THE UNIVERSITY OF HULL

THE RELATIONSHIP BETWEEN FDI AND INTERNATIONAL TRADE: EVIDENCE FROM P.R.CHINA AND OECD

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Abbreviations

AfT	Aid for Trade
APEC	Asia-Pacific Economic Cooperation
AR	Autoregressive
ASEAN	Association of Southeast Asian Nations
CIS	Commonwealth of Independent States
CITIC	China International Trust and Investment Corporation
CNPC	China National Petroleum Corporation
FDI	Foreign Direct Investment
FPE	Factor Price Equalisation
FTAs	Free Trade Agreements
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GE	General Equilibrium
GNP	Gross National Product
H-O	Heckscher-Ohlin
ILD	International Labour Division
LDC	Least Developed Countries
M&As	Mergers and Acquisitions
MNCs	Multinational Corporations
NAFTA	North America Free Trade Agreement
OECD	Organisation for Economic Co-operation and Development
PD	Product Differentiation
PLCM	Product Life Cycle Model
PPP	Purchasing Power Parity
PTAs	Preferential Trading Arrangements
R&D	Research and Development
RTAs	Regional Trade Agreements
S.E.	Standard Error
SMEs	Small Medium Enterprises
SSA	Sub-Saharan Africa
TCI	Trade Conformity Index
UK	United Kingdom

UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
US	United States
WTO	World Trade Organisation

Abstract

This study examines the relationship between foreign direct investment (FDI) and international trade. It aims at offering a unified representation of trade-FDI cycles to better understand the process of internationalisation via exploring the trade-FDI relationship and related impacts on economic growth, both of the home and the host country. In particular, it makes inquiries into the relationships between trade and FDI for developing countries and developed countries, being inspired by the product life cycle of Vernon (1966). It attempts to answer the question of whether the relationship between trade and FDI is complementary or substitute in the conjecture of a trade-FDI cycle. Further, it scrutinises the factors that contribute to the relationship between trade and FDI, and the ways in which these factors play a role and exert their effects.

The thesis examines empirically FDI-trade relationships for Organisation for Economic Co-operation and Development (OECD) countries and China, in the derived analytical framework and with the adapted models. Pooled panel data ranging from 1988 to 2012 are applied, covering 23 OECD developed countries and China. The evolving relationships fit into the phases and cycles reasonably satisfactorily, lending support to the conjectures and hypotheses developed in this study. The trade-FDI cycle is expressed as follow:

$$I_t \uparrow \rightarrow IFDI_t \rightarrow \ I_t \uparrow;\ Net\ I_t \downarrow;\ X_t \uparrow \rightarrow \ OFDI_{t+3} \uparrow \rightarrow \ X_{t+4} \downarrow$$

This research contributes to the existing literature by examining the trade-FDI relationship in a dynamic trade-FDI cycle. Moreover, it provides a clear path that demonstrates how a country achieves its development by attracting inward FDI, utilising trade, and taking advantage of outward FDI. Another obvious extension of this study is its systematic review of the determinants of trade and FDI, and its defining of the factors that drive the cycle of trade and FDI relationship. This gives a more comprehensive insight into the nature and patterns of the trade-FDI relationship, and how they interact with each other.

1 CHAPTER 1: INTRODUCTION

1.1 Backgrounds of the study

Foreign direct investment (FDI) is one of the economic activities that mostly symbolise the trend in the contemporary global economy, and is closely related to international trade. Both FDI and international trade play increasingly influential roles and interact with each other in the rapid economic globalisation process. The interactions and relationships between FDI and trade have attracted attention from academia, policy-makers and investors. Many scholars have strived to identify worthy of note patterns in the evolving relationships between FDI and trade. However, there is no uniform answer to the question of how FDI and trade interact yet.

In particular, debate goes on with regard to a substitute or complementary relationship between FDI and trade. Some studies suggest FDI complements international trade while others believe FDI substitutes trade. Mundell (1957) finds that high levels of trade barriers, such as tariffs, impede trade; however, firms may conduct FDI in order to circumvent trade barriers. Consequently FDI substitutes trade. Vernon (1966) introduces the product life cycle theory, and proves that FDI substitutes international trade when the multinational corporation holds comparative advantages. In contrast, Kojima (1977) applies comparative advantages theory into investment. By analysing the actual performance of Japanese FDI, he demonstrates the complementary relationship between trade and FDI. He suggests that if the home country invests in those industries that already lost or were going to lose its comparative advantages, the aim of the investments is to obtain the raw material or the intermediate products. So both the home country and host country can concentrate more on their comparative advantages and gain benefit. Thus, FDI complements trade. So far, the interaction between trade and FDI remains an unresolved question. Insights into the trade-FDI relationship will contribute towards a better understanding of the internationalisation process and its potential impacts on economic growth, both of home and host country.

Identifying the trade-FDI relationship is important for policy making. Take Singapore as an example, Singapore has made great efforts, including the policy changes and the establishment of institutions dedicated to attract FDI, in particular, the US FDI since 1968. Owing to these enormous efforts, the effects of which persisted for the next three decades, Singapore has successfully achieved remarkable improvements in comparative living standards and economic status by utilising US FDI (Wint & Williams, 2002). Inspired by the successful example of Singapore, many less developed countries have enthusiastically engaged in activities that aiming at attracting FDI and increasing trade, in the economic globalisation ever since the 1990s. A major reason that developing countries would like to attract direct investment from more advanced countries and get involved in globalisation is potential technology spillovers (Lai, 2001). Most of these developing countries believe that foreign affiliated firms have higher levels of total factor productivity and it is hoped that foreign affiliated firms would bring superior technologies, new business models, innovative management and marketing know-how to the host country (Blomström *et al.*, 2000; Kimino, *et al.*, 2007). Borenstein *et al.* (1998) conclude that, the main channel through which FDI contributes to economic growth is by stimulating technological progress, rather than by increasing total capital accumulation in the host country. In addition, the entry of foreign firms increases competition in the host country, thereby further stimulating domestic firms to operate more efficiently (Driffield, 2001; Kimino, *et al.*, 2007). Moreover, many studies suggest that the spillover effects of FDI promote host countries' exports by improving the productivity of local firms (Buckley *et al.*, 2002; 2007a; Wei and Liu, 2006; Zhao and Wang, 2008). Studies of China also prove such kind of linkages between trade, FDI and economic growth. For example, Liu *et al.* (2002) indicate that the economic development, exports and FDI appear to be mutually reinforcing under the open-door policy of Chinese government. Thereby, with an increasing flow of FDI, the trade volume tends to increase dramatically.

With beneficial effects from both FDI and international trade on economic growth and development, it is crucial to understand the relationship between them (UNCTAD, 1996). Simply viewing FDI and trade as either alternatives or complementary modes of internationalisation can be biased. Therefore, this thesis aims at answering the question of how trade and FDI interact with each other and what are the major driving factors of their relationships. The case of Singapore shows FDI and trade is in dynamic relationships subject to specific contexts. Inspired by the case of Singapore, this thesis chooses a developing country, China and developed countries from OECD as research settings. We argue that trade volumes and FDI flows, which strongly contribute to China and OECD's economic development may present a trade-FDI cycle. This study attempts to demonstrate how the relationship between trade and FDI changes during the process that a developing country improves its economy status by utilising the trade volumes and FDI flows.

1.2 Objectives of the study

This research aims to achieve three major objectives. First, it seeks to verify whether a trade-FDI cycle can better explain the evolving relationship between trade and FDI by examining the interaction between trade and FDI. Second, it endeavours to offer a unified representation of FDI-trade cycles and phases. Finally, it tries to identify the determinants that contribute to the relationship between trade and FDI and scrutinise the ways in which these determinants contribute to the relationship, from the perspectives of both home and host countries.

In analysing the relationship between trade and FDI, this research seeks to answer the question whether FDI and trade are complements or substitutes. Theoretically, there are mainly two kinds of relationships between international trade and FDI whereby the former is complementary and the latter is substitute. Empirically, the interaction and relationship between them will vary, depending on different definitions, periods of product life, and multinational corporations' (MNCs) motivations. Technically and in some works, FDI is said to be trade creating when FDI and trade are complements; FDI is trade substituting or replacing, when FDI and trade are substitutes. So if increases in FDI cause the trade volume between the home country and the host country to increase, the relationship between trade and FDI is defined to be complementary; if an increase in FDI leads to falls in trade volumes between the home country and the host country, the relationship between trade and FDI is substitute.

According to internationalisation theory (Andersen, 1993; Hedlund & Kverneland, 1983), manufacturing firms are likely to undertake incremental steps to serve these unknown foreign markets. They do so by exporting first, until sufficient experience is accumulated and necessary knowledge is acquired to operate a direct subsidiary overseas. This is because exporting requires less investment in sunk costs than FDI and is the least risky mode of serving unknown overseas markets. In this context, internationalisation theory postulates that FDI is a substitute for exports only when higher fixed costs associated with foreign production can offset external transaction costs (Buckley & Casson, 1976; Dunning, 1996). Furthermore, FDI undertaken in a host country in order to overcome trade barriers has also contributed a great deal to the substitution relationship. However, some empirical studies find the opposite relationship, suggesting the relationship is complementary (Buck, *et al.*, 2007; Yu and Zhao, 2008). Yet, some others even point out that the relationship is not clear (Bedassa, 2003; Chen, 2006; Wang, 2007; Liu & Cui, 2008). So this study attempts to shed new light on the variation of trade-FDI relationships in the development phases of a country by examining a major developing country, China, against the backdrop of its trade and FDI engagement with OECD economies. Meanwhile, with regard to the locational characteristics of the countries concerned, this work is also undertaking to predict the path of the development of international production, and aiming to identify and evaluate the variables that possibly influence the changes of the relationship between trade and FDI over time.

Based on the successful examples examined in the empirical literature, the idea that integration of the world economy via FDI and trade improves the development and economic growth of developing countries and world welfare is widely accepted (Balassa, 1978; Borensztein *et al.*, 1998; Markusen & Venables, 1999). So the relationship between FDI and trade may also vary with the development of host and home countries. These suggest that the variation of FDI-trade relationships is different, according to time and development levels. During the developing process of a country from less developed to more developed, the relationship between trade and FDI should have also changed, accompanied by various improvements in productivity, technology, management and business models. Most of the empirical works do not pay attention to the possible effect of time and development levels on the relationship between trade and FDI, which is picked up in this work in an attempt to analyse the evolving trade-FDI relationship in a cycle. It demonstrates clearer patterns in the internationalisation and development of the world economy.

Moreover, most studies in existing literature focus on the characteristics of host countries to address the relationship between trade and FDI (Clegg & Scott-Green, 1999; Frankel *et al.*, 1995; Jun & Singh, 1996; Buckley *et al.*, 2007; Bhaumik & Co, 2011; Kang & Jiang, 2012). In fact, home countries' characteristics also matter considerably in determining trade and FDI flows (Kimino *et al.*, 2007). However, association between home countries' characteristics and trade-FDI relationship is under explored. Hence, this thesis undertakes to fill in this gap in the existing literature, concerning the economic factors from both home and host countries. Moreover, this study systematically reviews the factors that influence trade and FDI respectively, and specified the determinants of trade and FDI relationships based on these factors' common and joint effects on trade and FDI. Then how these factors may influence the trade-FDI cycle is conjectured and investigated empirically.

