0.000	0.015	0.682
Serial Correlation	0.373	0.087	0.052
White Hetero-scedasticity	0.302	0.013	0.551

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 9 Canada

	FDINF	FDIOF	GDP
FDINF	..	0.338***	1.385
	..	(0.088)	(1.202)
FDINF(-1)	0.142	0.138	0.127
	(0.186)	(0.105)	(1.224)
FDIOF	1.022***	..	1.070
	(0.266)	..	(2.129)
FDIOF(-1)	-0.214	0.300**	-2.199
	(0.251)	(0.135)	(1.601)
GDP	0.033	0.008	..
	(0.028)	(0.017)	..
GDP(-1)	-0.021	-0.010	0.674***
	(0.020)	(0.011)	(0.038)
Constant	-12.074	8.960	296.790***
	(11.847)	(6.729)	(54.941)
R-squared	0.603	0.731	0.932
Adj. R-squared	0.533	0.683	0.919
F-statistic	8.524	15.207	76.458
	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.001	0.010	0.658
Serial Correlation	0.363	0.576	0.002
White Hetero-scedasticity	0.014	0.809	0.357

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 10 Czech Republic

	FDINF	FDIOF	GDP
FDINF	..	0.023	-0.829
	..	(0.028)	(1.120)
FDINF(-1)	0.280	-0.012	0.284
	(0.355)	(0.027)	(1.063)
FDIOF	4.263	..	27.434*
	(5.274)	..	(11.315)
FDIOF(-1)	13.672	-1.180**	43.493*
	(7.541)	(0.493)	(20.199)
GDP	-0.101	0.018*	..
	(0.136)	(0.007)	..
GDP(-1)	-0.041	-0.001	0.406
	(0.130)	(0.010)	(0.338)
Constant	58.622	-5.380	201.355
	(47.033)	(3.197)	(126.983)
R-squared	0.479	0.619	0.856
Adj. R-squared	0.046	0.301	0.735
F-statistic	1.105	1.949	7.112
	(0.445)	(0.220)	(0.017)
No. obs.	34	34	34
Histogram-Normality	0.662	0.813	0.633
Serial Correlation	0.007	0.241	0.020
White Hetero-scedasticity	0.841	0.091	0.237

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6. 11 Denmark

	FDINF	FDIOF	GDP
FDINF	..	0.003***	-2.557*
	..	(0.000)	(1.312)
FDINF(-1)	-0.330*	0.001	-2.221
	(0.181)	(0.001)	(1.357)
FDIOF	235.931***	..	476.582
	(19.883)	..	(349.862)
FDIOF(-1)	83.204*	-0.221	437.871
	(47.274)	(0.188)	(359.274)
GDP	-0.047*	0.000	..
	(0.024)	(0.000)	..
GDP(-1)	-0.009	0.000	0.374***
	(0.019)	(0.000)	(0.120)
Constant	41.351*	-0.106	593.126***
	(20.779)	(0.083)	(120.100)
R-squared	0.894	0.882	0.593
Adj. R-squared	0.875	0.861	0.520
F-statistic	47.399	41.782	8.150
	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.872	0.862	0.635
Serial Correlation	0.541	0.578	0.045
White Hetero-scedasticity	0.524	0.560	0.509

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 12 Finland

	FDINF	FDIOF	GDP
FDINF	..	0.866***	-0.471
	..	(0.248)	(1.344)
FDINF(-1)	0.324*	-0.570*	0.431
	(0.188)	(0.292)	(1.412)
FDIOF	0.351***	..	0.035
	(0.100)	..	(0.858)
FDIOF(-1)	-0.225*	0.543***	-0.139
	(0.129)	(0.187)	(0.970)
GDP	-0.009	0.002	..
	(0.026)	(0.042)	..
GDP(-1)	-0.020	-0.006	0.703***
	(0.026)	(0.042)	(0.135)
Constant	39.747*	8.466	290.309*
	(21.692)	(36.022)	(154.264)
R-squared	0.428	0.458	0.570
Adj. R-squared	0.326	0.361	0.494
F-statistic	4.197	4.735	7.437
	(0.006)	(0.003)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.000	0.000	0.707
Serial Correlation	0.435	0.327	0.011
White Hetero-scedasticity	0.882	0.128	0.653

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 13 France

	FDINF	FDIOF	GDP
FDINF	..	1.285***	3.389
	..	(0.345)	(3.541)
FDINF(-1)	0.043	0.867*	2.639
	(0.215)	(0.451)	(4.062)
FDIOF	0.257***	..	-0.541
	(0.069)	..	(1.607)
FDIOF(-1)	-0.056	0.289*	-1428
	(0.071)	(0.151)	(1.343)
GDP	0.009	-0.007	..
	(0.010)	(0.022)	..
GDP(-1)	-0.001	-0.006	0.579***
	(0.009)	(0.019)	(0.122)
Constant	-1.742	6.378	387.632***
	(7.609)	(16.975)	(125.181)
R-squared	0.491	0.698	0.528
Adj. R-squared	0.400	0.644	0.444
F-statistic	5.399	12.943	6.276
	(0.001)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.814	0.154	0.503
Serial Correlation	0.692	0.060	0.016
White Hetero-scedasticity	0.354	0.003	0.622

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 14 Germany

	FDINF	FDIOF	GDP
FDINF	..	0.138	-2.724*
	..	(0.228)	(1.523)
FDINF(-1)	-0.288	-0.125	-0.817
	(0.201)	(0.210)	(1.504)
FDIOF	0.136	..	0.672
	(0.226)	..	(1.629)
FDIOF(-1)	0.701***	0.486*	0.818
	(0.252)	(0.279)	(2.137)
GDP	-0.053*	0.013	..
	(0.029)	(0.032)	..
GDP(-1)	-0.036	0.000	0.541**
	(0.033)	(0.034)	(0.213)
Constant	87.046**	-2.107	466.342**
	(26.730)	(33.550)	(214.169)
R-squared	0.565	0.320	0.615
Adj. R-squared	0.451	0.141	0.515
F-statistic	4.937	1.789	6.089
	(0.005)	(0.163)	(0.001)
No. obs.	25	25	25
Histogram-Normality	0.000	0.358	0.971
Serial Correlation	0.347	0.540	0.270
White Hetero-scedasticity	0.036	0.072	0.843

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 15 Greece

	FDINF	FDIOF	GDP
FDINF	..	0.506	9.218**
	..	(0.103)	(3.823)
FDINF(-1)	-0.149	0.030	3.292
	(0.207)	(0.205)	(4.166)
FDIOF	0.108	..	2.829
	(0.217)	..	(4.353)
FDIOF(-1)	-0.004	0.506**	2.774
	(0.229)	(0.196)	(4.579)
GDP	0.023**	0.007	..
	(0.009)	(0.010)	..
GDP(-1)	-0.011	-0.001	0.674***
	(0.009)	(0.009)	(0.132)
Constant	-2.764	-5.098	197.393
	(6.120)	(5.915)	(116.612)
R-squared	0.341	0.507	0.810
Adj. R-squared	0.191	0.395	0.767
F-statistic	2.278	4.534	18.738
	(0.082)	(0.005)	(0.000)
No. obs.	28	28	28
Histogram-Normality	0.872	0.035	0.886
Serial Correlation	0.948	0.439	0.099
White Hetero-scedasticity	0.010	0.026	0.428

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 16 Hungary

	FDINF	FDIOF	GDP
FDINF	..	0.443***	0.010
	..	(0.133)	(1.216)
FDINF(-1)	0.002	-0.046	-2.207*
	(0.273)	(0.192)	(1.262)
FDIOF	0.893***	..	0.216
	(0.268)	..	(1.727)
FDIOF(-1)	-0.290	0.256	3.023*
	(0.362)	(0.252)	(1.700)
GDP	0.000	0.004	..
	(0.048)	(0.034)	..
GDP(-1)	-0.026	0.032	0.729***
	(0.045)	(0.031)	(0.142)
Constant	60.121*	-39.459*	303.444*
	(30.912)	(22.075)	(154.808)
R-squared	0.406	0.594	0.822
Adj. R-squared	0.231	0.475	0.770
F-statistic	2.323	4.978	15.742
	(0.088)	(0.005)	(0.000)
No. obs.	23	23	23
Histogram-Normality	0.656	0.722	0.783
Serial Correlation	0.846	0.656	0.096
White Hetero-scedasticity	0.847	0.005	0.064

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 17 Iceland

	FDINF	FDIOF	GDP
FDINF	..	2.067***	0.851
	..	(0.254)	(0.554)
FDINF(-1)	0.431***	-0.880**	-0.609
	(0.137)	(0.347)	(0.439)
FDIOF	0.359***	..	0.044
	(0.044)	..	(0.242)
FDIOF(-1)	0.054	-0.143	0.213
	(0.065)	(0.154)	(0.177)
GDP	0.109	0.032	..
	(0.071)	(0.179)	..
GDP(-1)	-0.136**	0.181	0.608***
	(0.067)	(0.170)	(0.158)
Constant	33.129	-210.283	363.629**
	(59.631)	(137.097)	(149.281)
R-squared	0.911	0.855	0.765
Adj. R-squared	0.892	0.823	0.714
F-statistic	47.390	27.155	14.982
	(0.000)	(0.000)	(0.000)
No. obs.	29	29	29
Histogram-Normality	0.001	0.000	0.567
Serial Correlation	0.127	0.008	0.167
White Hetero-scedasticity	0.761	0.984	0.804

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 18 Ireland*

	FDINF	FDIOF	GDP
FDINF	..	0.337***	-0.330
	..	(0.107)	(0.219)
FDINF(-1)	0.330*	-0.116	0.099
	(0.194)	(0.122)	(0.222)
FDIOF	0.917***	..	0.277
	(0.292)	..	(0.375)
FDIOF(-1)	0.213	0.772**	1.111*
	(0.600)	(0.326)	(0.606)
GDP	-0.283	0.087	..
	(0.188)	(0.118)	..
GDP(-1)	0.048	-0.013	0.668***
	(0.168)	(0.102)	(0.114)
Constant	197.762**	-60.671	246.457**
	(94.431)	(61.339)	(98.644)
R-squared	0.556	0.681	0.846
Adj. R-squared	0.456	0.609	0.811
F-statistic	5.521	9.405	24.145
	(0.000)	(0.000)	(0.000)
No. obs.	28	28	28
Histogram-Normality	0.610	0.131	0.188
Serial Correlation	0.047	0.632	0.048
White Hetero-scedasticity	0.009	0.013	0.535

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 19 Italy

	FDINF	FDIOF	GDP
FDINF	..	0.664***	-0.025
	..	(0.175)	(3.764)
FDINF(-1)	-0.088	0.543***	1.383
	(0.203)	(0.208)	(4.042)
FDIOF	0.509***	..	3.376
	(0.135)	..	(3.235)
FDIOF(-1)	-0.220*	0.372***	-1.750
	(0.122)	(0.129)	(2.540)
GDP	0.000	0.011	..
	(0.009)	(0.011)	..
GDP(-1)	-0.005	-0.000	0.751***
	(0.010)	(0.011)	(0.137)
Constant	9.535**	-12.027	216.072
	(6.914)	(7.834)	(136.344)
R-squared	0.404	0.723	0.613
Adj. R-squared	0.298	0.674	0.544
F-statistic	3.798	14.643	8.872
	(0.009)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.197	0.631	0.881
Serial Correlation	0.304	0.932	0.071
White Hetero-scedasticity	0.002	0.008	0.765

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 20 Japan

	FDINF	FDIOF	GDP
FDINF	..	0.730	-0.097
	..	(0.582)	(16.072)
FDINF(-1)	0.480***	-0.779	14.267
	(0.175)	(0.605)	(16.575)
FDIOF	0.073	..	0.917
	(0.058)	..	(5.090)
FDIOF(-1)	-0.066	0.872***	-4.817
	(0.062)	(0.114)	(5.323)
GDP	-0.000	0.001	..
	(0.002)	(0.007)	..
GDP(-1)	-0.000	-0.001	0.894***
	(0.002)	(0.007)	(0.080)
Constant	0.350	1.853	133.826*
	(1.025)	(3.222)	(83.612)
R-squared	0.238	0.700	0.817
Adj. R-squared	0.102	0.647	0.785
F-statistic	1.753	13.078	25.064
	(0.155)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.000	0.118	0.465
Serial Correlation	0.596	0.695	0.040
White Hetero-scedasticity	0.899	0.008	0.170

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 21 Korea

	FDINF	FDIOF	GDP
FDINF	..	0.064	204.270***
	..	(0.226)	(52.163)
FDINF(-1)	0.747***	-0.009	-171.065***
	(0.125)	(0.226)	(56.260)
FDIOF	0.044	..	160.493***
	(0.158)	..	(44.964)
FDIOF(-1)	-0.044	0.934***	-155.388***
	(0.161)	(0.080)	(47.164)
GDP	0.002***	0.002***	..
	(0.000)	(0.000)	..
GDP(-1)	-0.001***	-0.002***	0.648***
	(0.000)	(0.000)	(0.149)
Constant	1.808	0.720	3.688***
	(1.075)	(1.343)	(387.517)
R-squared	0.723	0.864	0.719
Adj. R-squared	0.674	0.840	0.669
F-statistic	14.649	35.617	14.364
	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.024	0.002	0.299
Serial Correlation	0.002	0.190	0.053
White Hetero-scedasticity	0.456	0.989	0.001

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 22 Luxembourg

	FDINF	FDIOF	GDP
FDINF	..	0.721***	4.282***
	..	(0.106)	(0.306)
FDINF(-1)	-0.107	0.152	0.351
	(0.197)	(0.176)	(0.899)
FDIOF	0.886***	..	-3.030***
	(0.131)	..	(0.794)
FDIOF(-1)	0.166	0.015	-1.012
	(0.218)	(0.198)	(0.984)
GDP	0.206***	-0.118***	..
	(0.015)	(0.031)	..
GDP(-1)	0.022	-0.045	-0.049
	(0.044)	(0.039)	(0.201)
Constant	-172.741	114.607**	435.647
	(122.066)	(103.647)	(571.095)
R-squared	0.971	0.864	0.946
Adj. R-squared	0.965	0.837	0.936
F-statistic	173.916	32.933	91.488
	(0.000)	(0.000)	(0.000)
No. obs.	32	32	32
Histogram-Normality	0.000	0.000	0.000
Serial Correlation	0.873	0.568	0.921
White Hetero-scedasticity	0.958	0.881	0.126

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 23 Mexico

	FDINF	FDIOF	GDP
FDINF	..	-0.217	4.109
	..	(0.429)	(4.773)
FDINF(-1)	0.533***	0.280	-3.542
	(0.131)	(0.372)	(4.173)
FDIOF	-0.042	..	1.181
	(0.082)	..	(2.110)
FDIOF(-1)	0.242***	0.402*	0.971
	(0.087)	(0.211)	(2.510)
GDP	0.006	0.009	..
	(0.007)	(0.017)	..
GDP(-1)	-0.005**	-0.005	0.265***
	(0.002)	(0.005)	(0.038)
Constant	7.995	-0.641	679.045***
	(5.725)	(13.492)	(80.571)
R-squared	0.536	0.163	0.904
Adj. R-squared	0.453	0.014	0.887
F-statistic	6.469	1.091	52.699
	(0.000)	(0.387)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.029	0.000	0.034
Serial Correlation	0.916	0.025	0.009
White Hetero-scedasticity	0.761	0.996	0.646

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 24 Netherland*

	FDINF	FDIOF	GDP
FDINF	..	0.151	-0.370
	..	(0.169)	(0.531)
FDINF(-1)	-0.077	0.234*	-0.189
	(0.193)	(0.170)	(0.548)
FDIOF	0.183	..	0.160
	(0.205)	..	(0.589)
FDIOF(-1)	0.316	0.413**	0.471
	(0.206)	(0.179)	(0.603)
GDP	-0.046	0.016	..
	(0.066)	(0.060)	..
GDP(-1)	-0.013	-0.027	0.513***
	(0.043)	(0.039)	(0.076)
Constant	74.124*	28.285	456.605***
	(42.676)	(40.432)	(93.563)
R-squared	0.270	0.431	0.668
Adj. R-squared	0.139	0.220	0.609
F-statistic	2.067	4.252	11.267
	(0.100)	(0.005)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.000	0.000	0.717
Serial Correlation	0.032	0.553	0.062
White Hetero-scedasticity	0.213	0.989	0.002

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 25 New Zealand*

	FDINF	FDIOF	GDP
	..	-0.951	6.611
FDINF	..	(1.461)	(7.134)
	0.436	-0.248	-3.436
FDINF(-1)	(0.170)	(1.474)	(7.229)
	-0.016	..	0.429
FDIOF	(0.024)	..	(0.926)
	-0.006	0.992***	0.036
FDIOF(-1)	(0.035)	(0.202)	(1.357)
	0.004	0.018	..
GDP	(0.005)	(0.038)	..
	-0.004***	-0.001	-0.111*
GDP(-1)	(0.001)	(0.013)	(0.062)
	10.886	25.603	1,132.194***
Constant	(6.973)	(56.418)	(178.444)
R-squared	0.402	0.494	0.703
Adj. R-squared	0.296	0.404	0.650
	3.771	5.477	13.245
F-statistic	(0.010)	(0.001)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.016	0.000	0.000
Serial Correlation	0.271	0.000	0.001
White Hetero-scedasticity	0.894	0.551	0.077

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 26 Norway

	FDINF	FDIOF	GDP
FDINF	..	0.379	118.943***
	..	(0.272)	(13.202)
FDINF(-1)	0.504***	-0.414	-64.616***
	(0.148)	(0.251)	(21.053)
FDIOF	0.171	..	13.725
	(0.123)	..	(17.301)
FDIOF(-1)	0.188	0.500***	-41.777**
	(0.133)	(0.181)	(17.216)
GDP	0.006***	0.002	..
	(0.001)	(0.002)	..
GDP(-1)	-0.005***	0.000	0.666***
	(0.001)	(0.002)	(0.133)
Constant	-1.940	9.613**	223.373
	(3.212)	(4.461)	(443.949)
R-squared	0.903	0.701	0.906
Adj. R-squared	0.886	0.648	0.889
F-statistic	52.380	13.160	53.836
	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.864	0.000	0.383
Serial Correlation	0.100	0.450	0.118
White Hetero-scedasticity	0.480	0.956	0.124

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 27 Poland

	FDINF	FDIOF	GDP
	..	0.408***	52.752
FDINF	..	(0.150)	(76.384)
	0.830***	-0.320**	-12.674
FDINF(-1)	(0.109)	(0.160)	(77.809)
	0.510***	..	-7.700
FDIOF	(0.188)	..	(86.108)
	-0.606	0.918***	-25.891
FDIOF(-1)	(0.212)	(0.128)	(98.207)
	0.000	-0.000	..
GDP	(0.000)	(0.000)	..
	-0.000	0.000	-0.075
GDP(-1)	(0.000)	(0.000)	(0.188)
	3.404	-0.083	-323.605
Constant	(2.310)	(2.145)	(975.457)
R-squared	0.740	0.706	0.049
Adj. R-squared	0.693	0.654	-0.121
	15.929	13.486	0.289
F-statistic	(0.000)	(0.000)	(0.915)
No. obs.	34	34	34
Histogram-Normality	0.009	0.000	0.000
Serial Correlation	0.436	0.019	0.643
White Hetero-scedasticity	0.136	0.116	0.920

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 28 Portugal

	FDINF	FDIOF	GDP
	..	0.752***	1.379
FDINF	..	(0.179)	(1.902)
	0.111	0.752	2.878
FDINF(-1)	(0.181)	(0.179)	(1.767)
	0.514***	..	-0.969
FDIOF	(0.122)	..	(1.576)
	-0.294**	0.437***	-0.398
FDIOF(-1)	(0.139)	(0.161)	(1.522)
	0.013	-0.014	..
GDP	(0.018)	(0.022)	..
	-0.011	0.006	0.424***
GDP(-1)	(0.009)	(0.012)	(0.059)
	13.369	-2.100	481.148***
Constant	(11.910)	(14.723)	(83.814)
R-squared	0.448	0.521	0.656
Adj. R-squared	0.349	0.436	0.595
	4.547	6.098	10.709
F-statistic	(0.004)	(0.001)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.698	0.001	0.788
Serial Correlation	0.559	0.938	0.016
White Hetero-scedasticity	0.067	0.941	0.866

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 29 Slovakia

	FDINF	FDIOF	GDP
	..	-0.099	1.176
FDINF	..	(0.189)	(1.047)
	0.000	-0.167	0.380
FDINF(-1)	(0.252)	(0.188)	(1.093)
	-0.170	..	0.497
FDIOF	(0.324)	..	(1.418)
	0.031	-0.290	-0.015
FDIOF(-1)	(0.339)	(0.249)	(1.478)
	0.062	0.015	..
GDP	(0.055)	(0.044)	..
	-0.010	-0.002	0.167***
GDP(-1)	(0.011)	(0.009)	(0.026)
	3.946	15.184	715.342***
Constant	(47.618)	(36.198)	(104.693)
R-squared	0.090	0.133	0.774
Adj. R-squared	-0.194	-0.138	0.703
	0.317	0.491	10.962
F-statistic	(0.895)	(0.777)	(0.000)
No. obs.	22	22	22
Histogram-Normality	0.025	0.000	0.685
Serial Correlation	0.000	0.029	0.000
White Hetero-scedasticity	0.052	0.690	0.053

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6. 30 Spain

	FDINF	FDIOF	GDP
	..	0.514	3.900***
FDINF	..	(0.392)	(2.920)
	0.183	-1.149***	2.104
FDINF(-1)	(0.178)	(0.367)	(3.155)
	0.705***	..	0.077
FDIOF	(0.228)	..	(1.408)
	0.076	0.939***	-0.47
FDIOF(-1)	(0.241)	(0.226)	(2.140)
	0.010***	0.001	..
GDP	(0.001)	(0.025)	..
	-0.005***	0.000	0.422***
GDP(-1)	(0.002)	(0.012)	(0.047)
	6.899**	14.172	427.518***
Constant	(3.474)	(15.409)	(83.980)
R-squared	0.864	0.733	0.773
Adj. R-squared	0.839	0.685	0.733
	35.511	15.350	19.150
F-statistic	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.774	0.000	0.487
Serial Correlation	0.008	0.778	0.000
White Hetero-scedasticity	0.043	0.338	0.149

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 31 Sweden

	FDINF	FDIOF	GDP
FDINF	..	0.230**	-0.866
	..	(0.109)	(0.585)
FDINF(-1)	-0.041	0.416***	-2.009***
	(0.233)	(0.122)	(0.646)
FDIOF	0.593**	..	2.482***
	(0.281)	..	(0.854)
FDIOF(-1)	0.382	-0.032	1.467*
	(0.243)	(0.158)	(0.765)
GDP	-0.084	0.093***	..
	(0.056)	(0.032)	..
GDP(-1)	0.017	-0.053**	0.529***
	(0.043)	(0.025)	(0.097)
Constant	54.420	-12.369	372.945***
	(39.302)	(25.232)	(110.062)
R-squared	0.418	0.590	0.671
Adj. R-squared	0.314	0.517	0.613
F-statistic	4.025	8.064	11.446
	(0.007)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.000	0.462	0.740
Serial Correlation	0.480	0.542	0.381
White Hetero-scedasticity	0.396	0.945	0.350

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 32 Switzerland

	FDINF	FDIOF	GDP
FDINF	..	0.876***	0.350
	..	(0.221)	(0.982)
FDINF(-1)	-0.018	0.229	0.644
	(0.242)	(0.343)	(1.210)
FDIOF	0.430***	..	-0.609
	(0.108)	..	(0.679)
FDIOF(-1)	0.045	0.154	0.364
	(0.137)	(0.194)	(0.687)
GDP	0.014	-0.049	..
	(0.039)	(0.055)	..
GDP(-1)	-0.012	0.022	0.764***
	(0.039)	(0.055)	(0.124)
Constant	-3.854	49.580	223.212
	(29.055)	(40.326)	(139.221)
R-squared	0.467	0.531	0.615
Adj. R-squared	0.364	0.441	0.541
F-statistic	4.554	5.899	8.307
	(0.004)	(0.001)	(0.000)
No. obs.	32	32	32
Histogram-Normality	0.000	0.066	0.676
Serial Correlation	0.025	0.765	0.419
White Hetero-scedasticity	0.423	0.858	0.675

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 33 Turkey

	FDINF	FDIOF	GDP
FDINF	..	0.831*	88.902
	..	(0.448)	(75.987)
FDINF(-1)	0.822***	-0.451	-79.123
	(0.101)	(0.459)	(74.901)
FDIOF	0.131*	..	-12.679
	(0.071)	..	(30.851)
FDIOF(-1)	-0.021	0.248	0.957
	(0.082)	(0.202)	(33.911)
GDP	0.000	-0.000	..
	(0.000)	(0.001)	..
GDP(-1)	-0.000	0.000	-0.105
	(0.000)	(0.001)	(0.181)
Constant	1.497	1.054	1,227.873**
	(1.528)	(3.902)	(596.251)
R-squared	0.761	0.214	0.072
Adj. R-squared	0.718	0.073	-0.094
F-statistic	17.841	1.522	0.432
	(0.000)	(0.215)	(0.822)
No. obs.	34	34	34
Histogram-Normality	0.000	0.000	0.000
Serial Correlation	0.020	0.082	0.009
White Hetero-scedasticity	0.571	0.156	0.862