This research seeks to answer the following questions:

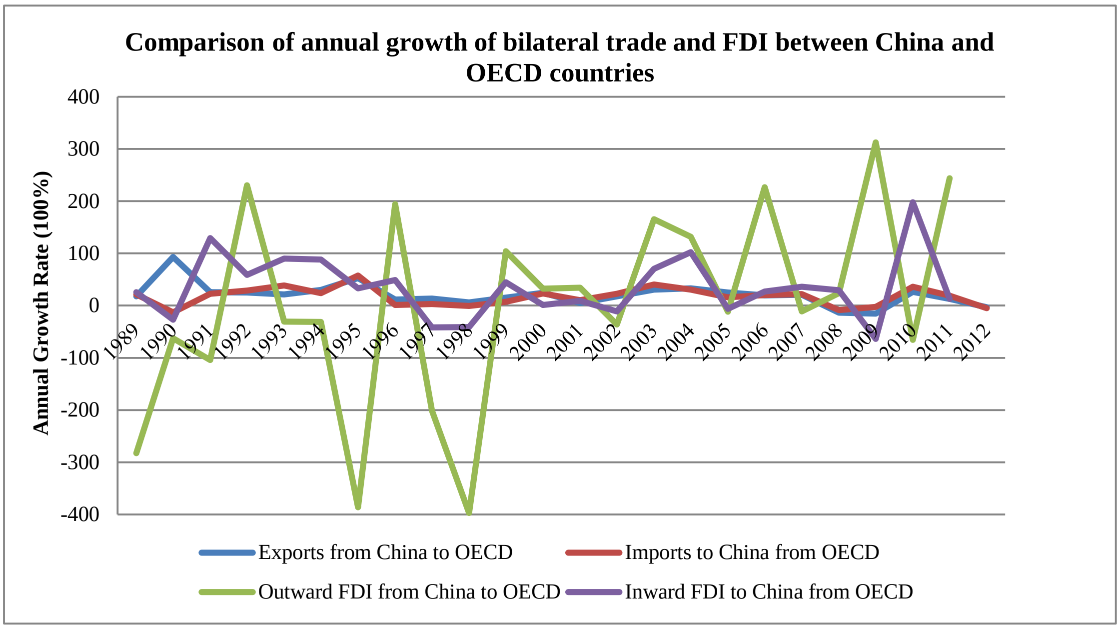
1. What is the relationship between trade and FDI, especially between developing and developed economies? Is it complementary or substitute?
2. Does a trade-FDI cycle really exist in the process of globalisation, and could a coherent presentation of this cycle offer a better demonstration of the trade-FDI relationship?
3. What are the factors that exert effects on trade and FDI? How the identified factors contribute to the evolving relationship between trade and FDI in trade-FDI cycles?

1.3 Research context

This research will answer the above stated questions by examining trade and FDI undertakings of China, the largest developing country in the world, and OECD developed countries as its partner economies. During the past 30 years, China has made great efforts to attract FDI, and stick to the "reform and openning up" policy. These efforts have embraced policy changes and the establishment of institutions dedicated to the attraction of FDI (Wint & Williams, 2002). The importance of this successful development strategy to attract of FDI could not be neglected in explaining the dramatic improvement of China's economic status and development.

Given widely accepted notion that integration of the world economy via FDI and trade improves the development and economic growth of developing countries and world welfare, the contribution of China to the globalisation process will be enormous. So will be the significance of studies on China in this regard. Likewise, China's fast development and phenomenal progress make it the ideal country for the examination of the trade-FDI relationship, which evolves with time and in accordance with development levels.

Chart 1.1 Comparison of Annual Growth Rate of Bilateral Trade and FDI between China and OECD Countries



Source: Calculated by the data from OECD database: http://stats.oecd.org/Index.aspx?DataSetCode=HS1988 and http://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_PARTNER. Data accessed in April, 2013.

A comparison of the annual growth of OECD countries' FDI outflows to China with the bilateral trade is illustrated in Chart 1.1. We can find that around every three to four years, the FDI flows and trade volume repeat themselves, showing certain signs of cycles. Moreover, the relationship between trade and FDI shown in this chart is not uniform; sometimes it is substitute while at the other times complementary. Therefore, the relationship between trade and FDI might be better explained in a cycle.

Given the potentially identifiable cyclical patterns in the relationship between FDI and trade, pooled data ranging from 1988 to 2012, covering 23 OECD developed countries, will be used to examine the trade-FDI relationship. Moreover, under the augmented gravity like model framework, panel data analysis and models will be implemented to test the relationship of trade and FDI between China (developing country) and OECD countries (developed countries). The empirical work, meanwhile, examines the factors that influence the trade-FDI relationship and how they influence this relationship.

1.4 Contributions and implications

1.4.1 Contributions

This study has made three-fold contributions. First, this study investigates the relationship between trade and FDI on a dynamic basis featured with development stages in cycles; while most of previous studies examine the relationship between trade and in a static way. Such a trade-FDI cycle explicitly explains the dynamic relationship between trade and FDI under different circumstances between developing countries and developed countries. This trade-FDI cycle further demonstrates the evolving process of a developing country and interprets the globalisation process in which trade and FDI impact economic growth.

Moreover, compared to the ad hoc choice of factors in previous studies, factors that influence the relationship between trade and FDI in trade-FDI cycle are explored systematically in this study. We first examine the determinants of trade and FDI respectively, and then pick out the common factors. Considering the possible different effects these common factors would impose on trade-FDI relationships, the driving factors for trade-FDI cycles are defied. The study then puts forward a trade-FDI cycle analytical frame work for the examination of the dynamic, evolving relationship between trade and FDI.

In addition, although there are many studies that deal with the determinants of China's outward FDI and inward FDI, there is little research concentrating on the relationship between trade and FDI based on the example of China. Moreover, most empirical works that investigate the relationship between trade and FDI are based on the cases of Japan and the US, and some other developed countries. Therefore, this study fills in these gaps by adopting China and OECD countries for empirical investigations to demonstrate the relationship between trade and FDI.

1.4.2 Practical implications

This trade-FDI cycle model not only provides explanations for the dynamic relationship between trade and FDI, but also explicitly demonstrates the process in which a developing country achieves its enhanced economic status with improvements and advancements in productivity, technology, management and business models. With the above improvement in developing countries, the relationship between trade and FDI varies accordingly. Meanwhile, with the alternating volumes of trade and FDI flows, developing countries gain great benefits, progressing through stages in the process. Therefore, understanding the relationship between trade and FDI in a trade-FDI cycle is important for policy makers, especially policy makers of developing countries. By mastering the trade-FDI cycle, policy makers of developing countries could better understand the development stage of their country by assessing the trends in trade and FDI. They can anticipate what would follow in the next phase of the cycle; and therefore make the pertinent policy accordingly to foster the development of their country. Equally, the findings of the study have valuable implications for policy makers in developed countries. If they could understand such a cyclical relationship between trade and FDI, they should not get too worried over the large trade deficit with developing countries. With the fast development of developing countries, this adverse pattern in trade will be altered gradually. Moreover, they should be aware of their technology advantages and utilise such advantages to remain technology and industry leaders and to improve their technology level further. Therefore, they should concentrate on the development of policies that encourage R&D, boost productivity and innovate business processes, instead of adopting trade-deterrence policies and measures to reduce the trade deficit. Thus, the whole world achieves great development, and the global welfare increases as well.

1.5 Structure of the thesis

This thesis consists of seven chapters. This chapter, Chapter 1, introduces the background of the study, the major objectivities and context of the research, the potential contributions of this study, and the structure of the thesis. In Chapter 2, the current state and trends in world FDI and trade will be provided by examining the data reported in recent years. This gives an insight into the two important indicators of world economies and globalisation. Chapter 2 also provides an overview of the sectoral and regional distribution of FDI and trade for China and OECD countries. This depicts the economic structures and development trends for these two major economies in the world, which will help us to better understand and demonstrate the trade-FDI cycle between China and OECD countries.

Chapter 3 summarises the factors that contribute to trade and FDI separately. Based on the findings of Chapter 3, Chapter 4 deals with the common factors that influence both trade and FDI, and further defines the crucial factors that affect the relationship between trade and FDI. Moreover, Chapter 4 presents the existing theoretical and empirical literatures pertaining to the relationship between trade and FDI and meanwhile, focuses on the main factors that drive the relationship between trade and FDI. Chapter 5 puts forward and explains the proposed trade-FDI cycles and the hypotheses accordingly. Research methodology adopted in this study is also addressed in Chapter 5.

The results from model estimation and hypotheses tests are presented in Chapter 6, together with the interpretations and analysis of the results. The implications of the findings are also discussed. Finally, Chapter 7 provides a summary of this study, highlighting how this study contributes to the existing literature on this topic and its practical meanings. It also discusses some of the limitations of the study undertaken at this time and suggests potential further research for the future.

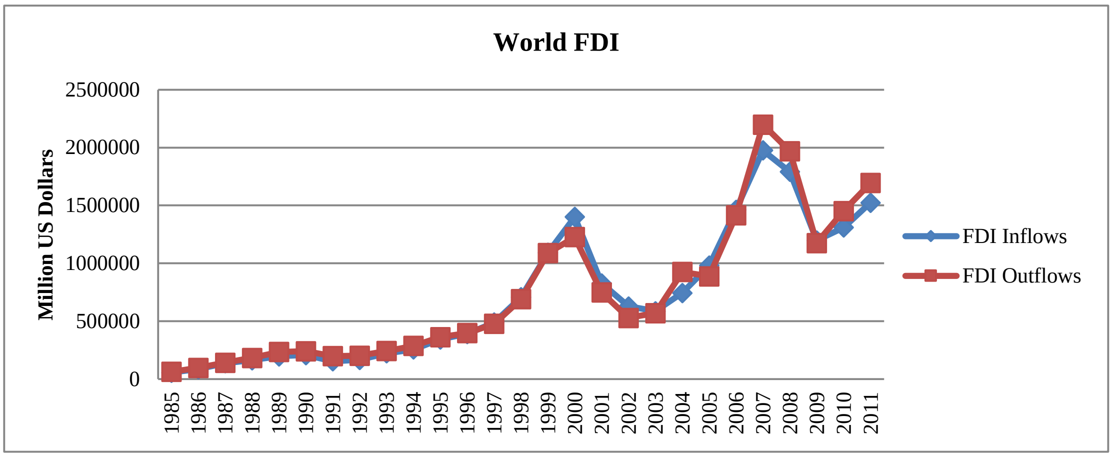
2 CHAPTER 2: FDI AND TRADE STATUS

This chapter presents an overview of the worldwide status and trends in FDI and trade during the past three decades, especially for OECD countries and China. It also highlights some of the important aspects of FDI and trade patterns of China. These indicate both substantial increases in FDI and trade volume as well as changes in crucial factors that may affect trade and FDI.

2.1 World trade and FDI status

During the past 30 years, both FDI and trade have experienced rapid growth, as shown in Chart 2.1 and Chart 2.2. FDI inflows have raised from 55,866.10 million US dollars in 1985 to 1,524,422.19 million US dollars in 2011 and FDI outflows have increased from 62,013.74 million US dollars in 1985 to 1,694,396.07 million US dollars in 2011.