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 34 The United Kingdom

	FDINF	FDIOF	GDP
FDINF	..	0.926***	1.766*
	..	(0.296)	(0.999)
FDINF(-1)	0.383**	-0.241	1.024
	(0.172)	(0.336)	(1.021)
FDIOF	0.279***	..	0.451
	(0.089)	..	(0.572)
FDIOF(-1)	-0.033	0.405**	-1.245**
	(0.109)	(0.183)	(0.561)
GDP	0.057*	0.048	..
	(0.032)	(0.061)	..
GDP(-1)	-0.020	-0.044	0.181***
	(0.019)	(0.035)	(0.207)
Constant	-28.931	0.209	474.793***
	(19.419)	(36.752)	(67.743)
R-squared	0.667	0.584	0.735
Adj. R-squared	0.608	0.510	0.687
F-statistic	11.227	7.863	15.504
	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.000	0.205	0.816
Serial Correlation	0.107	0.016	0.121
White Hetero-scedasticity	0.565	0.000	0.685

*** p<0.01, ** p<0.05, * p<0.1

Table 6. 35 The United States

	FDINF	FDIOF	GDP
FDINF	..	0.408*	1.826**
	..	(0.219)	(0.730)
FDINF(-1)	0.512***	-0.194	-0.845
	(0.159)	(0.226)	(0.779)
FDIOF	0.270*	..	-0.180
	(0.145)	..	(0.656)
FDIOF(-1)	-0.082	0.473***	0.028
	(0.159)	(0.420)	(0.683)
GDP	0.100**	-0.015	..
	(0.040)	(0.054)	..
GDP(-1)	-0.074***	0.002	0.695***
	(0.028)	(0.039)	(0.033)
Constant	-21.247	15.708	288.196***
	(14.829)	(18.650)	(36.603)
R-squared	0.529	0.422	0.946
Adj. R-squared	0.444	0.319	0.936
F-statistic	6.280	4.088	98.235
	(0.000)	(0.006)	(0.000)
No. obs.	34	34	34
Histogram-Normality	0.384	0.055	0.517
Serial Correlation	0.426	0.568	0.007
White Hetero-scedasticity	0.158	0.031	0.224

*** p<0.01, ** p<0.05, * p<0.1

Appendices for Chapter 7 Empirical Study 2

Table 7. 4 Austria

	FDINF	FDIOF	RD
	..	0.901***	0.014
FDINF	..	(0.171)	(0.016)
	-0.394*	0.289	0.032
FDINF(-1)	(0.197)	(0.261)	(0.017)
	0.564***	..	0.005
FDIOF	(0.107)	..	(0.014)
	0.038	0.143	0.002
FDIOF(-1)	(0.153)	(0.192)	(0.013)
	1.967	2.607	..
RD	(2.262)	(2.857)	..
	-2.150	-1.558	0.949***
RD(-1)	(2.152)	(2.754)	(0.046)
	..	..	0.001
GDP	..	..	(0.002)
	..	..	-0.002*
GDP(-1)	..	..	(0.001)
	10.151	-18.554*	1.767
Constant	(8.844)	(10.881)	(1.364)
R-squared	0.676	0.803	0.983
Adj. R-squared	0.616	0.766	0.978
	11.286	21.972	204.680
F-statistic	(0.000)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.256	0.622	0.609
Serial Correlation	0.187	0.693	0.299
White Hetero-scedasticity	0.692	0.015	0.956

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 5 Belgium

	FDINF	FDIOF	RD
FDINF	..	0.772***	0.002
	..	(0.108)	(0.002)
FDINF(-1)	-0.159	0.037	0.007***
	(0.269)	(0.243)	(0.002)
FDIOF	0.959***	..	0.001
	(0.134)	..	(0.003)
FDIOF(-1)	-0.041	0.241	-0.004
	(0.269)	(0.235)	(0.002)
RD	25.845	-13.707	..
	(17.085)	(15.954)	..
RD(-1)	-25.421	11.480	0.944***
	(16.288)	(15.338)	(0.052)
GDP	..	..	0.001**
	..	..	(0.001)
GDP(-1)	..	..	0.003***
	..	..	(0.001)
Constant	23.045	28.379	-3.358
	(93.477)	(83.761)	(1.503)
R-squared	0.832	0.847	0.960
Adj. R-squared	0.785	0.805	0.943
F-statistic	17.839	19.970	55.301
	(0.000)	(0.000)	(0.000)
No. obs.	24	24	24
Histogram-Normality	0.352	0.296	0.798
Serial Correlation	0.296	0.054	0.322
White Hetero-scedasticity	0.229	0.080	0.136

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 6 Canada

	FDINF	FDIOF	RD
FDINF	..	0.343***	0.003
	..	(0.085)	(0.009)
FDINF(-1)	0.140	0.140	0.004
	(0.204)	(0.111)	(0.010)
FDIOF	1.122***	..	0.008
	(0.278)	..	(0.017)
FDIOF(-1)	-0.281	0.227	0.004
	(0.269)	(0.145)	(0.013)
RD	0.066	2.581	..
	(3.835)	(2.058)	..
RD(-1)	-0.010	-1.877	0.807***
	(2.523)	(1.345)	(0.068)
GDP	..	..	0.000
	..	..	(0.001)
GDP(-1)	..	..	-0.002
	..	..	(0.001)
Constant	-2.218	-2.997	4.492***
	(23.165)	(12.794)	(0.772)
R-squared	0.584	0.728	0.968
Adj. R-squared	0.503	0.676	0.958
F-statistic	7.299	13.945	102.737
	(0.000)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.003	0.040	0.645
Serial Correlation	0.300	0.769	0.097
White Hetero-scedasticity	0.010	0.647	0.255

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 7 The Czech Republic

	FDINF	FDIOF	RD
FDINF	..	0.002	-0.001
	..	(0.027)	(0.014)
FDINF(-1)	0.425	-0.048	0.029*
	(0.535)	(0.031)	(0.012)
FDIOF	0.420	..	0.166
	(6.186)	..	(0.353)
FDIOF(-1)	6.507	-0.925*	0.124
	(7.661)	(0.379)	(0.667)
RD	-3.817	1.637*	..
	(15.131)	(0.749)	..
RD(-1)	4.930	0.275	0.583
	(10.781)	(0.715)	(0.655)
GDP	..	..	-0.002
	..	..	(0.005)
GDP(-1)	..	..	0.006
	..	..	(0.008)
Constant	-2.809	-16.274	1.857
	(136.490)	(6.078)	(9.085)
R-squared	0.399	0.646	0.857
Adj. R-squared	0.101	0.350	0.608
F-statistic	0.797	2.186	3.434
	(0.589)	(0.184)	(0.125)
No. obs.	33	33	33
Histogram-Normality	0.663	0.771	0.890
Serial Correlation	0.648	0.016	0.050
White Hetero-scedasticity	0.208	0.159	0.536

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 8 Denmark

	FDINF	FDIOF	RD
FDINF	..	0.003***	-0.011
	..	(0.000)	(0.009)
FDINF(-1)	-0.110	0.001	-0.011
	(0.209)	(0.001)	(0.009)
FDIOF	226.858***	..	5.542**
	(31.948)	..	(2.125)
FDIOF(-1)	59.181	-0.345	6.727***
	(60.026)	(0.213)	(2.117)
RD	-6.167	0.045**	..
	(5.098)	(0.017)	..
RD(-1)	6.380	-0.048**	1.041***
	(5.369)	(0.018)	(0.024)
GDP	..	..	0.001
	..	..	(0.001)
GDP(-1)	..	..	-0.002**
	..	..	(0.001)
Constant	-17.477	0.116**	-1.081
	(12.844)	(0.042)	(1.010)
R-squared	0.744	0.797	0.990
Adj. R-squared	0.686	0.751	0.987
F-statistic	12.816	17.288	286.562
	(0.000)	(0.000)	(0.000)
No. obs.	28	28	28
Histogram-Normality	0.764	0.513	0.111
Serial Correlation	0.270	0.510	0.782
White Hetero-scedasticity	0.286	0.414	0.327

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 9 Finland

	FDINF	FDIOF	RD
FDINF	..	0.892***	0.002
	..	(0.318)	(0.012)
FDINF(-1)	0.183	-0.940**	0.056***
	(0.291)	(0.376)	(0.012)
FDIOF	0.431***	..	0.019***
	(0.111)	..	(0.007)
FDIOF(-1)	-0.099	0.506**	-0.021***
	(0.146)	(0.184)	(0.007)
RD	-0.011	13.405***	..
	(4.685)	(4.539)	..
RD(-1)	0.470	-12.688***	0.918***
	(3.422)	(4.189)	(0.026)
GDP	..	..	0.001
	..	..	(0.001)
GDP(-1)	..	..	-0.000
	..	..	(0.001)
Constant	-5.356	-7.760	0.614
	(10.262)	(14.760)	(1.120)
R-squared	0.580	0.688	0.989
Adj. R-squared	0.493	0.622	0.986
F-statistic	6.643	10.567	289.119
	(0.000)	(0.000)	(0.000)
No. obs.	30	30	30
Histogram-Normality	0.047	0.001	0.103
Serial Correlation	0.171	0.751	0.292
White Hetero-scedasticity	0.003	0.147	0.341

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 10 France

	FDINF	FDIOF	RD
	..	1.050**	0.001
FDINF	..	(0.408)	(0.018)
	0.245	0.779	-0.041*
FDINF(-1)	(0.219)	(0.499)	(0.020)
	0.193**	..	0.008
FDIOF	(0.075)	..	(0.007)
	-0.136*	0.215	0.020***
FDIOF(-1)	(0.075)	(0.182)	(0.006)
	1.435	4.117	..
RD	(2.090)	(4.852)	..
	-2.200	-5.355	0.881***
RD(-1)	(2.007)	(4.672)	(0.070)
	..	..	0.001
GDP	..	..	(0.001)
	..	..	0.000
GDP(-1)	..	..	(0.001)
	22.693	23.221	0.593
Constant	(13.811)	(33.541)	(1.452)
R-squared	0.548	0.713	0.937
Adj. R-squared	0.461	0.658	0.919
	6.301	12.922	51.075
F-statistic	(0.000)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.529	0.004	0.486
Serial Correlation	0.552	0.043	0.612
White Hetero-scedasticity	0.271	0.015	0.627

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 11 Germany

	FDINF	FDIOF	RD
FDINF	..	0.069	-0.009
	..	(0.186)	(0.015)
FDINF(-1)	0.040	-0.175	-0.005
	(0.222)	(0.165)	(0.013)
FDIOF	0.117	..	0.013**
	(0.314)	..	(0.014)
FDIOF(-1)	0.647*	0.473	0.042
	(0.370)	(0.287)	(0.020)
RD	-0.840	3.372	..
	(5.206)	(3.920)	..
RD(-1)	-0.177	-3.837	1.016***
	(5.405)	(4.050)	(0.055)
GDP	..	..	0.001
	..	..	(0.002)
GDP(-1)	..	..	-0.003
	..	..	(0.002)
Constant	18.452	21.522	1.150
	(26.237)	(19.782)	(2.323)
R-squared	0.311	0.376	0.966
Adj. R-squared	0.109	0.193	0.950
F-statistic	1.538	2.054	60.326
	(0.230)	(0.122)	(0.000)
No. obs.	23	23	23
Histogram-Normality	0.000	0.538	0.952
Serial Correlation	0.853	0.040	0.617
White Hetero-scedasticity	0.028	0.242	0.733

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 9 Greece

	FDINF	FDIOF	RD
FDINF	..	0.547	0.032
	..	(0.388)	(0.036)
FDINF(-1)	-0.235	0.210	-0.011
	(0.375)	(0.388)	(0.035)
FDIOF	0.519	..	-0.050
	(0.369)	..	(0.040)
FDIOF(-1)	-0.215	0.657	0.087
	(0.600)	(0.550)	(0.048)
RD	5.922	-4.763	..
	(4.301)	(4.728)	..
RD(-1)	-4.335	3.421	0.747**
	(2.850)	(3.190)	(0.206)
GDP	..	..	0.002
	..	..	(0.002)
GDP(-1)	..	..	-0.003
	..	..	(0.002)
Constant	-3.188	5.789	3.008
	(18.213)	(18.575)	(1.815)
R-squared	0.539	0.606	0.933
Adj. R-squared	0.078	0.213	0.776
F-statistic	1.168	1.541	5.957
	(0.434)	(0.323)	(0.085)
No. obs.	11	11	11
Histogram-Normality	0.729	0.509	0.906
Serial Correlation	0.069	0.007	0.005
White Hetero-scedasticity	0.848	0.253	0.406

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 10 Hungary

	FDINF	FDIOF	RD
FDINF	..	0.540***	-0.032
	..	(0.134)	(0.021)
FDINF(-1)	-0.190	0.110	-0.022
	(0.254)	(0.192)	(0.024)
FDIOF	0.960***	..	0.042
	(0.239)	..	(0.029)
FDIOF(-1)	0.219	-0.103	0.062*
	(0.375)	(0.283)	(0.033)
RD	-4.181	3.303	..
	(2.875)	(2.139)	..
RD(-1)	0.325	0.146	0.683***
	(2.884)	(2.163)	(0.170)
GDP	..	..	-0.004
	..	..	(0.004)
GDP(-1)	..	..	0.004
	..	..	(0.004)
Constant	99.319***	-67.939**	6.504
	(31.063)	(24.588)	(3.730)
R-squared	0.533	0.677	0.907
Adj. R-squared	0.378	0.570	0.858
F-statistic	3.431	6.297	18.233
	(0.029)	(0.002)	(0.000)
No. obs.	21	21	21
Histogram-Normality	0.932	0.870	0.445
Serial Correlation	0.125	0.117	0.007
White Hetero-scedasticity	0.315	0.066	0.683

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 12 Iceland

	FDINF	FDIOF	RD
	..	2.064***	-0.035
FDINF	..	(0.086)	(0.034)
	0.147*	-0.317*	0.006
FDINF(-1)	(0.073)	(0.150)	(0.018)
	0.475***	..	0.018
FDIOF	(0.020)	..	(0.016)
	0.189***	-0.381***	0.010*
FDIOF(-1)	(0.038)	(0.084)	(0.005)
	-5.000	9.453	..
RD	(2.952)	(6.291)	..
	4.220	-7.574	0.894***
RD(-1)	(3.097)	(6.591)	(0.117)
	..	..	-0.005
GDP	..	..	(0.004)
	..	..	-0.000
GDP(-1)	..	..	(0.005)
	11.083	-25.124	6.861
Constant	(11.756)	(24.313)	(6.065)
R-squared	0.991	0.986	0.972
Adj. R-squared	0.987	0.979	0.951
	247.874	151.963	45.258
F-statistic	(0.000)	(0.000)	(0.000)
No. obs.	17	17	17
Histogram-Normality	0.522	0.171	0.186
Serial Correlation	0.118	0.134	0.085
White Hetero-scedasticity	0.007	0.007	0.022

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 13 Ireland

	FDINF	FDIOF	RD
FDINF	..	0.022	-0.001
	..	(0.073)	(0.001)
FDINF(-1)	0.394*	-0.076	-0.002
	(0.221)	(0.074)	(0.001)
FDIOF	0.214	..	0.011**
	(0.717)	..	(0.004)
FDIOF(-1)	-0.840	0.059	0.005
	(0.675)	(0.224)	(0.004)
RD	7.882	22.503**	..
	(36.504)	(10.466)	..
RD(-1)	8.043	-11.423	0.968***
	(34.082)	(10.579)	(0.087)
GDP	..	..	0.001
	..	..	(0.001)
GDP(-1)	..	..	-0.003**
	..	..	(0.001)
Constant	-96.138	-66.432**	1.566*
	(107.846)	(31.673)	(0.802)
R-squared	0.254	0.617	0.970
Adj. R-squared	0.057	0.517	0.958
F-statistic	1.291	6.135	79.013
	(0.309)	(0.001)	(0.000)
No. obs.	25	25	25
Histogram-Normality	0.417	0.115	0.700
Serial Correlation	0.132	0.145	0.180
White Hetero-scedasticity	0.031	0.134	0.034

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 14 Italy

	FDINF	FDIOF	RD
FDINF	..	0.690***	0.008
	..	(0.192)	(0.017)
FDINF(-1)	-0.136	0.569**	0.009
	(0.208)	(0.225)	(0.018)
FDIOF	0.479***	..	0.013
	(0.134)	..	(0.015)
FDIOF(-1)	-0.228*	0.404***	0.011
	(0.117)	(0.127)	(0.011)
RD	1.186	1.054	..
	(2.125)	(2.556)	..
RD(-1)	-2.028	-0.660	1.016***
	(2.136)	(2.603)	(0.091)
GDP	..	..	-0.000
	..	..	(0.001)
GDP(-1)	..	..	-0.001
	..	..	(0.001)
Constant	14.565	-6.510	1.062
	(10.294)	(12.753)	(0.952)
R-squared	0.429	0.711	0.873
Adj. R-squared	0.319	0.655	0.836
F-statistic	3.906	12.775	23.627
	(0.009)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.643	0.408	0.377
Serial Correlation	0.066	0.855	0.323
White Hetero-scedasticity	0.002	0.012	0.338

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 15 Japan

	FDINF	FDIOF	RD
FDINF	..	0.616	-0.129
	..	(0.543)	(0.123)
FDINF(-1)	0.292	-0.233	-0.201
	(0.196)	(0.579)	(0.122)
FDIOF	0.076	..	0.103**
	(0.067)	..	(0.037)
FDIOF(-1)	-0.108	0.790***	-0.105**
	(0.071)	(0.143)	(0.042)
RD	-0.247	2.229***	..
	(0.313)	(0.787)	..
RD(-1)	0.355	-1.884**	0.977***
	(0.302)	(0.800)	(0.061)
GDP	..	..	-0.002
	..	..	(0.001)
GDP(-1)	..	..	0.001
	..	..	(0.001)
Constant	-1.472	-6.548	2.042**
	(1.523)	(4.209)	(0.898)
R-squared	0.328	0.754	0.973
Adj. R-squared	0.199	0.707	0.965
F-statistic	2.540	15.980	123.984
	(0.053)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.003	0.026	0.650
Serial Correlation	0.483	0.701	0.595
White Hetero-scedasticity	0.052	0.122	0.299

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 16 Korea

	FDINF	FDIOF	RD
FDINF	..	0.133	-0.129
	..	(0.197)	(0.090)
FDINF(-1)	0.757***	-0.263	-0.204**
	(0.185)	(0.201)	(0.080)
FDIOF	0.208	..	0.136
	(0.308)	..	(0.101)
FDIOF(-1)	-0.029	0.325	0.097
	(0.319)	(0.242)	(0.120)
RD	-0.547	1.019***	..
	(0.518)	(0.344)	..
RD(-1)	0.456	-0.561	0.872***
	(0.540)	(0.418)	(0.095)
GDP	..	..	0.011***
	..	..	(0.003)
GDP(-1)	..	..	-0.008***
	..	..	(0.003)
Constant	4.137	-7.390*	-0.006
	(5.426)	(4.008)	(3.549)
R-squared	0.530	0.918	0.993
Adj. R-squared	0.383	0.893	0.989
F-statistic	3.607	36.102	278.176
	(0.000)	(0.000)	(0.000)
No. obs.	22	22	22
Histogram-Normality	0.065	0.227	0.128
Serial Correlation	0.014	0.450	0.016
White Hetero-scedasticity	0.484	0.100	0.320

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 17 Luxembourg

	FDINF	FDIOF	RD
FDINF	..	0.207	-0.001
	..	(0.399)	(0.002)
FDINF(-1)	-0.614	0.274	-0.001
	(0.463)	(0.438)	(0.001)
FDIOF	0.564	..	-0.000
	(0.107)	..	(0.001)
FDIOF(-1)	0.038	-0.139	-0.001
	(0.153)	(0.423)	(0.002)
RD	1.967	-103.110	..
	(2.262)	(292.742)	..
RD(-1)	-2.150	266.425	0.232
	(2.152)	(258.852)	(1.288)
GDP	..	..	0.007
	..	..	(0.012)
GDP(-1)	..	..	-0.001
	..	..	(0.014)
Constant	10.151	-1,799.233	4.935
	(8.844)	(3,985.357)	(10.393)
R-squared	0.767	0.349	0.796
Adj. R-squared	0.661	-0.465	0.085
F-statistic	7.237	0.428	1.120
	(0.000)	(0.811)	(0.548)
No. obs.	10	10	10
Histogram-Normality	0.034	0.695	0.303
Serial Correlation	0.109	0.591	..
White Hetero-scedasticity	0.076	0.001	0.739

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7. 18 Mexico

	FDINF	FDIOF	RD
FDINF	..	0.119	-0.029
	..	(0.089)	(0.021)
FDINF(-1)	0.571*	-0.285***	0.028
	(0.317)	(0.085)	(0.020)
FDIOF	1.087	..	0.084*
	(0.814)	..	(0.043)
FDIOF(-1)	0.205	-0.179	0.007
	(0.637)	(0.205)	(0.037)
RD	-1.033	2.576	..
	(5.106)	(1.520)	..
RD(-1)	-2.984	1.286	0.491**
	(4.539)	(1.483)	(0.195)
GDP	..	..	0.002
	..	..	(0.001)
GDP(-1)	..	..	-0.000
	..	..	(0.001)
Constant	27.294*	-11.942***	0.869
	(13.307)	(4.781)	(0.865)
R-squared	0.246	0.809	0.948
Adj. R-squared	0.068	0.630	0.912
F-statistic	0.784	10.200	26.221
	(0.580)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.585	0.127	0.975
Serial Correlation	0.262	0.052	0.151
White Hetero-scedasticity	0.383	0.757	0.459

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 19 Netherland

	FDINF	FDIOF	RD
FDINF	..	0.289*	-0.002
	..	(0.167)	(0.004)
FDINF(-1)	-0.272	0.360**	-0.002
	(0.196)	(0.168)	(0.004)
FDIOF	0.357*	..	0.002
	(0.206)	..	(0.004)
FDIOF(-1)	0.433	0.149	0.005
	(0.202)	(0.195)	(0.004)
RD	-1.855	-1.667	..
	(9.535)	(8.588)	..
RD(-1)	0.380	-0.554	0.779***
	(6.975)	(6.282)	(0.048)
GDP	..	..	0.002
	..	..	(0.001)
GDP(-1)	..	..	-0.002*
	..	..	(0.001)
Constant	27.887	64.838	3.983***
	(56.620)	(49.633)	(1.005)
R-squared	0.380	0.502	0.967
Adj. R-squared	0.261	0.406	0.958
F-statistic	3.187	5.245	101.249
	(0.022)	(0.002)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.000	0.000	0.645
Serial Correlation	0.153	0.915	0.398
White Hetero-scedasticity	0.056	0.962	0.824

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 20 Norway

	FDINF	FDIOF	RD
FDINF	..	0.437	0.012
	..	(0.576)	(0.027)
FDINF(-1)	0.707***	-0.708	-0.023
	(0.199)	(0.514)	(0.025)
FDIOF	0.124	..	-0.006
	(0.164)	..	(0.014)
FDIOF(-1)	0.292	0.377	-0.002
	(0.163)	(0.331)	(0.015)
RD	0.762***	0.044	..
	(0.089)	(0.482)	..
RD(-1)	-0.702***	0.266	0.009**
	(0.138)	(0.483)	(0.000)
GDP	..	..	0.008***
	..	..	(0.000)
GDP(-1)	..	..	-0.007***
	..	..	(0.003)
Constant	-8.581	22.341*	0.667
	(6.292)	(10.731)	(1.237)
R-squared	0.954	0.732	0.999
Adj. R-squared	0.931	0.598	0.999
F-statistic	41.590	5.472	8,865.166
	(0.000)	(0.011)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.606	0.348	0.071
Serial Correlation	0.050	0.163	0.891
White Hetero-scedasticity	0.468	0.890	0.753

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 20 Poland

	FDINF	FDIOF	RD
FDINF	..	0.408**	-0.013
	..	(0.180)	(0.021)
FDINF(-1)	0.391**	-0.094	-0.008
	(0.193)	(0.181)	(0.023)
FDIOF	0.569**	..	0.039
	(0.251)	..	(0.024)
FDIOF(-1)	-0.019	0.225	0.038
	(0.298)	(0.246)	(0.024)
RD	-2.023	4.218**	..
	(2.350)	(1.757)	..
RD(-1)	-1.216	-1.406	0.542***
	(1.721)	(1.439)	(0.103)
GDP	..	..	-0.002
	..	..	(0.002)
GDP(-1)	..	..	0.005**
	..	..	(0.002)
Constant	47.787***	-33.326**	2.759
	(16.262)	(14.858)	(1.633)
R-squared	0.686	0.732	0.938
Adj. R-squared	0.594	0.653	0.909
F-statistic	7.432	9.277	32.303
	(0.000)	(0.000)	(0.000)
No. obs.	23	23	23
Histogram-Normality	0.844	0.173	0.664
Serial Correlation	0.620	0.176	0.991
White Hetero-scedasticity	0.018	0.204	0.264

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 21 Portugal

	FDINF	FDIOF	RD
	..	0.781***	0.014
FDINF	..	(0.178)	(0.017)
	0.041	0.161	-0.030
FDINF(-1)	(0.188)	(0.221)	(0.016)
	0.557***	..	0.005
FDIOF	(0.127)	..	(0.015)
	-0.280*	0.310*	0.039***
FDIOF(-1)	(0.151)	(0.181)	(0.013)
	1.689	0.136	..
RD	(1.769)	(2.132)	..
	-0.930	-1.424	0.991***
RD(-1)	(1.896)	(2.238)	(0.050)
	..	..	0.007***
GDP	..	..	(0.002)
	..	..	-0.002
GDP(-1)	..	..	(0.001)
	7.606	1.769	-4.437
Constant	(5.360)	(6.588)	(1.309)
R-squared	0.494	0.603	0.969
Adj. R-squared	0.393	0.524	0.960
	4.886	7.607	104.578
F-statistic	(0.003)	(0.000)	(0.000)
No. obs.	31	31	31
Histogram-Normality	0.529	0.790	0.582
Serial Correlation	0.661	0.845	0.134
White Hetero-scedasticity	0.053	0.479	0.188