Chart 2.1 World FDI

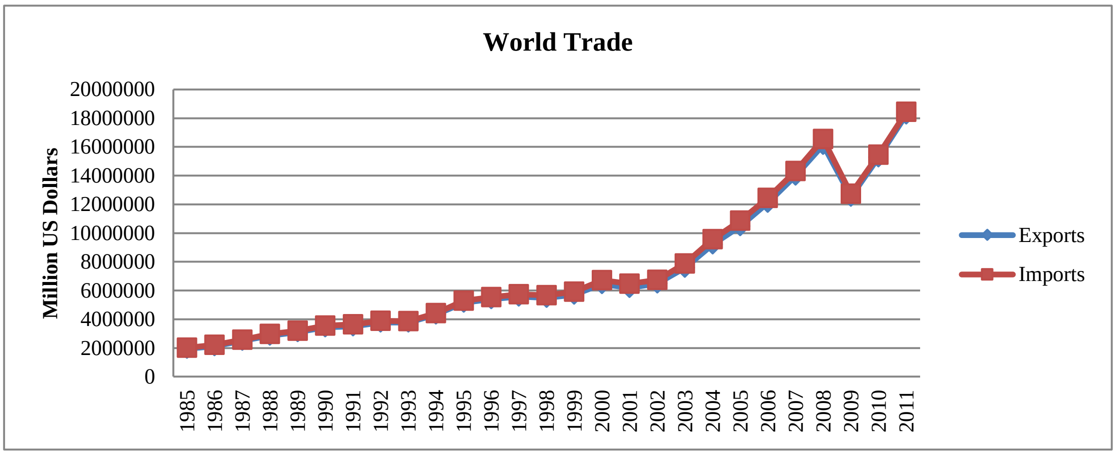


Source: UNCTAD Stat: http://unctadstat.unctad.org/TableViewer/tableView.aspx?ReportId=88 . Data accessed in April, 2013.

The outward FDI and inward FDI of world should be equal normally. However, due to different currency translation methods adopted, changes in exchange rates and statistical discrepencies, outward FDI and inward FDI figures differs slightly. Chart 2.1 also indicates that the world has experienced a great shock contributed by the financial crisis since 2007. The FDI flows in 2011 are still below its pre-crisis peak in 2007. UNCTAD has predicted that the flows of world FDI will recover to its peak of 2007 in 2013 (World Investment Reports, 2011). In spite of the fall, FDI has still remained an important source of capital and has played an important role in helping the world recover from the financial crisis (Encarnation, 1998; Poon and Thompson, 2001).

Meanwhile, the world trade volume also shows rapid growth as indicated in Chart 2.2. By 2011, the total trade volume is almost 10 times of that in 1985. Total merchandise import has risen from 2,015.00 billion US dollars in 1985 to 18,438.00 billion US dollars in 2011, with total merchandise export increasing from 1,954.00 billion US dollars in 1985 to 18,319.00 billion US dollars in 2011. Especially from 2001 to 2009, the world merchandise trade experienced the extraordinary growth than ever before. After the economic shock in 2009, which is considered as the worst financial crisis in modern history (Williams and Martinez, 2012), the world trade comes back to its pre-crisis level much faster than FDI, and has displayed robust increases. Similarly, the world should exports and imports the same vaule of products, but due to statistical errors and currency translation, the exports and imports value are different.

Chart 2.2 World Trade



Source: WTO data base: http://stat.wto.org/StatisticalProgram/WSDBViewData.aspx?Language=E. Data accessed in April, 2013.

The growth of trade is increasingly contributed by developing countries. Table 2.1 reveals the share of total developing countries' exports which has increased from 32.30 per cent in 2001 to 45.08 per cent in 2011, nearly accounting for half of the world exports nowadays. The share of imports of developing countries also has risen from 29.31 per cent in 2001 to 41.27 per cent in 2011. Although the participation of developing countries has been on the rise, developed countries continue to be both dominant exporters and importers in world trade. However, it is expected that in the near future, developing economies will engage more in the world economy and play a more crucial role than ever before.

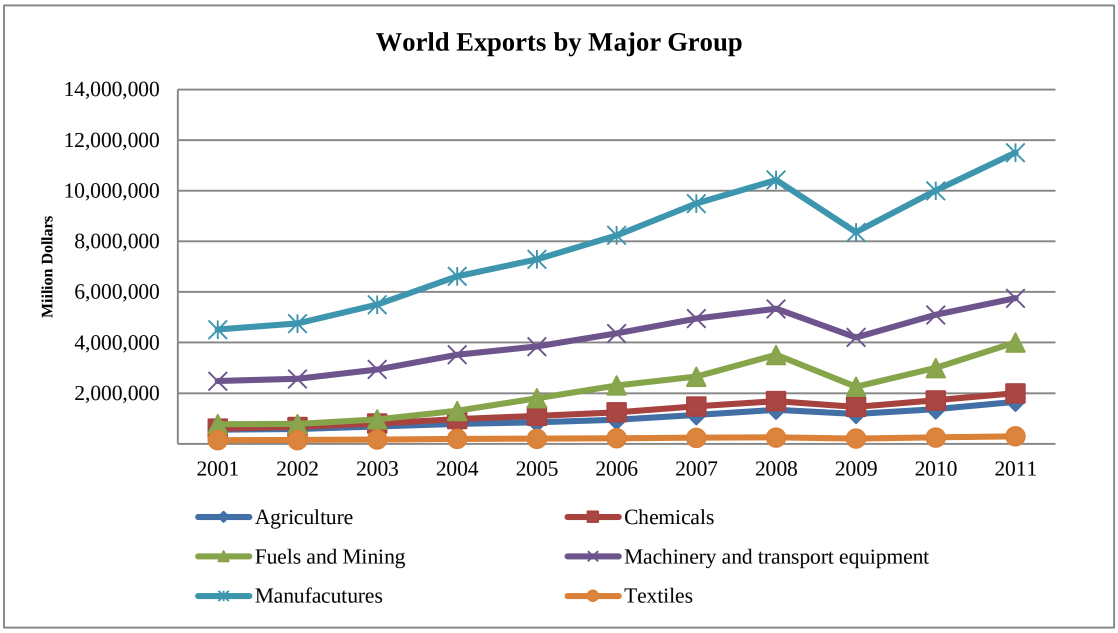
Table 2.1 World Trade by Economic Group

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Exports (Share 100%)											
Developed Economies	67.11	66.35	65.63	64.07	61.44	59.97	59.56	57.96	57.46	55.01	53.77
Developing Economies	32.30	33.02	33.75	35.25	37.75	39.16	39.50	40.97	41.49	43.90	45.08
Least Developed Countries (LDC)	0.59	0.63	0.62	0.67	0.81	0.88	0.94	1.08	1.04	1.09	1.15
Imports (Share 100%)											
Developed Economies	69.96	69.53	69.24	67.78	66.46	65.76	64.68	62.76	60.97	58.65	57.59
Developing Economies	29.31	29.72	29.99	31.47	32.73	33.42	34.43	36.24	37.80	40.24	41.27
LDC	0.73	0.74	0.77	0.75	0.81	0.82	0.88	1.00	1.22	1.11	1.14

Source: WTO data base: http://stat.wto.org/StatisticalProgram/WSDBStatProgramReporter.aspx?Language=E. Data accessed in April, 2013.

The sectoral composition of world trade has not changed too much, and keeps fairly constant from 2001 to 2011. Chart 2.3 and Chart 2.4 show the world exprots and imports by major group. Theoretically, the world exports by major group and world imports by major group should be equal. However, due to statistical errors and currency translations, the amount of exports and imports are slightly different. Therefore, we analyse the exports by major group and imports by major group respectively. As indicated in Chart 2.3, the total volume of agriculture and chemicals exports has tripled during the last decade, while the total exports volume of manufactures, textiles and machinery and transport equipment of 2011 is more than double of that in 2001. The fuels and mining exports volume has also increased from 774.33 billion US dollars in 2001 to 4,007.83 billion US dollars in 2011, which grows by more than fivefold.

Chart 2.3 World Exports by Major Group

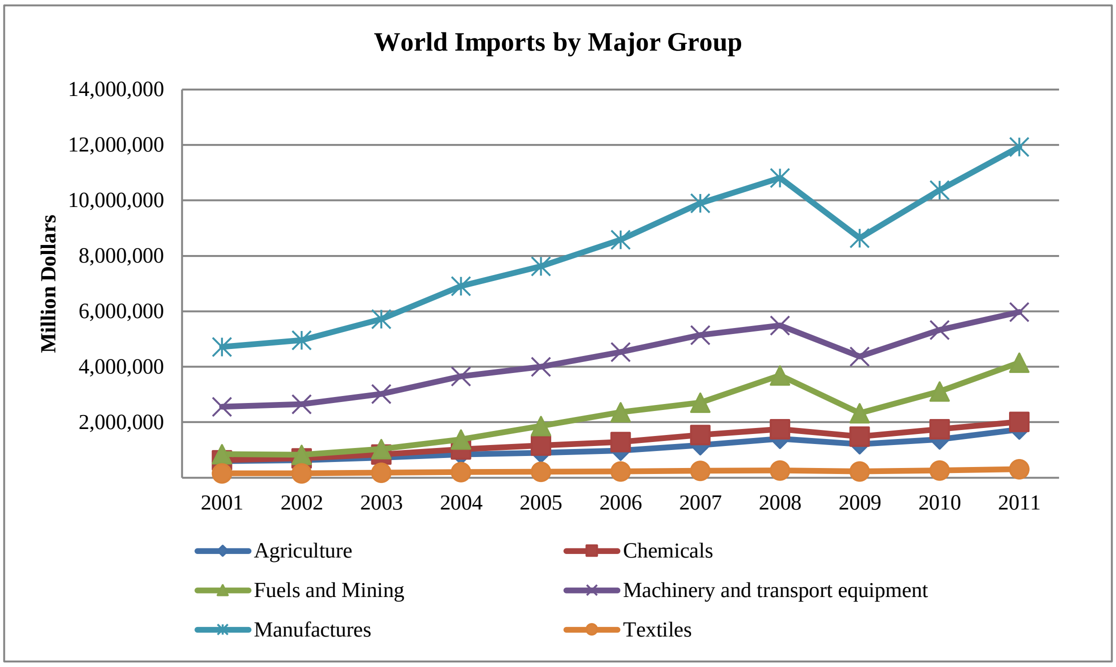


Source: WTO database: http://stat.wto.org/StatisticalProgram/WSDBViewData.aspx?Language=E. Data accessed in April, 2013.

However, there are still some sectoral or structural changes worthwhile noting. For example, manufactures still account for more than half of the world total exports, although the percentage drops from 74.23 per cent in 2001 to 65.57 per cent in 2011. Textiles have also experienced a slight decrease of share in trade, which is reduced from 2.41 per cent to 1.62 per cent. Another obvious decrease in trade share is machinery and transport equipment; the share of machinery and transport equipment in world trade has decreased from 41.35 per cent to 33.26 per cent during the past 10 years. Fuels and mining products rise up from 12.02 per cent to 22.23 per cent of world total exports, which is nearly doubled. The exports of chemicals increase slowly from 9.17 per cent to 11.08 per cent of the world export volume. The percentage of agriculture remains around 9.25 per cent of total world exports.

The similar trend could also be observed in the sectoral composition of world imports. Chart 2.4 indicates that all the industries have experienced considerable increases from 2001 to 2011. By 2011, the total imports volume has more than doubled that of 2001 in textiles, manufactures, and machinery and transport equipment. The agricultural products and chemicals have also increased dramatically. Agricultural products have increased from 595.41 billion US dollars to 1,745.21 billion US dollars, and chemicals have increased from 637.44 billion US dollars to 2,019.06 billion US dollars, being more than tripled. Fuels and mining products grow fastest among all the sectors. The total imports of fuels and mining products in 2011 is 4,155.81 million US dollars, which is fivefold of that in 2001.