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 21 Slovakia

	FDINF	FDIOF	RD
FDINF	..	0.019	0.013
	..	(0.202)	(0.034)
FDINF(-1)	-0.106	-0.060	0.002
	(0.264)	(0.200)	(0.030)
FDIOF	0.033	..	-0.028
	(0.353)	..	(0.040)
FDIOF(-1)	0.094	-0.353	-0.007
	(0.355)	(0.253)	(0.042)
RD	2.855	-0.698	..
	(1.981)	(1.597)	..
RD(-1)	-0.313	0.086	0.427
	(0.275)	(0.217)	(0.370)
GDP	..	..	0.027
	..	..	(0.016)
GDP(-1)	..	..	-0.016
	..	..	(0.017)
Constant	30.233	20.091	-2.812
	(30.608)	(23.369)	(5.549)
R-squared	0.173	0.135	0.855
Adj. R-squared	0.135	0.021	0.771
F-statistic	0.439	0.427	10.123
	(0.000)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.444	0.000	0.748
Serial Correlation	0.003	0.030	0.000
White Hetero-scedasticity	0.007	0.975	0.426

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 22 Spain

	FDINF	FDIOF	RD
FDINF	..	0.392	0.006
	..	(0.406)	(0.011)
FDINF(-1)	-0.216	-1.151	0.012
	(0.209)	(0.388)	(0.012)
FDIOF	0.089	..	0.014
	(0.091)	..	(0.005)
FDIOF(-1)	0.289	0.858***	-0.000
	(0.127)	(0.241)	(0.008)
RD	1.518	3.955	..
	(1.594)	(3.328)	..
RD(-1)	-0.843	-2.790	0.906***
	(1.278)	(2.660)	(0.002)
GDP	..	..	0.004***
	..	..	(0.001)
GDP(-1)	..	..	-0.003***
	..	..	(0.000)
Constant	11.871**	8.671	-0.052
	(5.962)	(13.377)	(0.443)
R-squared	0.689	0.737	0.983
Adj. R-squared	0.630	0.687	0.979
F-statistic	7.897	14.588	204.456
	(0.000)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.700	0.033	0.633
Serial Correlation	0.402	0.988	0.005
White Hetero-scedasticity	0.007	0.096	0.041

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 23 Sweden

	FDINF	FDIOF	RD
FDINF	..	0.465**	0.049
	..	(0.142)	(0.021)
FDINF(-1)	-0.653	0.551*	0.043
	(0.592)	(0.245)	(0.035)
FDIOF	1.563**	..	-0.090
	(0.479)	..	(0.047)
FDIOF(-1)	1.689	-1.116**	-0.035
	(0.933)	(0.400)	(0.059)
RD	4.750	-0.802	..
	(5.867)	(3.429)	..
RD(-1)	2.661	-4.318	-0.285
	(8.389)	(4.098)	(0.391)
GDP	..	..	0.008
	..	..	(0.003)
GDP(-1)	..	..	-0.000
	..	..	(0.002)
Constant	-345.799	235.283	31.627
	(262.703)	(124.825)	(13.264)
R-squared	0.924	0.889	0.965
Adj. R-squared	0.829	0.750	0.843
F-statistic	9.728	6.409	7.932
	(0.023)	(0.048)	(0.116)
No. obs.	33	33	33
Histogram-Normality	0.597	0.718	0.186
Serial Correlation	0.205	0.066	0.085
White Hetero-scedasticity	0.901	0.529	0.022

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 24 Turkey

	FDINF	FDIOF	RD
FDINF	..	0.407	0.014
	..	(0.346)	(0.035)
FDINF(-1)	0.794***	-0.813**	0.026
	(0.204)	(0.366)	(0.040)
FDIOF	0.185	..	0.019
	(0.157)	..	(0.022)
FDIOF(-1)	0.010	-0.436**	0.014
	(0.147)	(0.191)	(0.020)
RD	1.695	2.304	..
	(1.752)	(2.610)	..
RD(-1)	-1.976	0.411	0.896***
	(1.729)	(2.658)	(0.093)
GDP	..	..	0.002
	..	..	(0.002)
GDP(-1)	..	..	-0.001
	..	..	(0.002)
Constant	3.399	-14.637	-0.359
	(4.307)	(5.449)	(1.094)
R-squared	0.738	0.528	0.972
Adj. R-squared	0.660	0.389	0.959
F-statistic	9.561	3.803	75.377
	(0.000)	(0.017)	(0.000)
No. obs.	23	23	23
Histogram-Normality	0.000	0.000	0.692
Serial Correlation	0.107	0.002	0.936
White Hetero-scedasticity	0.854	0.020	0.027

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 25 The United Kingdom

	FDINF	FDIOF	RD
FDINF	..	0.972**	0.014**
	..	(0.354)	(0.006)
FDINF(-1)	0.412**	-0.257	0.004
	(0.179)	(0.380)	(0.006)
FDIOF	0.262***	..	0.000
	(0.095)	..	(0.003)
FDIOF(-1)	-0.132	0.338	-0.000
	(0.108)	(0.202)	(0.001)
RD	13.322*	5.743	..
	(7.205)	(14.864)	..
RD(-1)	-12.171*	-4.837	0.879***
	(6.336)	(13.145)	(0.026)
GDP	..	..	-0.001
	..	..	(0.001)
GDP(-1)	..	..	0.001
	..	..	(0.001)
Constant	-2.142	-7.417	2.352**
	(20.083)	(38.653)	(0.981)
R-squared	0.653	0.523	0.984
Adj. R-squared	0.575	0.414	0.978
F-statistic	8.299	4.828	172.394
	(0.000)	(0.000)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.000	0.363	0.983
Serial Correlation	0.671	0.012	0.072
White Hetero-scedasticity	0.463	0.001	0.260

*** p<0.01, ** p<0.05, * p<0.1

Table 7. 26 The United States

	FDINF	FDIOF	RD
FDINF	..	0.504*	0.022
	..	(0.261)	(0.023)
FDINF(-1)	0.461***	-0.182	0.023
	(0.150)	(0.243)	(0.022)
FDIOF	0.258*	..	-0.006
	(0.133)	..	(0.017)
FDIOF(-1)	-0.078	0.371*	0.020
	(0.150)	(0.198)	(0.017)
RD	2.712**	-0.215	..
	(1.115)	(1.733)	..
RD(-1)	-2.539**	-0.149	0.781***
	(0.993)	(1.559)	(0.081)
GDP	..	..	0.026***
	..	..	(0.005)
GDP(-1)	..	..	-0.016***
	..	..	(0.004)
Constant	0.144	12.125	-4.336**
	(8.522)	(11.664)	(1.656)
R-squared	0.628	0.405	0.968
Adj. R-squared	0.554	0.287	0.959
F-statistic	8.459	3.411	101.847
	(0.000)	(0.017)	(0.000)
No. obs.	33	33	33
Histogram-Normality	0.599	0.154	0.493
Serial Correlation	0.176	0.158	0.027
White Hetero-scedasticity	0.021	0.114	0.619

*** p<0.01, ** p<0.05, * p<0.1

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Table 8. 4 Australia

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.367**	0.226*	-0.229
	..	(0.144)	(0.130)	(0.160)
FDINF(-1)	-0.112	-0.250	0.193	-0.225
	(0.201)	(0.158)	(0.137)	(0.165)
FDIOF	0.543**	..	-0.013	0.009
	(0.213)	..	(0.168)	(0.202)
FDIOF(-1)	0.262	0.210	-0.184	0.208
	(0.245)	(0.202)	(0.173)	(0.209)
EXP	0.457*	-0.018	..	1.204***
	(0.264)	(0.229)	..	(0.015)
EXP(-1)	0.011	0.009	0.330**	-0.400**
	(0.244)	(0.201)	(0.159)	(0.192)
IMP	-0.318	0.009	0.827***	..
	(0.222)	(0.190)	(0.010)	..
IMP(-1)	-0.018	0.019	-0.306**	0.371**
	(0.206)	(0.169)	(0.132)	(0.159)
Constant	-1.360	0.807	12.418***	-15.232***
	(5.810)	(4.780)	(3.287)	(3.931)
R-squared	0.889	0.582	0.999	0.999
Adj. R-squared	0.859	0.469	0.999	0.999
F-statistic	29.758	5.164	5,577.011	5,292.966
	(0.000)	(0.650)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.635	0.837	0.164	0.099
Serial Correlation	0.054	0.226	0.400	0.475
White Hetero-scedasticity	0.201	0.163	0.094	0.151

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 5 Austria

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.735***	-0.225	0.137
	..	(0.124)	(0.231)	(0.236)
FDINF(-1)	-0.434	0.373**	0.052	-0.107
	(0.180)	(0.179)	(0.239)	(0.241)
FDIOF	0.781***	..	0.508	-0.314
	(0.132)	..	(0.221)	(0.237)
FDIOF(-1)	0.193	-0.094	-0.055**	0.077
	(0.171)	(0.412)	(0.210)	(0.212)
EXP	-0.156	0.331**	..	0.969***
	(0.160)	(0.144)	..	(0.055)
EXP(-1)	-0.084	0.044	0.346**	-0.319**
	(0.125)	(0.122)	(0.136)	(0.140)
IMP	0.093	-0.201	0.951***	..
	(0.160)	(0.152)	(0.054)	..
IMP(-1)	0.097	-0.097	-0.265**	0.278**
	(0.114)	(0.110)	(0.128)	(0.129)
Constant	24.391*	-30.831**	-8.033	22.366
	(12.554)	(11.555)	(16.073)	(15.703)
R-squared	0.714	0.897	0.991	0.987
Adj. R-squared	0.637	0.870	0.988	0.984
F-statistic	9.289	32.484	408.335	292.588
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.114	0.000	0.884	0.660
Serial Correlation	0.534	0.088	0.004	0.001
White Hetero-scedasticity	0.728	0.566	0.013	0.035

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 6 Belgium

	FDINF	FDIOF	EXP	IMP
	..	0.750***	0.073	-0.082*
FDINF	..	(0.087)	(0.047)	(0.049)
	0.276	-0.227	-0.072	0.093
FDINF(-1)	(0.217)	(0.188)	(0.052)	(0.053)
	1.005***	..	-0.055	0.063
FDIOF	(0.117)	..	(0.056)	(0.058)
	-0.272	0.365*	0.028	-0.041
FDIOF(-1)	(0.230)	(0.190)	(0.056)	(0.058)
	1.267	-0.713	..	1.043***
EXP	(0.809)	(0.719)	..	(0.030)
	-1.067	0.895	0.815***	-0.842***
EXP(-1)	(0.791)	(0.685)	(0.106)	(0.117)
	-1.280	0.739	0.940***	..
IMP	(0.763)	(0.680)	(0.027)	..
	1.099	-0.911	-0.782***	0.819***
IMP(-1)	(0.738)	(0.640)	(0.094)	(0.101)
	-14.281	-5.268	27.438	-23.324
Constant	(71.623)	(61.927)	(16.286)	(17.511)
R-squared	0.841	0.865	0.992	0.991
Adj. R-squared	0.794	0.825	0.989	0.990
	18.150	21.942	411.710	445.621
F-statistic	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	32	32	32	32
Histogram-Normality	0.001	0.094	0.378	0.643
Serial Correlation	0.359	0.147	0.829	0.843
White Hetero-scedasticity	0.124	0.009	0.963	0.899

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 7 Canada

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.260**	0.174	-0.011
	..	(0.097)	(0.203)	(0.212)
FDINF(-1)	0.210	0.172	-0.270	0.178
	(0.199)	(0.109)	(0.207)	(0.217)
FDIOF	0.829**	..	0.297	0.106
	(0.310)	..	(0.363)	(0.378)
FDIOF(-1)	-0.206	0.315**	-0.097	-0.112
	(0.289)	(0.151)	(0.305)	(0.315)
EXP	0.158	0.084	..	0.854***
	(0.184)	(0.103)	..	(0.113)
EXP(-1)	-0.112	-0.049	0.760***	-0.702***
	(0.173)	(0.097)	(0.105)	(0.128)
IMP	-0.009	0.028	0.803***	..
	(0.181)	(0.101)	(0.106)	..
IMP(-1)	0.039	-0.021	-0.598***	0.711***
	(0.167)	(0.093)	(0.130)	(0.115)
Constant	-20.889	-5.420	8.078	37.857
	(17.110)	(9.787)	(18.395)	(17.532)
R-squared	0.618	0.756	0.952	0.931
Adj. R-squared	0.515	0.689	0.940	0.913
F-statistic	6.015	11.428	74.628	50.465
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.000	0.008	0.330	0.869
Serial Correlation	0.366	0.125	0.904	0.006
White Hetero-scedasticity	0.016	0.686	0.007	0.009

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 8 The Czech Republic

	FDINF	FDIOF	EXP	IMP
FDINF	..	-0.007	0.327	-0.334
	..	(0.020)	(0.234)	(0.222)
FDINF(-1)	0.062	-0.041*	-0.034	0.157
	(0.656)	(0.017)	(0.374)	(0.356)
FDIOF	-4.555	..	3.246	0.300
	(12.206)	..	(6.897)	(6.906)
FDIOF(-1)	-8.637	-1.544**	5.051	-0.727
	(20.771)	(0.365)	(11.839)	(11.796)
EXP	1.005	0.016	..	0.918***
	(0.718)	(0.034)	..	(0.164)
EXP(-1)	0.409	0.069	0.248	-0.338
	(1.292)	(0.040)	(0.736)	(0.708)
IMP	-1.080	0.001	0.966***	..
	(0.718)	(0.036)	(0.172)	..
IMP(-1)	-0.133	-0.053	-0.241	0.359
	(0.995)	(0.030)	(0.556)	(0.525)
Constant	3.494	-3.460*	-14.194	23.765
	(56.367)	(1.471)	(31.386)	(29.035)
R-squared	0.664	0.926	0.995	0.994
Adj. R-squared	0.076	0.797	0.985	0.983
F-statistic	1.129	7.167	107.286	90.354
	(0.481)	(0.038)	(0.000)	(0.000)
No. obs.	12	12	12	12
Histogram-Normality	0.916	0.674	0.959	0.776
Serial Correlation	0.012	0.004	0.052	0.017
White Hetero-scedasticity	0.763	0.281	0.573	0.463

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8. 9 Denmark

	FDINF	FDIOF	EXP	IMP
	..	-0.591***	-0.251	0.203
FDINF	..	(0.313)	(0.196)	(0.193)
	-0.231	-0.024	-0.065	0.079
FDINF(-1)	(0.181)	(0.388)	(0.191)	(0.187)
	246.307***	..	74.919	-59.297
FDIOF	(20.722)	..	(52.097)	(51.660)
	67.844	-0.159	13.573	-19.959
FDIOF(-1)	(49.392)	(0.188)	(52.611)	(51.384)
	-0.237	0.001	..	0.950***
EXP	(0.185)	(0.001)	..	(0.046)
	0.321*	-0.001*	0.845***	-0.772***
EXP(-1)	(0.180)	(0.001)	(0.105)	(0.118)
	0.200	-0.001	0.993***	..
IMP	(0.191)	(0.001)	(0.048)	..
	-0.338*	0.001*	-0.845***	0.817***
IMP(-1)	(0.687)	(0.001)	(0.110)	(0.110)
	1.687	0.010	5.218	-2.267
Constant	(10.351)	(0.038)	(10.615)	(10.423)
R-squared	0.895	0.891	0.987	0.986
Adj. R-squared	0.867	0.861	0.983	0.982
	1.661	30.328	227.660	254.326
F-statistic	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.948	0.943	0.826	0.688
Serial Correlation	0.245	0.511	0.933	0.784
White Hetero-scedasticity	0.597	0.732	0.232	0.124

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 10 Finland

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.762***	0.203	-0.199
	..	(0.241)	(0.165)	(0.164)
FDINF(-1)	0.318	-0.691**	0.153	-0.046
	(0.220)	(0.302)	(0.196)	(0.196)
FDIOF	0.364***	..	-0.005	0.037
	(0.115)	..	(0.117)	(0.116)
FDIOF(-1)	-0.193	0.491**	0.052	-0.009
	(0.143)	(0.191)	(0.128)	(0.127)
EXP	0.270	-0.014	..	0.934***
	(0.220)	(0.330)	..	(0.064)
EXP(-1)	-0.184	0.276	0.775***	-0.713***
	(0.212)	(0.307)	(0.108)	(0.121)
IMP	-0.270	0.104	0.953***	..
	(0.222)	(0.330)	(0.065)	..
IMP(-1)	0.216	-0.368	-0.817**	0.841***
	(0.223)	(0.321)	(0.114)	(0.104)
Constant	-3.882	2.564	28.919	-21.870
	(16.216)	(23.489)	(12.891)	(13.267)
R-squared	0.418	0.531	0.997	0.970
Adj. R-squared	0.261	0.405	0.958	0.961
F-statistic	2.664	4.212	108.653	118.766
	(0.032)	(0.003)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.000	0.000	0.540	0.328
Serial Correlation	0.311	0.663	0.540	0.338
White Hetero-scedasticity	0.368	0.348	0.535	0.814

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 11 France

	FDINF	FDIOF	EXP	IMP
	..	0.619***	0.594***	-0.630***
FDINF	..	(0.388)	(0.163)	(0.192)
	-0.385	1.124**	0.468**	-0.495**
FDINF(-1)	(0.192)	(0.478)	(0.190)	(0.219)
	0.248***	..	-0.211***	0.243***
FDIOF	(0.059)	..	(0.067)	(0.075)
	0.034	0.164	-0.067	0.065
FDIOF(-1)	(0.058)	(0.147)	(0.058)	(0.067)
	0.568	-1.318***	..	1.122***
EXP	(0.156)	(0.416)	..	(0.035)
	-0.025	0.706*	0.467***	-0.568***
EXP(-1)	(0.160)	(0.384)	(0.135)	(0.149)
	-0.466***	1.175***	0.869***	..
IMP	(0.142)	(0.364)	(0.027)	..
	0.065	-0.740**	-0.476***	0.589***
IMP(-1)	(0.145)	(0.343)	(0.116)	(0.149)
	-27.773***	33.965	30.922***	-31.595***
Constant	(7.861)	(23.530)	(7.678)	(9.233)
R-squared	0.719	0.782	0.992	0.994
Adj. R-squared	0.644	0.723	0.990	0.992
	9.523	13.322	481.565	587.884
F-statistic	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.004	0.333	0.798	0.756
Serial Correlation	0.880	0.794	0.514	0.323
White Hetero-scedasticity	0.763	0.161	0.462	0.716

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 12 Germany

	FDINF	FDIOF	EXP	IMP
	..	0.085	0.087	-0.091
FDINF	..	(0.199)	(0.167)	(0.144)
	-0.029	-0.217	0.245	-0.182
FDINF(-1)	(0.225)	(0.)	(0.145)	(0.128)
	0.125	..	0.184	-0.132
FDIOF	(0.292)	..	(0.199)	(0.173)
	0.796**	0.540*	-0.428	0.381*
FDIOF(-1)	(0.333)	(0.290)	(0.246)	(0.212)
	0.180	0.261	..	0.836***
EXP	(0.346)	(0.282)	..	(0.053)
	-0.016	-0.112	0.705***	-0.494**
EXP(-1)	(0.385)	(0.318)	(0.206)	(0.198)
	-0.252	-0.251	1.119***	..
IMP	(0.399)	(0.329)	(0.071)	..
	-0.057	0.071	-0.700**	0.511**
IMP(-1)	(0.433)	(0.358)	(0.248)	(0.228)
	32.232	16.053	-26.917	31.72*
Constant	(27.380)	(23.228)	(18.665)	(15.261)
R-squared	0.412	0.379	0.992	0.989
Adj. R-squared	0.170	0.123	0.989	0.985
	1.704	1.480	314.361	232.265
F-statistic	(0.174)	(0.239)	(0.000)	(0.000)
No. obs.	25	25	25	25
Histogram-Normality	0.000	0.532	0.036	0.185
Serial Correlation	0.696	0.190	0.613	0.454
White Hetero-scedasticity	0.061	0.067	0.832	0.843

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 13 Greece

	FDINF	FDIOF	EXP	IMP
FDINF	..	-0.052	-0.427	0.754
	..	(0.160)	(0.449)	(0.541)
FDINF(-1)	-0.125	-0.029	-0.998**	0.998
	(0.247)	(0.178)	(0.459)	(0.589)
FDIOF	-0.100	..	-0.966	1.846**
	(0.310)	..	(0.601)	(0.672)
FDIOF(-1)	-0.157	-0.072	-0.888	1.547*
	(0.353)	(0.254)	(0.700)	(0.830)
EXP	-0.101	-0.118	..	1.137***
	(0.106)	(0.074)	..	(0.107)
EXP(-1)	0.029	0.067	0.767***	-0.837***
	(0.098)	(0.069)	(0.108)	(0.166)
IMP	0.117	0.148**	0.746***	..
	(0.084)	(0.054)	(0.070)	..
IMP(-1)	-0.033	-0.061	-0.454***	0.573***
	(0.068)	(0.047)	(0.098)	(0.118)
Constant	2.011	-7.502**	-10.158	23.450*
	(4.937)	(3.142)	(9.920)	(11.417)
R-squared	0.276	0.708	0.982	0.986
Adj. R-squared	0.022	0.606	0.976	0.981
F-statistic	1.088	6.924	161.287	204.428
	(0.407)	(0.000)	(0.000)	(0.000)
No. obs.	28	28	28	28
Histogram-Normality	0.990	0.508	0.153	0.134
Serial Correlation	0.080	0.043	0.683	0.720
White Hetero-scedasticity	0.015	0.062	0.975	0.934

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8. 14 Hungary

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.489	0.310	-0.323
	..	(0.115)	(0.320)	(0.318)
FDINF(-1)	-0.193	0.129***	0.102	-0.234
	(0.265)	(0.175)	(0.344)	(0.338)
FDIOF	1.115***	..	-0.457	0.523
	(0.263)	..	(0.485)	(0.478)
FDIOF(-1)	0.121	-0.110	0.012	0.199
	(0.389)	(0.257)	(0.500)	(0.495)
EXP	0.189	-0.122	..	-0.235***
	(0.196)	(0.130)	..	(0.146)
EXP(-1)	-0.197	0.146	0.666***	0.965***
	(0.177)	(0.116)	(0.233)	(0.062)
IMP	-0.199	0.141	0.975***	..
	(0.196)	(0.129)	(0.063)	..
IMP(-1)	0.137	-0.106	-0.561***	-0.673***
	(0.181)	(0.119)	(0.186)	(0.158)
Constant	77.398***	-46.587**	-56.924	69.838*
	(23.008)	(16.208)	(36.127)	(34.356)
R-squared	0.560	0.734	0.995	0.993
Adj. R-squared	0.355	0.610	0.992	0.990
F-statistic	2.730	5.916	395.013	316.910
	(0.048)	(0.002)	(0.000)	(0.000)
No. obs.	23	23	23	23
Histogram-Normality	0.897	0.443	0.000	0.001
Serial Correlation	0.065	0.069	0.276	0.555
White Hetero-scedasticity	0.588	0.098	0.777	0.686

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 15 Iceland

	FDINF	FDIOF	EXP	IMP
	..	1.374***	0.251*	0.001
FDINF	..	(0.147)	(0.139)	(0.213)
	0.099	-0.811*	0.288*	-0.114
FDINF(-1)	(0.222)	(0.391)	(0.139)	(0.217)
	0.360***	..	-0.038	0.203*
FDIOF	(0.082)	..	(0.077)	(0.102)
	0.134	-0.374*	-0.088	0.228***
FDIOF(-1)	(0.082)	(0.146)	(0.057)	(0.069)
	0.538	-0.304	..	0.698**
EXP	(0.297)	(0.610)	..	(0.272)
	-0.307	-1.533*	1.062***	0.026
EXP(-1)	(0.438)	(0.787)	(0.197)	(0.435)
	0.001	0.786*	0.342**	..
IMP	(0.223)	(0.394)	(0.133)	..
	0.058	1.330**	-0.580***	0.104
IMP(-1)	(0.327)	(0.558)	(0.185)	(0.319)
	-69.500	-68.879	50.089	51.955
Constant	(44.968)	(89.943)	(30.542)	(44.926)
R-squared	0.934	0.931	0.959	0.936
Adj. R-squared	0.912	0.908	0.945	0.915
	42.574	40.345	70.502	44.273
F-statistic	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	29	29	29	29
Histogram-Normality	0.000	0.373	0.728	0.405
Serial Correlation	0.116	0.006	0.050	0.023
White Hetero-scedasticity	0.117	0.151	0.115	0.499