Chart 2.4 World Imports by Major Group



Source: WTO database: http://stat.wto.org/StatisticalProgram/WSDBViewData.aspx?Language=E. Data accessed in April, 2013.

Although world imports have experienced high growth in this period, the rates of growth vary between industries. The share of each industry accounting for the whole world varies accordingly. The share of manufactures decreases from 73.89 per cent to 66.23 per cent from 2001 to 2011, and that of machinery and transport equipment drops from 40.11 per cent to 33.26 per cent. Textiles have also experienced a decrease in their import share from 2.44 per cent to 1.79 per cent. During the period of 2001 to 2011, the share of fuels and mining increases dramatically from 13.08 per cent to 23.71 per cent, and the share of chemicals increases slightly from 10.09 per cent to 11.25 per cent. The total imports of agricultural products, similar with exports, still maintain a share of approximately 9.07 per cent in the world total imports. Therefore, with the fast development of the global economy, the need for energy resources, such as fuels and mining, has increased dramatically compared to other industries. In addition, from Chart 2.4 we can also find that in 2009, both imports and exports have experienced setbacks due to the global financial crisis, especially in the sectors of textiles, fuels and mining, and machinery and transport equipment. The effect does not last for a long time though. After 2010, the total trade volume begins to bloom again.

Different from the world trade, the world foreign investment appears more fluctuant. But we can still clearly find that developing economies are getting more popular as the recipient of FDI inflows. Table 2.2 reports the world FDI figures from 2001 to 2011, revealing the trends and changing patterns in world FDI. By 2011, around half of the total investment from developed economies takes place in developing countries (World Investment Report, 2011). The share of FDI inflows to developing economies rises from 26.28 per cent in 2001 to 47.29 per cent in 2011. On the contrary, developed economies experience great decline in receiving inward FDI flows, the share decreasing from 72.86 per cent to 51.67 per cent.

Moreover, developing countries are no longer constrained to be the recipient of FDI as indicated in Table 2.2, they also become important investors. This trend is likely to continue in the near future (World Investment Prospects Survey, 2011-2013). Outflows of FDI from developing economies have increased from 75,218 million US dollars to 383,754 million US dollars, and the share they account for the total world FDI outflows has doubled from 11.27 per cent to 24.35 per cent. Although the FDI outflows of developed countries experienced a great shock by 2009, and declined marginally after that, they show a strong turnaround in 2011, and have stopped the downward trend (World Investment Report, 2011). Even if the total share of outflows from developed countries have declined from 88.88 per cent in 2001 to 76.18 per cent by 2011, developed countries are still the main investors in the world.

In general, developing countries have engaged increasingly in world investment as both investors and recipients, while developed countries remain the dominant investors.

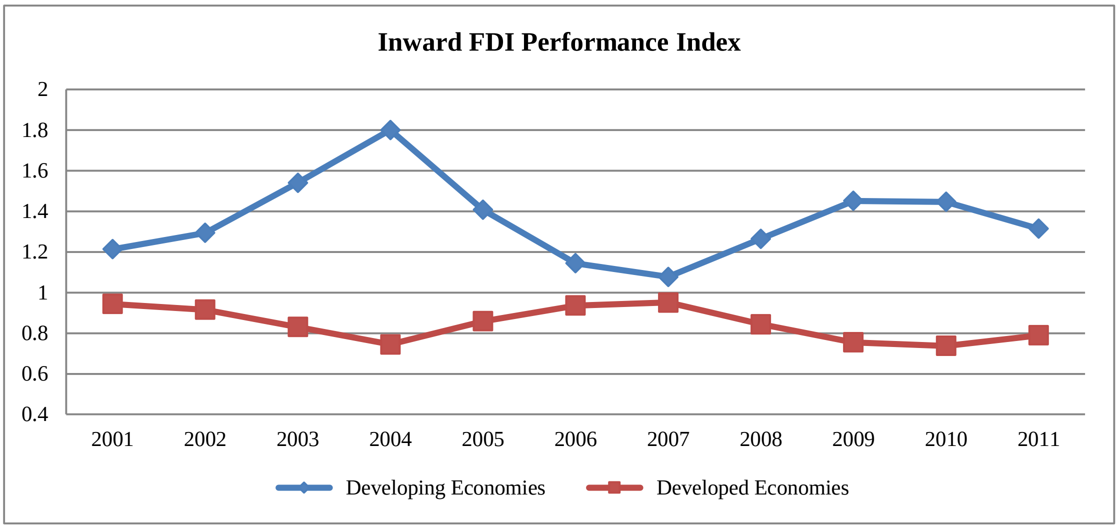
Table 2.2 World FDI Flows by Economic Group

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
FDI Inflows **(Share 100%)**											
Developed Economies	72.86	71.11	65.28	58.43	65.06	69.11	68.97	60.40	53.00	49.40	51.67
Developing Economies	26.28	27.79	32.94	40.39	34.19	30.07	30.23	38.50	45.40	49.25	47.29
LDC	0.86	1.10	1.79	1.18	0.75	0.83	0.80	1.10	1.60	1.35	1.04
FDI Outflows **(Share100%)**											
Developed Economies	88.88	90.84	91.62	86.50	84.79	82.76	85.18	82.66	76.09	71.05	76.18
Developing Economies	11.16	9.06	8.33	13.46	15.15	17.19	14.75	17.16	23.81	28.73	23.62
LDC	-0.03	0.1	0.05	0.04	0.06	0.05	0.07	0.18	0.1	0.22	0.20

Source: UNCTAD database: http://unctadstat.unctad.org/TableViewer/tableView.aspx?ReportId=88. Data accessed in April, 2013.

UNCTAD also presents an *Inward FDI Performance Index* to measure the change of a country's FDI performance relative to its GDP. The index indicates that the trends of FDI flows have been diversed towards developing countries, suggested by Chart 2.5. The index for developed countries as a group is below unity (the point where the country's share in global FDI flows and the country's share in global GDP are equal) (UNCTAD, 2011b). In contrast, the index of developing countries is above unity and indicates their greatly improved performance in FDI. Moreover, Chart 2.5 further indicates that there is a cyclical relationship between the inward FDI performance indexes of developing economies and developed economies, and the lengths of each period of cycle is approximately 6 years. While the inward FDI performance of developing economies goes up, the inward FDI performance of developed economies drop down, and *vice versa*.

Chart 2.5 Inward FDI Performance Index of Developing and Developed Economies



Source: Calculated from UNCTAD database: http://unctadstat.unctad.org/TableViewer/tableView.aspx and http://unctadstat.unctad.org/TableViewer/tableView.aspx?ReportId=96. Data accessed in April, 2013.

Worthwhile noting, in 2004, the inward FDI of developing economies performs extraordinarily well and has reached the highest point while the inward FDI of developed economies experienced the worst time. This is mainly because the developing economies have received much more inward FDI in 2004 compared to previous years. The developing economies have received around 60 billion US dollars in the year of 2003 and 2004 consistently, while they have only received 36.6 billion US dollars in total from 1998 to 2002 (United Nations, 2005). Nevertheless, in 2007 the developing economies experienced a slowdown in attracting inward FDI, while the inward FDI performance index of developed economies has increased a little. This is approximately due to the housing recession in the US. The housing downturn of the US has decelerated the growth of world financial markets, and reduced the FDI flows. Therefore, compared to the relatively robust growth in developing economies (United Nations, 2008), the decreased inward FDI flows cause the inward FDI performance index to fall.

The sectoral distribution of FDI projects also changes with time. As indicated in Table 2.3, the FDI sectoral distribution reveals that the value of manufacturing FDI has increased to 660 billion US dollars in 2011, almost accounting for half of the total. The primary and services sectors have declined, which is especially severe for the services sector. The value of FDI in the services sector has fallen from 1130 billion US dollars in 2008 to 490 billion US dollars in 2010, being more than halved. The value of primary FDI has decreased to 140 billion US dollars in 2010 compared with 230 billion US dollars in 2008. These reductions in value and share in the primary and services sectors are mainly contributed to the financial crisis. All kinds of services, including business, transportation and telecommunications sectors, have suffered the sharpest decline, although the extents of decline vary for different services (UNCTAD, 2011a). With the recovery from the global financial crisis, the FDI value in service sector rebounds to 570 billion US dollars in 2011, and FDI in the primary sector reaches 200 billion US dollars. However, compared to pre-crisis FDI flows, there is still a large gap.

Table 2.3 Sectoral Distribution of World FDI Projects

	Value (Billion US$)			**Share (100%)**		
Year	**Primary**	**Manufacturing**	**Services**	**Primary**	**Manufacturing**	**Services**
2008	230	980	1130	10	42	48
2009	170	510	630	13	39	48
2010	140	620	490	11	50	39
2011	200	660	570	14	46	40

Source: UNCTAD, *World Investment Report 2012: Towards A New Generation of Investment Policies.*

The FDI flows are hit by the crisis seriously. As Table 2.4 reveals, industries that are sensitive to business cycles, such as coke, petroleum and nuclear fuel, and electrical and electronic equipment, all have suffered great decrease in the financial crisis. As a result, investment falls in these industries (UNCTAD, 2011b). Some manufacturing industries, such as food, beverages, tobacco, and chemicals and chemical products, have all performed more stably as indicated in Table 2.4; while other industries have recovered quickly from the crisis, such as motor vehicles and other transport equipment. That is due to the sustained demand for basic items, especially in developing countries. However, FDI in the services sector, especially the financial and business industry, has experienced the sharpest decline. In order to remove the distorting effect of the economic crisis on FDI, this study will focus on primary and manufacturing FDI only for the examination of the interactions and relationship between FDI and trade.

Table 2.4 Distribution Shares and Growth Rates of FDI Project Values by Industry, 2011

Industry	**Distribution shares**	**Growth rates**	
		2011 compared with 2010	**2011 compared with pre-crisis average (2005-2007)**
Total	100	15	-12
Primary	14	46	50
Mining, quarrying and petroleum	14	51	53
Manufacturing	46	7	-1
Food, beverages and tobacco	6	18	40
Coke, petroleum and nuclear fuel	4	-37	-30
Chemicals and chemical products	10	65	25
Electrical and electronic equipment	5	-8	-26
Motor vehicles and other transport equipment	6	-15	10
Services	40	15	-31
Electricity, gas and water	8	43	6
Transport, storage and communications	8	38	-31
Finance	6	13	-52
Business Services	8	8	-33

Source: UNCTAD, *World Investment Report 2012: Towards A New Generation of Investment Policies.*

In past ten years, major developing countries, such as China and India, have all experienced high growth in both exports and imports. China's exports have reached 1,898.38 billion US dollars in 2011, taking up to 10.40 per cent of the world share. Its share in imports has risen up to 9.46 per cent. The share of India's imports grows from only 0.78 per cent in 2001 to 2.51 per cent in 2011. Meanwhile, developed countries are taking less and less share in world trade. The share of exports of the US has shrunk by more than 3.67 per cent from 2001 to 2011. In the case of imports, the share of the US has decreased by 5.89 per cent. Other developed economies, for instance, Germany, France, Japan, Canada, have all experienced varying degrees of decline. Table 2.5 presents and summarises these trade figures.