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 16 Ireland

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.315***	0.065*	-0.073**
	..	(0.107)	(0.037)	(0.035)
FDINF(-1)	0.278	-0.148	0.087**	-0.080*
	(0.249)	(0.143)	(0.042)	(0.041)
FDIOF	0.963***	..	-0.076	0.068
	(0.326)	..	(0.068)	(0.066)
FDIOF(-1)	-0.494	0.780**	0.100	-0.062
	(0.664)	(0.343)	(0.119)	(0.116)
EXP	2.030*	-0.768	..	0.936***
	(1.160)	(0.692)	..	(0.057)
EXP(-1)	-1.656	1.153*	0.691***	-0.598***
	(1.054)	(0.585)	(0.128)	(0.141)
IMP	-2.397**	0.738	0.994***	..
	(1.167)	(0.716)	(0.060)	..
IMP(-1)	1.934*	-1.125*	-0.638***	0.604***
	(1.024)	(0.584)	(0.140)	(0.149)
Constant	32.530	-23.429	-4.148	7.466
	(67.343)	(38.383)	(12.120)	(11.674)
R-squared	0.584	0.734	0.997	0.996
Adj. R-squared	0.438	0.641	0.997	0.995
F-statistic	4.012	7.879	1,159.956	853.190
	(0.007)	(0.000)	(0.000)	(0.000)
No. obs.	33	33	33	33
Histogram-Normality	0.141	0.166	0.520	0.528
Serial Correlation	0.065	0.419	0.125	0.123
White Hetero-scedasticity	0.508	0.078	0.271	0.114

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 17 Italy

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.473**	-0.291	0.397
	..	(0.198)	(0.331)	(0.347)
FDINF(-1)	-0.044	0.315	0.307	-0.023
	(0.214)	(0.231)	(0.362)	(0.388)
FDIOF	0.380**	..	0.049	0.244
	(0.159)	..	(0.301)	(0.315)
FDIOF(-1)	-0.391**	0.291	-0.498*	0.457
	(0.160)	(0.190)	(0.289)	(0.309)
EXP	-0.099	0.021	..	0.949***
	(0.113)	(0.127)	..	(0.091)
EXP(-1)	0.083	-0.008	0.807***	-0.769***
	(0.109)	(0.123)	(0.103)	(0.131)
IMP	0.121	0.092	-0.600***	..
	(0.106)	(0.119)	(0.112)	..
IMP(-1)	-0.048	-0.033	-5.616***	0.677***
	(0.094)	(0.105)	(13.148)	(0.149)
Constant	-5.319	-14.245*	-5.616	20.053
	(7.630)	(8.117)	(13.148)	(13.385)
R-squared	0.447	0.755	0.967	0.969
Adj. R-squared	0.298	0.689	0.959	0.961
F-statistic	2.999	11.450	110.309	117.078
	(0.019)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.288	0.163	0.648	0.353
Serial Correlation	0.722	0.816	0.370	0.658
White Hetero-scedasticity	0.007	0.002	0.341	0.485

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 18 Japan

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.508	0.776	0.649
	..	(0.477)	(0.978)	(0.117)
FDINF(-1)	0.438**	-0.598	0.022	-0.778
	(0.184)	(0.492)	(1.028)	(0.975)
FDIOF	0.082	..	-0.645	-0.049***
	(0.077)	..	(0.378)	(1.025)
FDIOF(-1)	-0.080	0.705***	0.434*	0.969*
	(0.080)	(0.149)	(0.404)	(0.349)
EXP	0.030	-0.156*	..	0.888***
	(0.038)	(0.091)	..	(0.089)
EXP(-1)	-0.005	0.118	0.607***	-0.423**
	(0.036)	(0.087)	(0.233)	(0.163)
IMP	-0.031	0.236**	0.894***	..
	(0.038)	(0.085)	(0.089)	..
IMP(-1)	0.016	-0.162*	-0.638***	0.649***
	(0.034)	(0.079)	(0.121)	(0.117)
Constant	-1.054	-0.139	21.197***	-20.190***
	(1.519)	(3.809)	(6.529)	(6.622)
R-squared	0.266	0.821	0.952	0.972
Adj. R-squared	0.069	0.773	0.940	0.964
F-statistic	1.349	17.031	74.757	128.464
	(0.368)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.000	0.063	0.808	0.027
Serial Correlation	0.187	0.640	0.814	0.730
White Hetero-scedasticity	0.146	0.274	0.419	0.061

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 19 Korea

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.073	2.273	-2.048
	..	(0.246)	(1.485)	(1.575)
FDINF(-1)	0.748***	-0.020	-2.170	2.003
	(0.130)	(0.246)	(1.493)	(1.579)
FDIOF	0.047	..	-0.745	1.035
	(0.156)	..	(1.227)	(1.279)
FDIOF(-1)	-0.109	0.962***	2.023	-2.344*
	(0.168)	(0.098)	(1.278)	(1.325)
EXP	0.036	-0.019	..	1.046***
	(0.024)	(0.030)	..	(0.014)
EXP(-1)	-0.013	0.006	0.591***	-0.619***
	(0.024)	(0.031)	(0.155)	(0.162)
IMP	-0.030	0.024	0.952***	..
	(0.023)	(0.029)	(0.013)	..
IMP(-1)	0.008	-0.010	-0.559***	0.589***
	(0.023)	(0.029)	(0.146)	(0.153)
Constant	1.499	0.873	2.376	-2.661
	(1.068)	(1.379)	(8.746)	(9.167)
R-squared	0.758	0.869	0.999	0.998
Adj. R-squared	0.692	0.834	0.998	0.998
F-statistic	11.661	24.632	3,129.232	3,090.536
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.044	0.002	0.356	0.217
Serial Correlation	0.004	0.097	0.187	0.228
White Hetero-scedasticity	0.496	0.994	0.665	0.686

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 20 Luxembourg

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.728***	-0.035	0.037
	..	(0.111)	(0.075)	(0.075)
FDINF(-1)	-0.122	0.149	0.002	-0.001
	(0.201)	(0.181)	(0.075)	(0.074)
FDIOF	0.881***	..	0.068	-0.069
	(0.134)	..	(0.082)	(0.081)
FDIOF(-1)	0.179	0.012	-0.012	0.011
	(0.223)	(0.205)	(0.084)	(0.083)
EXP	-0.256	0.405	..	0.986***
	(0.545)	(0.491)	..	(0.001)
EXP(-1)	0.021	-0.040	0.003	-0.003
	(0.120)	(0.109)	(0.045)	(0.044)
IMP	0.276	-0.420	1.013***	..
	(0.552)	(0.497)	(0.001)	..
IMP(-1)	-0.019	0.037	-0.003	0.003
	(0.121)	(0.110)	(0.045)	(0.045)
Constant	26.073	36.612	342.718***	-338.273***
	(234.652)	(213.220)	(52.509)	(51.821)
R-squared	0.972	0.869	0.999	0.999
Adj. R-squared	0.964	0.831	0.999	0.999
F-statistic	121.443	22.724	44.659	18.959
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	32	32	32	32
Histogram-Normality	0.000	0.000	0.000	0.000
Serial Correlation	0.822	0.656	0.054	0.052
White Hetero-scedasticity	0.975	0.941	0.019	0.019

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 21 Mexico

	FDINF	FDIOF	EXP	IMP
FDINF	..	-0.582	0.205	0.477
	..	(0.343)	(0.451)	(0.589)
FDINF(-1)	0.156	-0.751	0.464	-0.301
	(0.214)	(0.372)	(0.492)	(0.657)
FDIOF	-0.171	..	0.104	0.307
	(0.101)	..	(0.245)	(0.317)
FDIOF(-1)	0.129	-0.035	0.115	0.044
	(0.100)	(0.195)	(0.238)	(0.314)
EXP	0.038	0.066	..	1.192***
	(0.084)	(0.156)	..	(0.110)
EXP(-1)	-0.026	0.002	0.686***	-0.853***
	(0.064)	(0.119)	(0.064)	(0.103)
IMP	0.051	0.113	0.686***	..
	(0.063)	(0.117)	(0.063)	..
IMP(-1)	0.002	0.037	-0.444***	0.558***
	(0.046)	(0.085)	(0.061)	(0.088)
Constant	2.727	-15.742*	-2.004	21.960
	(4.545)	(7.856)	(10.565)	(13.248)
R-squared	0.603	0.531	0.977	0.961
Adj. R-squared	0.496	0.405	0.971	0.950
F-statistic	5.648	4.208	160.553	90.619
	(0.000)	(0.003)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.000	0.000	0.105	0.000
Serial Correlation	0.049	0.607	0.310	0.363
White Hetero-scedasticity	0.870	0.220	0.483	0.747

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 22 Netherland

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.698***	-0.001	-0.010
	..	(0.183)	(0.124)	(0.104)
FDINF(-1)	0.310*	-0.021	-0.028	-0.002
	(0.171)	(0.198)	(0.102)	(0.086)
FDIOF	0.604	..	-0.010	0.021
	(0.158)	..	(0.115)	(0.097)
FDIOF(-1)	-0.022	0.236	0.021	0.008
	(0.160)	(0.164)	(0.089)	(0.075)
EXP	-0.029	-0.040	..	0.083***
	(0.404)	(0.435)	..	(0.035)
EXP(-1)	0.535	-0.418	0.804***	-0.611***
	(0.364)	(0.401)	(0.112)	(0.116)
IMP	-0.046	0.110	1.163***	..
	(0.479)	(0.514)	(0.049)	..
IMP(-1)	-0.532	0.379	-0.898***	0.701***
	(0.394)	(0.435)	(0.107)	(0.111)
Constant	6.522	21.495	-22.107	25.413**
	(26.231)	(27.832)	(13.660)	(10.876)
R-squared	0.784	0.790	0.997	0.997
Adj. R-squared	0.708	0.716	0.996	0.996
F-statistic	10.359	10.738	1,076.411	865.001
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	28	28	28	28
Histogram-Normality	0.620	0.458	0.153	0.146
Serial Correlation	0.153	0.965	0.930	0.778
White Hetero-scedasticity	0.235	0.463	0.859	0.890

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 23 New Zealand

	FDINF	FDIOF	EXP	IMP
	..	-0.939	0.023	-0.005
FDINF	..	(1.495)	(0.193)	(0.221)
	0.446**	-0.175	-0.026	-0.003
FDINF(-1)	(0.179)	(1.529)	(0.196)	(0.224)
	-0.016	..	0.024	-0.026
FDIOF	(0.025)	..	(0.025)	(0.028)
	-0.007	0.939***	0.007	-0.000
FDIOF(-1)	(0.388)	(0.225)	(0.037)	(0.043)
	0.024	1.491	..	1.128***
EXP	(0.199)	(1.500)	..	(0.035)
	0.006	0.312	-0.130	0.045
EXP(-1)	(0.145)	(1.116)	(0.141)	(0.164)
	-0.004	-1.221	0.864***	..
IMP	(0.174)	(1.316)	(0.027)	..
	-0.020	-0.301	0.127	-0.052
IMP(-1)	(0.133)	(1.022)	(0.129)	(0.150)
	9.337	-47.193	44.878***	-40.063
Constant	(15.462)	(119.246)	(12.570)	(15.676)
R-squared	0.407	0.512	0.997	0.997
Adj. R-squared	0.247	0.381	0.996	0.996
	2.549	3.897	1,268.768	1,357.195
F-statistic	(0.039)	(0.005)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.017	0.000	0.027	0.015
Serial Correlation	0.270	0.000	0.005	0.036
White Hetero-scedasticity	0.958	0.018	0.364	0.040

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 24 Norway

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.359	-0.155	0.271
	..	(0.255)	(0.631)	(0.548)
FDINF(-1)	0.549***	-0.641**	1.482**	-1.361**
	(0.181)	(0.254)	(0.612)	(0.527)
FDIOF	0.197	..	0.910**	-0.774**
	(0.140)	..	(0.433)	(0.379)
FDIOF(-1)	0.188	0.438	-0.374	0.81
	(0.141)	(0.178)	(0.465)	(0.407)
EXP	-0.015	0.159**	..	-0.871***
	(0.061)	(0.076)	..	(0.010)
EXP(-1)	-0.003	-0.047	0.602***	-0.529***
	(0.053)	(0.071)	(0.123)	(0.107)
IMP	0.034	-0.179*	1.145***	..
	(0.069)	(0.087)	(0.013)	..
IMP(-1)	-0.010	0.058	-0.703***	0.619***
	(0.060)	(0.080)	(0.137)	(0.118)
Constant	-1.864	9.071*	-11.805	10.596
	(3.511)	(4.420)	(11.133)	(9.697)
R-squared	0.903	0.754	0.999	0.999
Adj. R-squared	0.877	0.689	0.999	0.996
F-statistic	34.685	11.429	44.659	18.959
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.925	0.031	0.000	0.000
Serial Correlation	0.029	0.048	0.813	0.866
White Hetero-scedasticity	0.191	0.505	0.956	0.954

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 25 Poland

	FDINF	FDIOF	EXP	IMP
	..	0.401**	-0.541*	0.523*
FDINF	..	(0.168)	(0.307)	(0.294)
	0.515**	-0.336	-1.085**	1.037***
FDINF(-1)	(0.236)	(0.234)	(0.369)	(0.354)
	0.448**	..	0.003	-0.001
FDIOF	(0.188)	..	(0.344)	(0.330)
	-0.393	0.909***	0.751*	-0.716*
FDIOF(-1)	(0.242)	(0.162)	(0.396)	(0.380)
	-0.196	0.001	..	0.958***
EXP	(0.112)	(0.112)	..	(0.004)
	0.003*	-0.006	0.037	-0.038
EXP(-1)	(0.077)	(0.073)	(0.128)	(0.123)
	0.207*	-0.000	1.043***	..
IMP	(0.116)	(0.117)	(0.004)	..
	-0.005	0.008	-0.044	0.044
IMP(-1)	(0.081)	(0.076)	(0.134)	(0.128)
	4.364*	0.038	6.666	-6.389
Constant	(2.434)	(2.441)	(4.076)	(3.908)
R-squared	0.767	0.708	0.999	0.999
Adj. R-squared	0.707	0.630	0.999	0.999
	12.363	9.027	8,834.751	9,012.477
F-statistic	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.007	0.000	0.534	0.543
Serial Correlation	0.829	0.013	0.550	0.546
White Hetero-scedasticity	0.073	0.016	0.268	0.259

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 26 Portugal

	FDINF	FDIOF	EXP	IMP
	..	0.789***	0.037	0.136
FDINF	..	(0.182)	(0.247)	(0.375)
	0.003	0.119	0.470*	-0.528
FDINF(-1)	(0.202)	(0.245)	(0.236)	(0.372)
	0.530	..	0.000	-0.040
FDIOF	(0.122)	..	(0.202)	(0.308)
	-0.241	0.376*	-0.568***	0.845
FDIOF(-1)	(0.168)	(0.199)	(0.189)	(0.290)
	0.023	0.000	..	1.364***
EXP	(0.156)	(0.190)	..	(0.133)
	0.039	-0.094	0.745***	-0.933***
EXP(-1)	(0.130)	(0.157)	(0.073)	(0.169)
	0.037	-0.016	0.588***	..
IMP	(0.102)	(0.125)	(0.057)	..
	-0.042	0.046	-0.378***	0.555***
IMP(-1)	(0.064)	(0.079)	(0.035)	(0.061)
	0.699	4.624	-1.459	26.363
Constant	(10.519)	(12.808)	(13.243)	(19.493)
R-squared	0.499	0.558	0.954	0.932
Adj. R-squared	0.364	0.439	0.942	0.913
	3.704	4.688	77.965	50.707
F-statistic	(0.006)	(0.002)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.739	0.001	0.524	0.760
Serial Correlation	0.377	0.713	0.008	0.000
White Hetero-scedasticity	0.019	0.907	0.314	0.298

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 27 Slovakia

	FDINF	FDIOF	EXP	IMP
FDINF	..	-0.094	-0.065	0.038
	..	(0.209)	(0.172)	(0.175)
FDINF(-1)	-0.038	-0.222	-0.474**	0.470**
	(0.322)	(0.246)	(0.165)	(0.171)
FDIOF	-0.152	..	-0.094	0.112
	(0.337)	..	(0.218)	(0.222)
FDIOF(-1)	0.075	-0.282	0.076	-0.058
	(0.351)	(0.266)	(0.226)	(0.231)
EXP	-0.155	-0.1140	..	0.996
	(0.411)	(0.323)	..	(0.058)
EXP(-1)	0.410	0.063	0.375**	-0.295
	(0.279)	(0.235)	(0.165)	(0.181)
IMP	0.088	0.160	0.958***	..
	(0.405)	(0.316)	(0.056)	..
IMP(-1)	-0.365	-0.055	-0.310*	0.241
	(0.244)	(0.206)	(0.148)	(0.161)
Constant	77.218	7.024	-6.446	34.451
	(55.432)	(46.475)	(38.183)	(37.865)
R-squared	0.162	0.230	0.987	0.983
Adj. R-squared	0.010	0.155	0.981	0.975
F-statistic	0.387	0.366	153.870	117.418
	(0.590)	(0.652)	(0.000)	(0.000)
No. obs.	22	22	22	22
Histogram-Normality	0.512	0.000	0.851	0.823
Serial Correlation	0.028	0.030	0.037	0.041
White Hetero-scedasticity	0.012	0.833	0.295	0.790

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 28 Spain

	FDINF	FDIOF	EXP	IMP
	..	0.161	-0.130	0.298
FDINF	..	(0.379)	(0.254)	(0.286)
	-0.146	-0.983**	0.190	-0.171
FDINF(-1)	(0.214)	(0.372)	(0.279)	(0.320)
	0.043	..	-0.216*	0.305**
FDIOF	(0.101)	..	(0.125)	(0.138)
	0.273**	0.800	0.149	-0.151
FDIOF(-1)	(0.125)	(0.212)	(0.175)	(0.200)
	-0.076	-0.479*	..	1.072***
EXP	(0.150)	(0.276)	..	(0.077)
	0.013	0.248	0.893***	-0.905***
EXP(-1)	(0.157)	(0.301)	(0.106)	(0.152)
	0.134	0.519**	0.822***	..
IMP	(0.129)	(0.234)	(0.059)	..
	-0.043	-0.239	-0.727***	0.793***
IMP(-1)	(0.129)	(0.247)	(0.091)	(0.115)
	11.316	8.289	2.174	4.778
Constant	(6.613)	(13.443)	(9.890)	(10.349)
R-squared	0.715	0.791	0.974	0.977
Adj. R-squared	0.638	0.735	0.967	0.971
	9.327	14.054	141.292	160.568
F-statistic	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.915	0.503	0.768	0.896
Serial Correlation	0.514	0.373	0.014	0.047
White Hetero-scedasticity	0.487	0.005	0.721	0.841

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 29 Sweden

	FDINF	FDIOF	EXP	IMP
	..	0.201*	0.043	-0.052
FDINF	..	(0.106)	(0.066)	(0.058)
	-0.028	0.394***	-0.016	-0.037
FDINF(-1)	(0.242)	(0.116)	(0.082)	(0.072)
	0.602*	..	-0.089	0.150
FDIOF	(0.318)	..	(0.114)	(0.098)
	0.375	-0.084	0.029	0.004
FDIOF(-1)	(0.264)	(0.157)	(0.093)	(0.082)
	0.372	-0.257	..	0.852***
EXP	(0.571)	(0.329)	..	(0.046)
	0.060	0.176	0.857***	-0.679***
EXP(-1)	(0.585)	(0.336)	(0.107)	(0.115)
	-0.575	0.551	1.091***	..
IMP	(0.642)	(0.360)	(0.059)	..
	-0.046	-0.332	-0.951***	0.800***
IMP(-1)	(0.640)	(0.364)	(0.113)	(0.112)
	33.067	-11.954	10.403	-3.458
Constant	(28.996)	(16.991)	(9.905)	(8.914)
R-squared	0.438	0.661	0.989	0.987
Adj. R-squared	0.286	0.569	0.985	0.984
	2.890	7.232	323.383	286.804
F-statistic	(0.022)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.000	0.828	0.797	0.759
Serial Correlation	0.476	0.851	0.881	0.532
White Hetero-scedasticity	0.580	0.583	0.275	0.162

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 30 Switzerland

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.924***	-0.125	0.051
	..	(0.211)	(0.132)	(0.126)
FDINF(-1)	0.115	-0.126	0.298	-0.240
	(0.241)	(0.335)	(0.148)	(0.142)
FDIOF	0.480***	..	0.153	-0.088
	(0.110)	..	(0.092)	(0.089)
FDIOF(-1)	0.025	0.081	-0.105	0.118
	(0.136)	(0.188)	(0.087)	(0.081)
EXP	-0.286	0.676	..	0.900***
	(0.303)	(0.406)	..	(0.054)
EXP(-1)	0.355	-0.440	0.705***	-0.605***
	(0.254)	(0.355)	(0.098)	(0.107)
IMP	0.132	-0.440	1.022***	..
	(0.328)	(0.448)	(0.061)	..
IMP(-1)	-0.191	0.163	-0.674***	0.644***
	(0.268)	(0.374)	(0.114)	(0.104)
Constant	-12.420	32.715**	-6.902	5.883
	(12.065)	(15.754)	(8.028)	(7.556)
R-squared	0.587	0.657	0.995	0.994
Adj. R-squared	0.467	0.557	0.994	0.992
F-statistic	4.877	6.564	735.833	568.351
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	32	32	32	32
Histogram-Normality	0.592	0.731	0.719	0.668
Serial Correlation	0.004	0.024	0.625	0.388
White Hetero-scedasticity	0.455	0.836	0.508	0.137

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 31 Turkey

	FDINF	FDIOF	EXP	IMP
FDINF	..	0.616	-0.638	0.853
	..	(0.483)	(0.482)	(0.604)
FDINF(-1)	0.812***	-0.338	0.500	-0.653
	(0.105)	(0.480)	(0.474)	(0.596)
FDIOF	0.095	..	-0.228	0.292
	(0.075)	..	(0.191)	(0.240)
FDIOF(-1)	0.011	0.317	0.294	-0.383
	(0.089)	(0.217)	(0.218)	(0.274)
EXP	-0.099	-0.228	..	1.257***
	(0.075)	(0.191)	..	(0.018)
EXP(-1)	0.031	0.151	0.298	-0.430
	(0.089)	(0.225)	(0.219)	(0.273)
IMP	0.083	0.184	0.791***	..
	(0.059)	(0.151)	(0.011)	..
IMP(-1)	-0.027	-0.109	-0.221	0.320
	(0.069)	(0.174)	(0.170)	(0.212)
Constant	2.099	-0.434	9.781	-10.066
	(2.922)	(7.496)	(7.238)	(9.288)
R-squared	0.781	0.266	0.996	0.996
Adj. R-squared	0.722	0.068	0.995	0.996
F-statistic	13.277	1.344	1,036.208	1,075.370
	(0.000)	(0.370)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.000	0.000	0.936	0.937
Serial Correlation	0.013	0.020	0.412	0.415
White Hetero-scedasticity	0.853	0.029	0.380	0.554

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 32 The United Kingdom

	FDINF	FDIOF	EXP	IMP
FDINF	..	1.049***	0.022	0.015
	..	(0.267)	(0.101)	(0.113)
FDINF(-1)	0.194	0.144	0.038	0.005
	(0.206)	(0.358)	(0.108)	(0.121)
FDIOF	0.355***	..	-0.033	0.050
	(0.090)	..	(0.059)	(0.065)
FDIOF(-1)	-0.032	0.267	-0.063	0.021
	(0.112)	(0.186)	(0.057)	(0.065)
EXP	0.084	-0.367	..	1.045***
	(0.379)	(0.647)	..	(0.077)
EXP(-1)	-0.255	0.734*	0.531***	-0.624***
	(0.259)	(0.430)	(0.088)	(0.091)
IMP	0.044	0.443	0.838***	..
	(0.339)	(0.577)	(0.062)	..
IMP(-1)	0.264	-0.998**	-0.445***	0.613***
	(0.286)	(0.460)	(0.122)	(0.111)
Constant	-28.880	49.107	13.302	-4.201
	(17.504)	(30.095)	(9.148)	(10.592)
R-squared	0.694	0.660	0.977	0.976
Adj. R-squared	0.612	0.569	0.971	0.969
F-statistic	8.443	7.228	158.408	148.570
	(0.000)	(0.000)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.000	0.008	0.027	0.002
Serial Correlation	0.020	0.000	0.893	0.642
White Hetero-scedasticity	0.451	0.000	0.838	0.948

*** p<0.01, ** p<0.05, * p<0.1

Table 8. 33 The United States

	FDINF	FDIOF	EXP	IMP
	..	0.516**	-0.130	0.544**
FDINF	..	(0.225)	(0.210)	(0.238)
	0.637***	-0.305	0.115	-0.548**
FDINF(-1)	(0.171)	(0.260)	(0.228)	(0.260)
	0.325**	..	0.073	-0.176
FDIOF	(0.142)	..	(0.168)	(0.204)
	-0.215	0.482**	0.014	0.222
FDIOF(-1)	(0.159)	(0.185)	(0.178)	(0.214)
	-0.111	0.099	..	0.988***
EXP	(0.180)	(0.228)	..	(0.143)
	0.181	-0.268	0.829***	-0.915***
EXP(-1)	(0.171)	(0.213)	(0.095)	(0.146)
	0.308**	-0.158	0.655***	..
IMP	(0.135)	(0.183)	(0.095)	..
	-0.308**	0.250	-0.516***	0.889***
IMP(-1)	(0.135)	(0.180)	(0.124)	(0.090)
	-3.795	7.739	-1.669	6.887
Constant	(4.461)	(5.494)	(4.878)	(5.853)
R-squared	0.593	0.476	0.949	0.961
Adj. R-squared	0.484	0.335	0.935	0.950
	5.418	3.371	68.998	91.654
F-statistic	(0.000)	(0.011)	(0.000)	(0.000)
No. obs.	34	34	34	34
Histogram-Normality	0.200	0.361	0.591	0.476
Serial Correlation	0.393	0.353	0.000	0.000
White Hetero-scedasticity	0.407	0.037	0.515	0.104

*** p<0.01, ** p<0.05, * p<0.1