Table 2.5 World Merchandise Trade by Country

	Value (millions US$)		Share (100%)	
	2001	**2011**	**2001**	**2011**
Total exports	6,191,000	18,255,000	100	100
Total imports	6,483,000	18,438,000	100	100
Exporters				
OECD	4,354,653	9,785,877	70.34	53.61
United States	7,29,100	1,480,432	11.78	8.11
Germany	571,645	1,472,281	9.23	8.07
Japan	403,496	822,564	6.52	4.51
France	323,379	596,068	5.22	3.27
Canada	259,858	452,440	4.20	2.48
Korea	150,439	555,214	2.43	3.04
China	266,098	1,898,381	4.30	10.40
Hong Kong, China	191,066	455,650	3.09	2.50
Singapore	121,751	409,503	1.97	2.24
Russian Federation	101,884	522,013	1.65	2.86
India	43,361	304,585	0.70	1.67
Importers				
OECD	4,591,078	10,602,290	70.82	57.50
United States	1,179,180	2,265,894	18.18	12.29
Germany	486,119	1,253,940	7.50	6.80
Japan	349,089	854,998	5.38	4.64
France	328,608	713,859	5.07	3.87
Canada	227,291	462,635	3.51	2.51

Korea	141,098	524,413	2.18	2.84
China	243,553	1,743,484	3.76	9.46
Hong Kong, China	202,008	510,854	3.12	2.77
Singapore	116,000	365,770	1.79	1.98
Russian Federation	53,764	323,831	0.83	1.76
India	50,392	462,633	0.78	2.51

Source: OECD data base and WTO data base: http://stats.oecd.org/index.aspx?r=198865 and http://www.wto.org/english/res_e/statis_e/world_commodity_profiles11_e.pdf. Data accessed in April, 2013.

Moreover, developing countries, such as China and India, have attracted increasingly investment worldwide, while some developed countries, such as Japan, are becoming less attractive to absorb investment, as indicated in Table 2.6. Nevertheless, developed countries are still leading sources of world FDI. The US and Japan account for 23.41 per cent and 6.75 per cent of world outward investment respectively in 2011. Although other developed countries have all experienced different degrees of reduction in FDI share, they still take up to approximately 15 per cent of total world investment. The FDI outflows from China, Russia and India have increased dramatically in recent 10 years, due to the rapid economic growth in the home country and their abundant financial resources (UNCTAD, 2011a). Therefore, investigation on how the developing countries achieve their fast economic development by attracting inward FDI is vital. China, as the largest developing country, is a typical objective for this research.

Table 2.6 World FDI by Country

	Value (million US$)		**Share (100%)**	
	2001	**2011**	**2001**	**2011**
Total FDI Inflows	827,617	1,524,422	100	100
Total FDI Outflows	747,657	1,694,396	100	100
FDI Inflows				
OECD	651,977	872,330	79.76	52.42
United States	159,478	226,937	19.27	14.89
France	50,477	40,945	6.10	2.69
Canada	27,663	40,932	3.34	2.69
Germany	26,414	40,402	3.19	2.65
Korea	40,86	4,661	0.49	0.31

Japan	6,243	-1,758	0.75	-0.12
China	46,878	123,985	5.66	8.13
Hong Kong, China	23,776	83,156	2.87	5.45
Singapore	17,007	64,003	2.05	4.20
Russian Federation	2,748	52,878	0.33	3.47
India	5,478	31,554	0.66	2.07
FDI Outflows				
OECD	675,269	1,290,632	90.32	79.72
United States	124,873	396,656	16.70	23.41
Japan	38,333	114,353	5.13	6.75
France	86,767	90,146	11.61	5.32
Switzerland	18,320	69,612	2.45	4.11
Germany	39,684	54,368	5.31	3.21
Canada	36,029	49,569	4.82	2.93
Hong Kong, China	11,345	81,607	1.52	4.82
Russian Federation	2,533	67,283	0.34	3.97
China	6,885	65,117	0.92	3.84
Singapore	20,027	25,227	2.68	1.49
India	1,397	14,752	0.19	0.87

Source: UNCTAD database and OECD database: http://unctadstat.unctad.org/TableViewer/tableView.aspx and http://stats.oecd.org/index.aspx?r=198865 . Data accessed in April, 2013.

It has been demonstrated in Table 2.5 that the dominant exporters and importers in the world are Organisation for Economic Co-operation and Development (OECD) and their member countries. To the same extent, OECD countries are dominant sources as well as recipients of FDI, as revealed in Table 2.6. In the developing world, China is the largest exporter as well as the largest importer. Its export value of 1,898.38 billion US dollars in 2011 is more than three and half times of that for the second largest non-OECD exporter, the Russian Federation, in the same year; it is more than six times of that for India, the second largest developing country. Likewise, China's import value is more than three times of that for the second largest non-OECD region, Hong Kong, in 2011; it is more than three and half times of that for India. Turing to FDI, China has attracted the largest FDI inflows into the country, and is catching up with the top FDI provider amongst developing and non-OECD countries. FDI inflows into China in 2011, at the value of 123.99 billion US dollars, are nearly four times of FDI inflows into India. While China's FDI outflows in 2011, at the value of 65.12 million US dollars, are slightly lower than the Russia's of 67.28 billion US dollars, they are still more than four times of the figure for India.

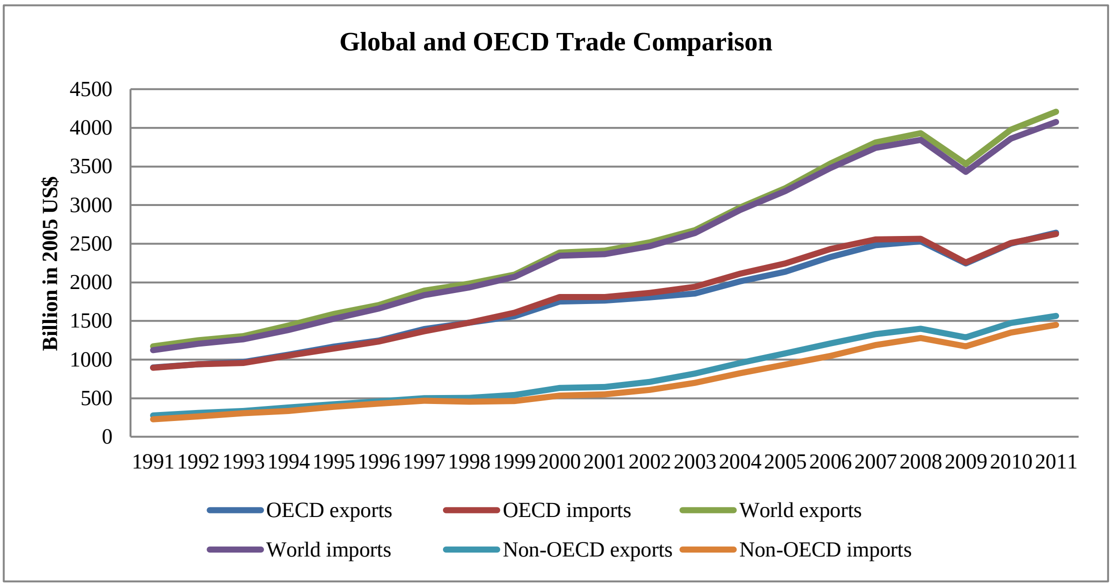
In a word, OECD countries and China are the leading countries for the rapid growth in trade and FDI across the world. OECD includes many countries that play an important role in the world economy and globalisation, such as the US, UK, Japan, Korea, Germany, France and so on. The trade volume of OECD countries accounts for more than half of the total world trade volume during the past 10 years. The percentage goes even higher for FDI. OECD countries receive more than half of world investments, and almost 80 per cent of world investments are from OECD countries. China, as a major developing country, is always among the top sources and recipients of world investments. In 2011, China even surpasses the US to become the largest exporter in the world. China has also become the second largest recipient of inward FDI during the past ten years. Moreover, increasingly rising FDI outflows come from China to the other parts of the world and a growing number of MNCs of China involve in cross-border M&As. For example, China's Sinopec Group has purchased the Repsol of Brazil for 7 billion US dollars in 2010. In summary, China and OECD countries all play important roles in world economies. Studies of their roles and interactions in world trade and FDI are therefore of significant values for theoretical advancement. Their practical implications would be significant as well, due to the significance of OECD and China in world trade and FDI.

2.2 Trade status of OECD countries and China

OECD was established in 1961. By the end of 2012, it has developed from a small organisation of only 18 European countries plus the US and Canada to an organisation that consists of 34 member countries all over the world. Nowadays, OECD includes numbers of the world's most advanced countries such as the US and Japan, as well as some emerging economies like Mexico and Turkey. OECD countries continue to be the major traders in the world over last twenty years as indicated in Chart 2.6. Compared to 1991, the exports value of OECD countries has increased from 897.10 billion US dollars to 2,642.47 billion US dollars in 2011, accounting for 63.80 per cent of the total world exports. The imports of OECD countries have reached 2,627.58 billion US dollars by the year 2011, taking up to

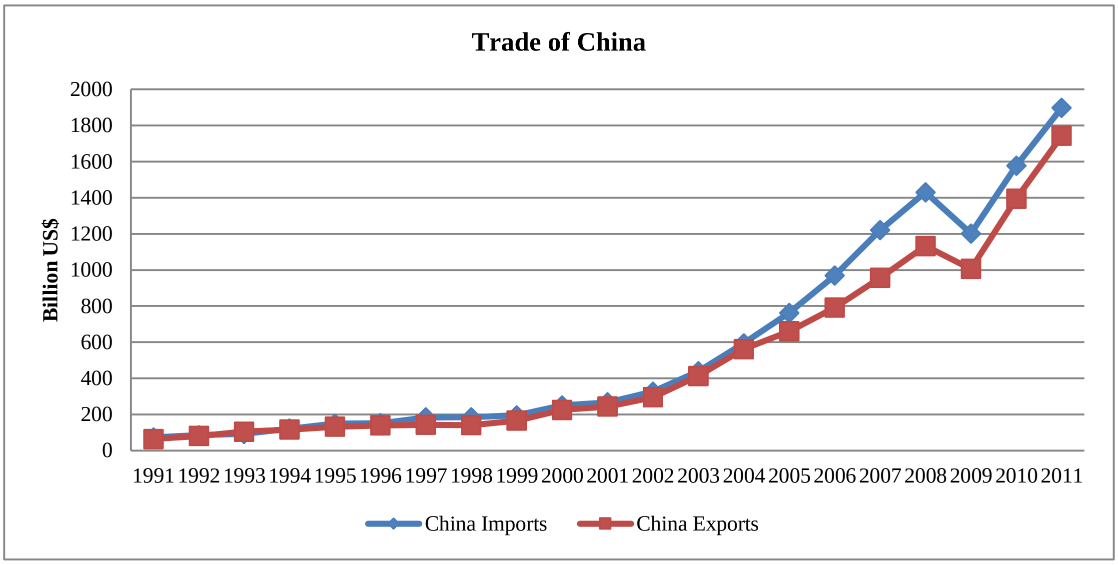
64.36 per cent of total world imports. However, the after crisis, the recovery of OECD countries is not as robust as non-OECD countries. In 2009 both exports and imports of OECD countries decreased by approximately 10 per cent compared with 2008, and it takes two years to recover from the crisis. However, it takes only one year for non-OECD countries to recover and their exports and imports volumes are increased by 7 per cent and 6 per cent in 2010 and 2011 respectively compared to 2008.

Chart 2.6 Global and OECD Trade Comparison



Source: OCED database: http://stats.oecd.org/Index.aspx?DataSetCode=MEI_TRD. Data accessed in April, 2013.

Chart 2.7 Trade of China



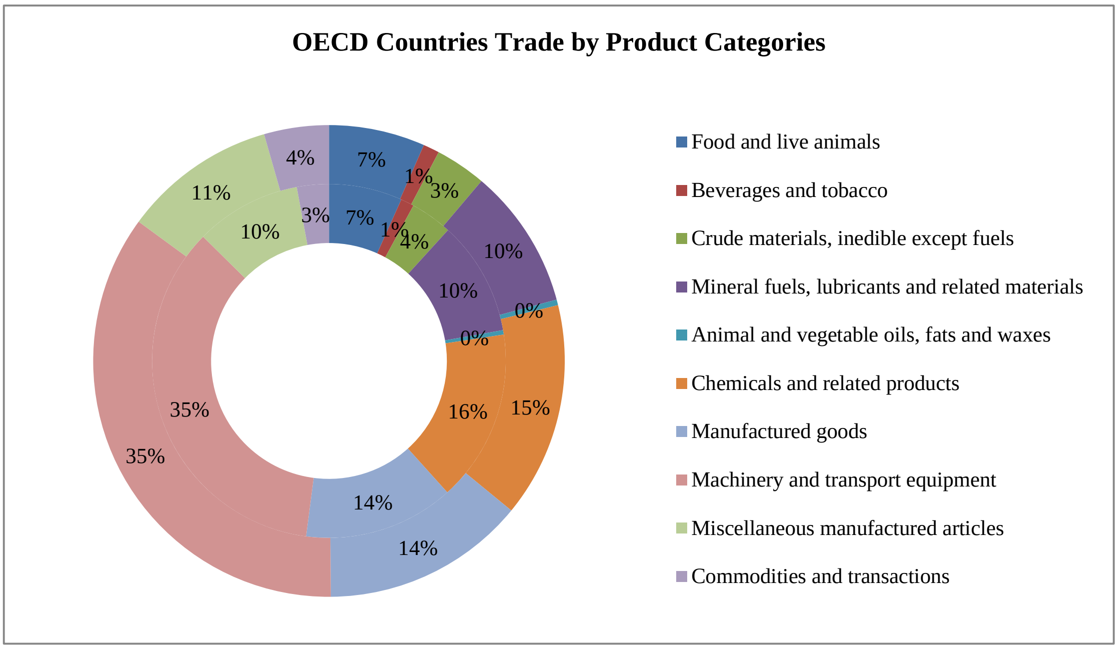
Source: IMF database: http://dx.doi.org/10.5257/imf/dots/2013-03. Data accessed in April, 2013.

If we look at China's trade trend in Chart 2.7, it's not hard to find out that since 2001, China's trade volume has increased dramatically, except the year of 2009. After the crisis, the trade volume has recovered within one year, and the trade volume has been growing at an even higher rate compared to the pre-crisis period. During the period of 2001 to 2008, the average annual growth rate of China's trade is around 22 per cent, while after the crisis, this rate has shot up to more than 28 per cent annually. The fast growth and development of China's trade are obvious by all measures. This is mainly because of that China has become the 143th member of World Trade Organisation (WTO) in 2001. The accession to the WTO contributes to a decisive deepening of the process of integration with the world. The importance of China's accession to the WTO has been widely recognised and studied, for example, by Panitchpakdi and Clifford (2002) and Lardy (2002). It is agreed by many studies that China's WTO accession has two fold policy goals. On the one hand, Chinese policy makers would like China to become a great trading nation without trade disputes with other countries. On the other hand, Chinese policy makers wish to accelerate the process of domestic economic reform. Nowadays, it is evident that China has become one of the largest trading nations in the world and has achieved great economic development.

As Chart 2.8 indicated (The inner side of Chart 2.8 represents imports of OECD countries and the outer side of Chart 2.8 represents exports of OECD countries), in 2011, machinery and transport equipment is the major industry that supports OECD countries' trade. This industry holds approximately 35 per cent of the total OCED trade volume, including exports and imports. The second largest group of trade in OECD countries is chemicals and related products, accounting for 15.70 per cent of total imports and 14.69 per cent of total exports of OECD countries. The following groups are manufactured goods, miscellaneous manufactured articles and mineral fuels. Moreover, we have also found that there are no big differences between the industry distribution of exports and imports for OECD countries. That is to say, OECD countries export and import the similar products.

According to the theory of comparative advantage, a country usually exports and imports different products. When a country holds certain comparative advantages in certain products, it will choose to export those products in exchange for the products that other countries are specialised in. Therefore, the similar exports and imports structures of OECD countries indicate that OECD countries are quite specialised in those industries, and the connections between the industries are more vertical than horizontal. For example, in the machinery and transport equipment industry, due to high division of labour, a car could have its tires produced in country A, steering wheel in country B and its engine in country C. Then country D imports all of the parts and assembles them together and exports the whole car to other countries. In general, the industries of OECD countries are vertical linked with each other, and OECD countries tend to import and export the similar products.

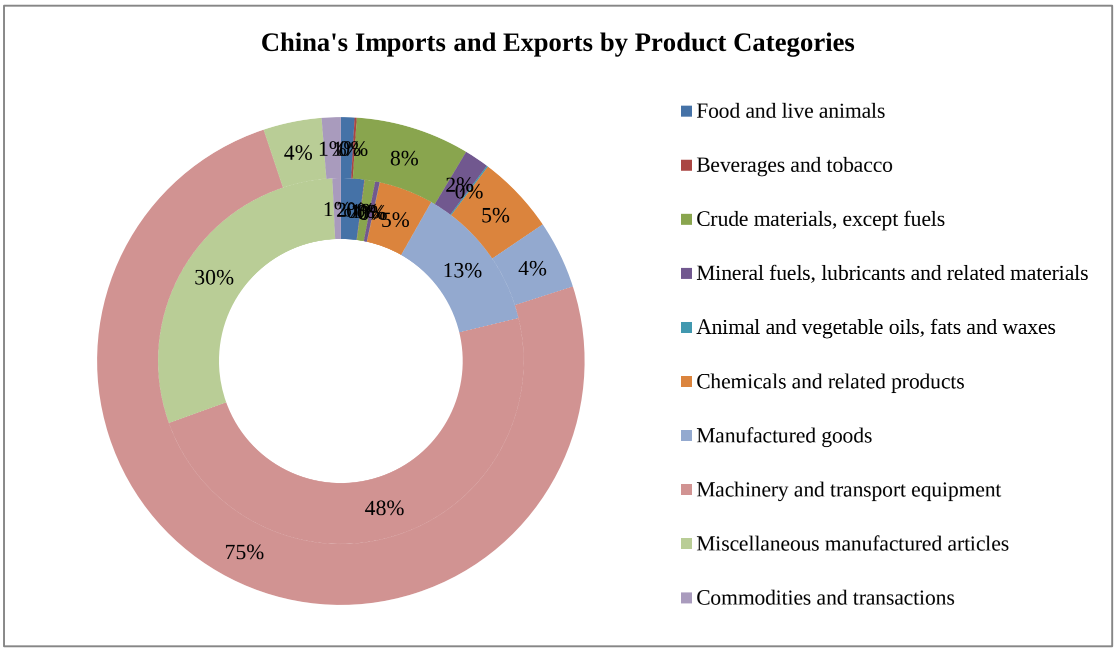
Chart 2.8 OECD Countries' Imports and Exports by Product Categories (SITC3), 2011



Source: OECD database: http://www.oecd-ilibrary.org/docserver/download/3412051e.pdf?expires=1378733407&id=id&accname=oid006169&checksum=E3F78AFA9A893762045EE91E382DE419. Data accessed in April, 2013

Different from OECD countries, Chart 2.9 indicates that China's exports and imports structures are quite different (where the inner side of Chart 2.9 represents imports of China, and the outer side of Chart 2.9 represents exports of China). China's major imports and exports groups both are machinery and transport equipment. However, the shares the industry of machinery and transport equipment account for in exports and imports are dissimilar. The machinery and transport equipment industry only accounts for 48.24 per cent of China's total imports while it accounts for 75.08 per cent of China's total exports. Moreover, among all China's imports, miscellaneous manufactured articles account for 29.74 per cent while these kinds of products only account for 4.92 per cent of China's exports. The shares that manufactured goods account for in China’s exports and imports also show giant differences. Approximately 12.98 per cent of China’s imports are manufactured goods while only 4.42 per cent of China’s exports are manufactured goods. In addition, approximately 8.40 per cent of China’s exports are crude materials, except fuels, but the imports of these groups only account for 0.92 per cent of the total imports of China. Mineral fuels, lubricants and related materials account for 1.76 per cent of China’s exports while only account for almost 0.40 per cent of China’s imports. The amount of imports and exports of chemicals and related products take up about 5 per cent in both exports and imports respectively.

Chart 2.9 China’s Imports and Exports by Product Categories (SITC 3), 2011



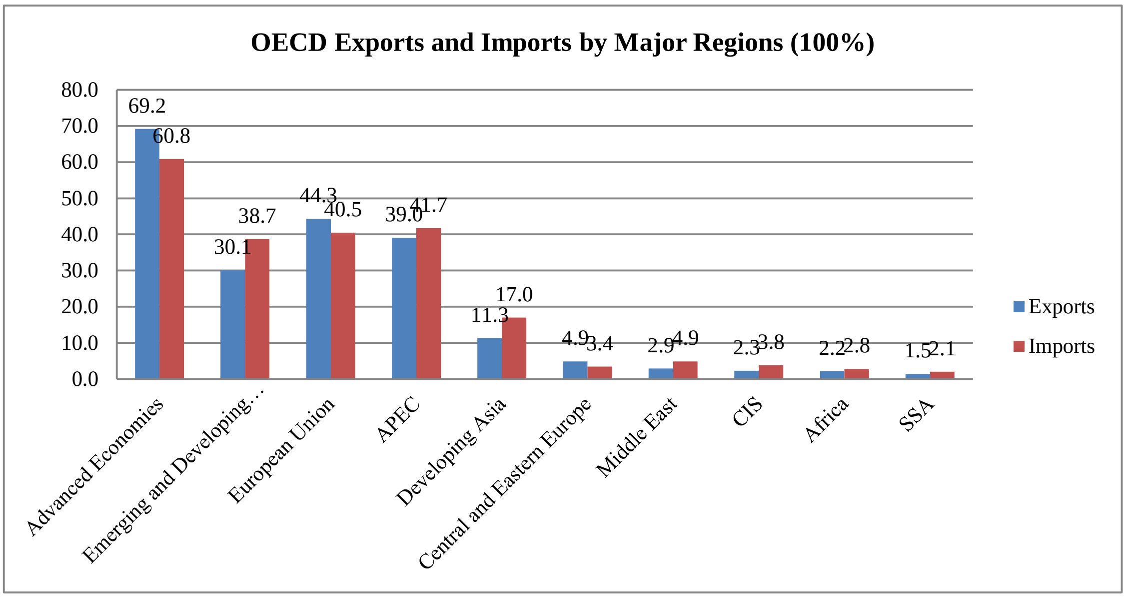
Source: OECD database: http://www.oecd-ilibrary.org/docserver/download/3412051e.pdf?expires=1378733407&id=id&accname=oid006169&checksum=E3F78AFA9A893762045EE91E382DE419. Data accessed in April, 2013

From Chart 2.9, we further find out that China is abundant in crude materials and mineral fuels. In another word, China is kind of nature resource abundant country. Moreover, China also exports large amount of machinery and transport equipment in 2011. This is probably owing to the relative cheap labour costs in China. Thereby a large quantity of inward FDI that is driven by the cheap labour costs flows into China and thus facilitates the exports of machinery and transport equipment of China. Compared with OECD countries, China has comparative disadvantages in miscellaneous manufactures, possibly due to the lower level of technology and skills.

So China's miscellaneous manufactures imports account for 29.74 per cent of total imports. The similarity in exports and imports of chemicals indicates that high levels of specialisation are more likely to materialise in this industry and companies in this industry are vertically connected to each other.

OECD countries usually trade with advanced economies as exhibited in Chart 2.10, which accounts for approximately 69.21 per cent in exports and more than 60.76 per cent in imports. Emerging and developing countries play a more important role as an exporter to OECD countries than the recipients of exports from OECD countries. Products worth around 3,041.00 billion US dollars are exported to emerging and developing countries and more than 4,310.00 billion US dollars' worth products are imported from emerging and developing countries, accounting for 38.73 per cent of OECD imports.

Chart 2.10 OECD Exports and Imports by Major Regions, 2011

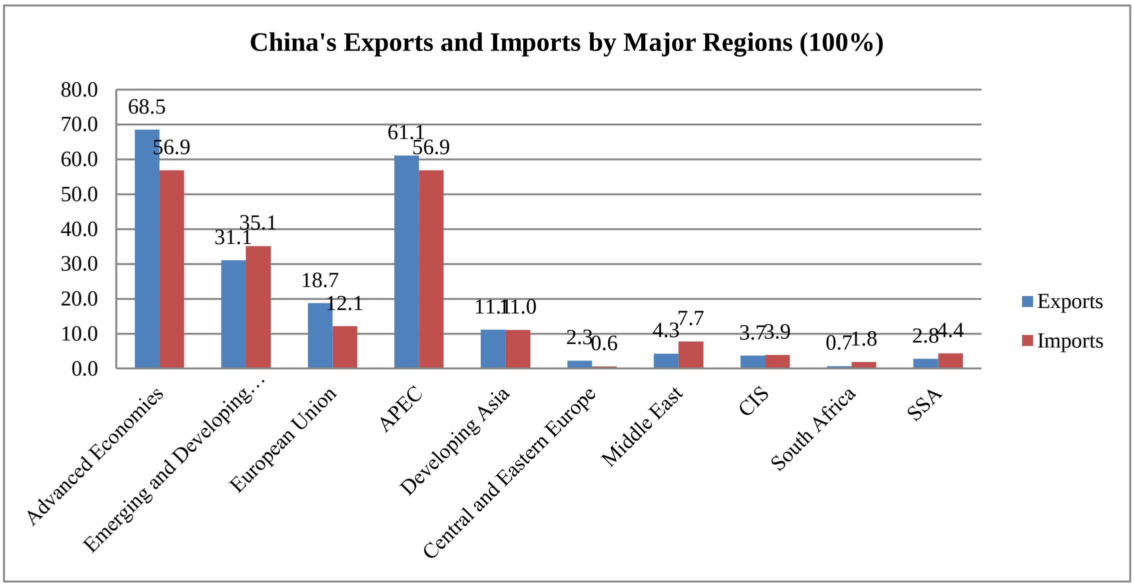


Source: IMF database: http://esds80.mcc.ac.uk/wds_dots/TableViewer/tableView.aspx. Data accessed in April, 2013.

In the year of 2011, 39.01 per cent of OECD countries' exports go to Asia-Pacific Economic Cooperation (APEC), while 41.72 per cent of OECD imports from APEC. The European Union is a major trade partner of OECD countries among all regions, including both exports and imports and accounting for 44.30 per cent and 40.56 per cent of exports and imports respectively. Developing Asia is ranked second both as the major imports and exports partners of OECD. The rest regions that are deemed as the major trade partners of OECD countries include Central and Eastern Europe, Middle East, Commonwealth of Independent State (CIS), Africa and Sub-Saharan Africa (SSA). These regions take over from 1.52 to 4.89 percentage of the exports and imports of OECD countries respectively, and the trade values are all more than 100 billion US dollars. Most of those regions are ranked with the similar position in exports and imports, except that OECD countries tend to export more to Central and Eastern Europe but import more from Middle East and CIS.

China's trade of share with its trading partner groups and regions is exhibited in Chart 2.11. Similar with OECD countries, most of China's trade is connected with advanced economies. Around 56.9 per cent of China's imports come from advanced economies while nearly 70 per cent of China's exports go to those advanced economies. However, different from OECD countries, instead of EU, APEC becomes the largest region that trade with China. By 2011, the exports from China to APEC reached 1,162.00 billion US dollars and the imports from APEC to China reached 9,906.00 billion US dollars, accounting for approximately sixty per cent of total trade of China. However, the exports to EU only account for 18.73 per cent of China's exports and the imports from EU only account for 12.09 per cent. These figures indicate that trade between China and EU is approximately 25 per cent less than that between OECD and EU.

Chart 2.11 China's Exports and Imports by Major Regions, 2011



Source: IMF database: http://esds80.mcc.ac.uk/wds_dots/TableViewer/tableView.aspx. Data accessed in April, 2013.

This difference is probably attributed by the geographic distance between China and these regions. China is a member of APEC, and most members of APEC are close to China geographically. This could reduce the cost of transportation and communication, and make it easier to get information. Thus trade between China and APEC countries gets promoted. So it is not surprised that China trades more with APEC countries. In the same way, some of OECD countries are also the members of EU, and a large number of those countries even use the same currency. Therefore OECD countries tend to trade more with EU rather than APEC countries.

This explanation could also be applied to demonstrate the difference of trade between China and Central and Eastern Europe and trade between OECD and Central and Eastern Europe. Trade between China and Central and Eastern Europe only accounts for 2.31 per cent in China's exports and 0.58 per cent of imports. While in the case of OECD countries and Central and Eastern Europe the figures are 4.90 per cent and 3.37 per cent respectively. So the geographic distance is indeed an obstacle to trade.

Trade of China with emerging and developing countries possesses around 30 per cent of total trade, which is almost half of the trade between China and advanced economies. Exports of 590.70 billion US dollars go to emerging and developing countries, while imports of 611.80 billion US dollars come from emerging and developing countries. Behind EU, developing Asia, CIS, Middle East, Africa, and SSA are the other top major exports destinations of China, as well as the major importing sources of China.

Table 2.7 provides summary figures for trade values and shares of OECD countries with their major trading partners. In 2011, the US is the first exports destination for OECD countries while China is the leading source country of imports. The US imports products worth of 1,148.65 billion US dollars from OECD countries, accounting for 11.37 per cent of total OECD exports. Following the US, the percentage of other top export partners is as follows: 8.71 per cent to Germany, 6.83 per cent to China, 5.61 per cent to France and 4.92 per cent to United Kingdom. The Percentage of OECD countries' imports from China accounts for 11.48 per cent of total imports, followed by 9.35 per cent from Germany, 7.77 per cent from the US, 4.70 per cent from Netherlands and 3.97 per cent from France.

Excluding intra OECD trade, China becomes the top partner country with OECD countries. 11.48 per cent of imports of OECD countries come from China, worth more than 1,280.00 billion US dollars; while exports of 689.39 million US dollars go to China from OECD countries, accounting for 6.89 per cent. Russian Federation remains the second largest partner country in both exports and imports with OECD countries. The total values of exports to, and imports from, OECD countries are 326.02 billion US dollars and 165.53 billion US dollars respectively.

Brazil takes the sixth position as the major import source countries and the fourth as the major export destination countries. Other important export destinations include Hong Kong, Singapore and India. Altogether they account for more than 3 per cent of OECD countries' total exports. Saudi Arabia, India and Indonesia are the top six countries of important imports partner countries of OECD right after China, Germany and Brazil. Products worth approximately 5 billion US dollars are imported from these three countries to OECD.

Table 2.7 Major Trading Partner Countries of OECD Countries, 2011

Exports			**Imports**		
Partner Country	**Value (Billion US$)**	**Share (100%)**	**Partner Country**	**Value (Billion US$)**	**Share (100%)**
All Countries			**All Countries**		
United States	1,148.65	11.37	China	1,280.00	11.48
Germany	879.92	10.80	Germany	1,042.35	9.35
China	689.39	6.83	United States	866.22	7.77
France	566.11	5.61	Netherlands	523.92	4.70
United Kingdom	497.04	4.92	France	442.66	3.97
Netherlands	385.09	3.81	Japan	356.11	3.20
Belgium	346.25	3.43	United Kingdom	351.89	3.16
Italy	343.35	3.40	Italy	351.39	3.15
Mexico	258.15	2.56	Belgium	350.50	3.14
Japan	247.36	2.45	Mexico	326.98	2.93
Non-OECD Countries			**Non-OECD Countries**		
China	689.39	6.83	China	1,280.00	11.48
Russian Federation	165.53	1.64	Russian Federation	326.02	2.93

Hong Kong, China	164.86	1.63	Saudi Arabia	180.73	1.62
Singapore	125.93	1.25	Brazil	121.87	1.09
India	124.84	1.24	India	120.53	1.08
Brazil	121.69	1.21	Indonesia	105.18	0.94

Source: IMF database: http://esds80.mcc.ac.uk/wds_dots/TableViewer/tableView.aspx. Data accessed in April, 2013.

Table 2.8 provides summary figures for trade values and shares of China with its major trading partners. In the year of 2011, exports of 324.86 billion US dollars of China go to the US, accounting for 17.08 per cent. This is followed by Hong Kong of China, receiving exports from China with 268.04 billion US dollars, accounting for 14.10 per cent. Japan is the third largest exports destination of China, and it takes over 7.75 per cent of China's exports, with a value of 147.29 billion US dollars. Korea is ranked the fourth, with a value of 82.93 billion US dollars and account for 4.36 per cent. Germany, the Netherlands, India, the UK, Russian Federation, and Singapore are among the top ten largest exports destinations.

The imports of China from Japan and Korea surpass that from the US, being ranked number one and number two, with the imports value of 194.41 billion US dollars and 161.67 billion US dollars respectively. Imports from the US account for 6.84 per cent of China's total imports from the world. Germany and Australia are the fourth and fifth importing source countries of China, accounting for more than 9 per cent together. The sixth to tenth largest importing source countries of China are all emerging and developing economies, including Malaysia, Brazil, Saudi Arabia, Russian Federation and Thailand. Therefore, China's imports are more related with emerging and developing economies while exports of China are more related with developed and advanced economies.

Table 2.8 Major Trading Partner Countries of China, 2011

Exports			**Imports**		
Partner Country	**Value (billion US$)**	**Share (100%)**	**Partner Country**	**Value (billion US$)**	**Share (100%)**
United States	324.86	17.08	**Japan**	194.41	11.16
Hong Kong, China	268.04	14.10	**Korea**	161.67	9.28
Japan	147.29	7.75	**United States**	119.16	6.84

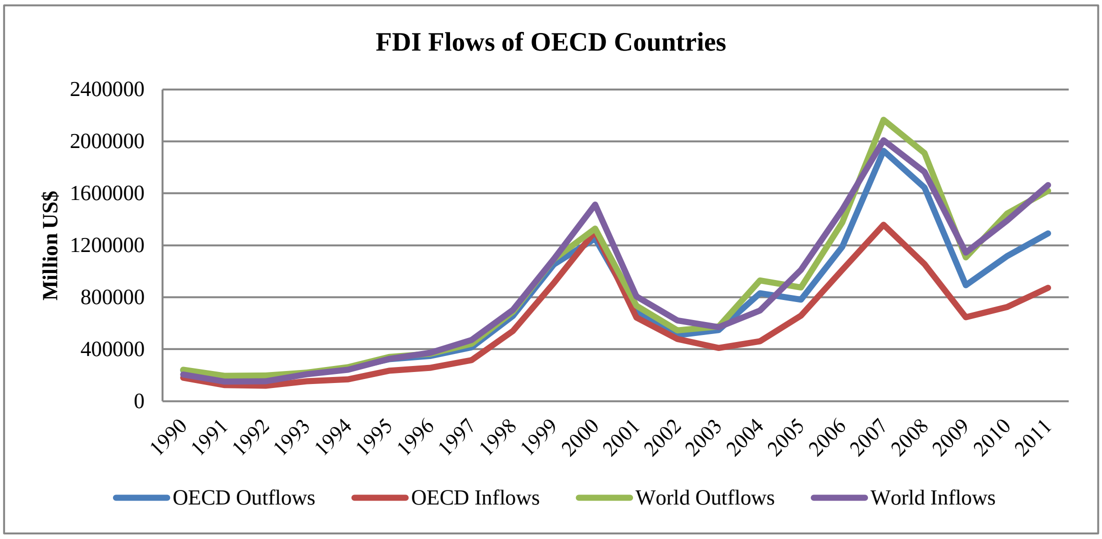
Korea	82.93	4.36	**Germany**	92.76	5.33
Germany	76.43	4.02	**Australia**	80.93	4.65
Netherlands	59.48	3.13	**Malaysia**	62.02	3.56
India	50.49	2.66	**Brazil**	52.65	3.02
United Kingdom	44.11	2.32	**Saudi Arabia**	49.55	2.85
Russian Federation	38.89	2.05	**Russian Federation**	39.04	2.24
Singapore	35.30	1.86	**Thailand**	39.04	2.24

Source: IMF database: http://esds80.mcc.ac.uk/wds_dots/TableViewer/tableView.aspx. Data accessed in April, 2013.

2.3 FDI status of OECD countries and China

World FDI flows have increased dramatically during the past twenty years. This is particularly evident for China and OECD countries, driven by the rapid economic development. However, the progress is not as smooth as that in trade, especially in OECD countries. Chart 2.12 and Chart 2.13 show these trends and developments in FDI of OECD countries and China respectively.

Chart 2.12 FDI Flows of OECD Countries



Source: OECD database: http://stats.oecd.org/Index.aspx?DataSetCode=FDI_BOP_IIP. Data accessed in April, 2013.

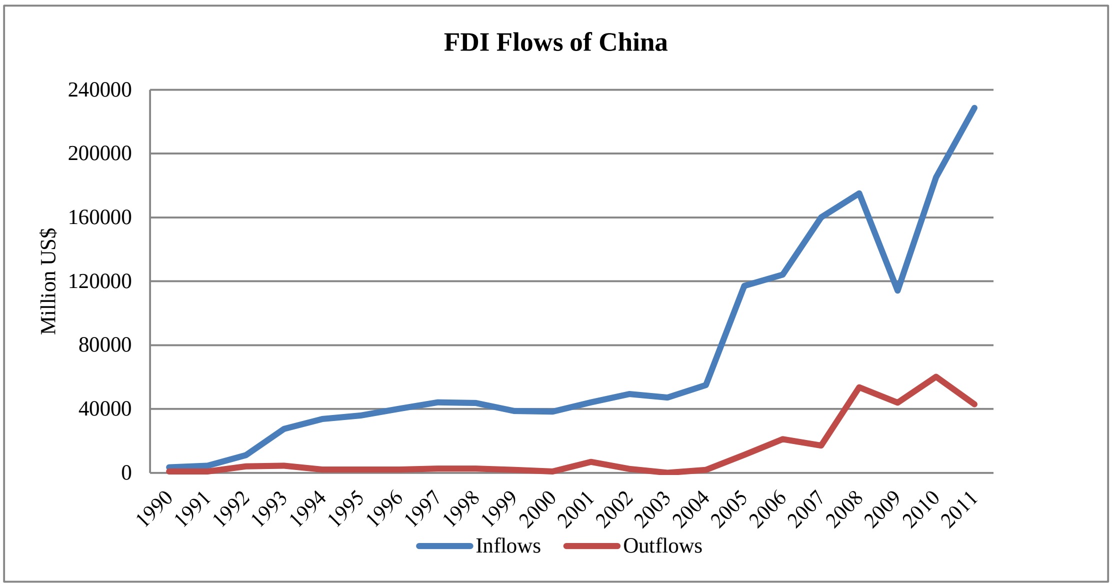
OECD countries represent more than 70 per cent of world total FDI outflows and receive more than 50 per cent of world total inward FDI. Hence the sensitivity of economic fluctuations of OECD FDI also affects the whole world FDI flows tremendously. From 1990 to 2011, two huge waves of fluctuations in both FDI inflows and outflows are observed in the OECD area and world, while China shows comparably stable and steady growth in both inward and outward FDI.

FDI inflows of both OECD countries and world have reached their first peak in 2000, with 1,288.01 billion US dollars and 1,400.54 billion US dollars respectively. In 2001, FDI flows to OECD countries experienced a sharp decline and the value dropped to 6,249.46 billion US dollars, only half of that in 2000. This down turn trend did not stop until 2004. This is partially attributed to sluggish macroeconomic performance, weak economic recovery and concerns about international security (OECD, 2005). By the year of 2007, FDI flows of 1,355.01 million US dollars have gone to OECD countries, setting their new historical record. Then FDI inflows of OECD countries experienced another slowdown in 2008 and the trend continued in 2009 due to the global financial and economic crisis. From 2010, a slow recovery of OECD countries' inward FDI is observed, in line with the recovery of the world economy. However, FDI inflows still remain below the peak in both 2000 and 2007 for the OECD area.

Outward FDI flows from OECD countries have fluctuated more violently than inward FDI flows into OECD countries. Nevertheless, inflows and outflows of FDI in OECD countries have peaked in the same two years of 2000 and 2007. OECD countries are the dominant areas in world outward FDI. By the year of 2011, the FDI outflows of OECD countries have reached 1,290.63 billion US dollars with the net outflows from OECD area being about 418.30 billion US dollars approximately. The post-crisis recovery of OECD's outward FDI is much quicker than its inward FDI. FDI inflows display a slow recovery in 2010, and the increases become more significant in 2011, while FDI outflows show a rapid growth right after the crisis with an annual growth rate of 19 per cent.

During the same period, FDI flows to and from China exhibit comparatively smooth and steady growth. Although the growth rate is volatile, FDI flows of China have seldom experienced any decreases except 2009. On average, China keeps the growth rate at 17 per cent for FDI inflows annually, and 50 per cent for FDI outflows annually. From the year of 2001, the outward FDI from China has been growing at an accelerating rate that even doubles every year. By the end of 2011, direct investments worth of 65.12 billion US dollars flow from China to the rest of world, while investments of 123.99 billion US dollars go to China. Moreover, it seems that the 2009 global financial and economic crisis has limited impacts on the FDI flows of China, particularly the outward FDI flows of China. And by the end of 2010, China becomes the fifth largest host and source country of FDI, right after the US, Germany, France and Hong Kong.

Chart 2.13 FDI Flows of China

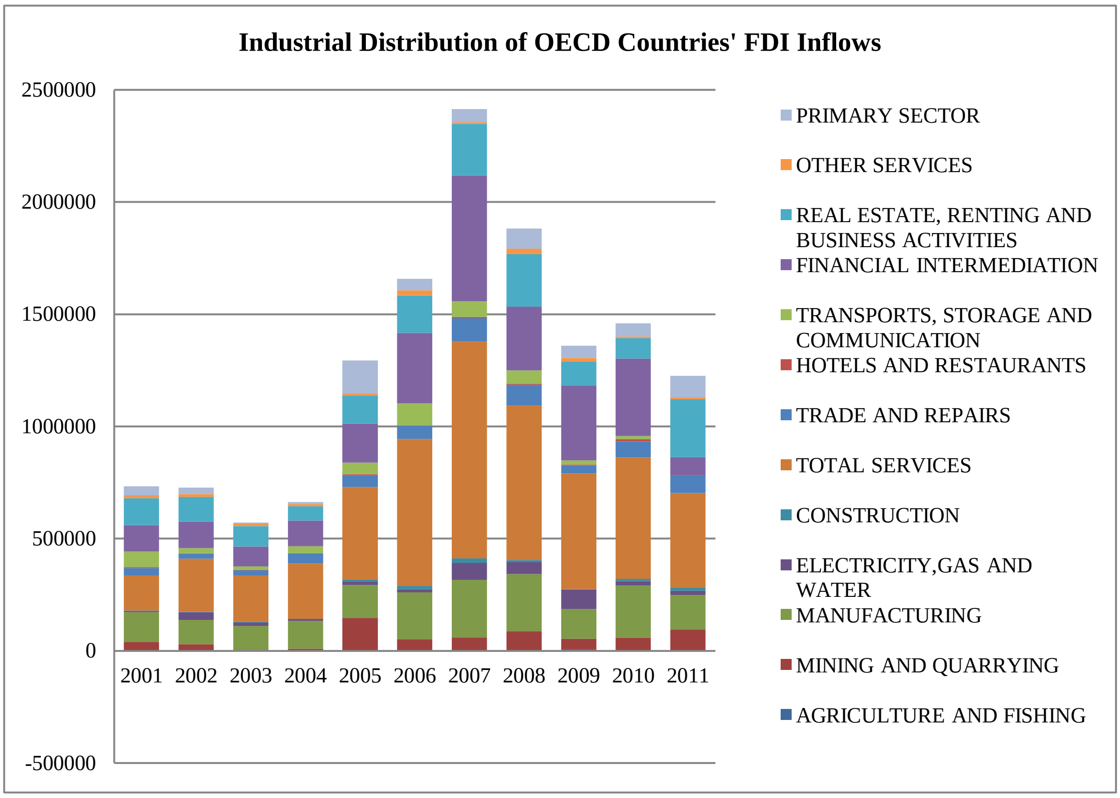


Source: OECD database: http://stats.oecd.org/Index.aspx?DataSetCode=FDI_BOP_IIP. Data accessed in April, 2013.

Chart 2.14 shows the industry distribution of OECD countries' FDI inflows. It is revealed that OECD countries' FDI inflows mostly concentrate on the services sector, which account for nearly half of total inward FDI. Financial intermediation and real estates, renting and business activities are the main services areas that FDI from abroad is attracted in. Besides the services sector, manufacturing is another important industry that attracts FDI from abroad. The manufacturing industry is the major concern in the relationship between FDI and trade. The manufacturing industry includes food, textile, wood, chemical products, metal products, mechanical products and many other crucial sub industries. Mining and quarrying is the vital resource industry that most foreign investment is made in.

From 2001 to 2011, the tendency of FDI inflows into OECD countries in the services sector is consistent with the tendency of the total OECD inflows. In 2007, the value of FDI flows into the services sector has reached 414,351.15 million US dollars, setting its historical highest record. FDI inflows of the manufacturing industry also fluctuate in line with the total FDI inflows, reaching its peak value of 257,246.57 million US dollars by the year of 2007. The mining and quarrying industry displays a different pattern of movement. In 2005, the FDI inflows of mining and quarrying come to the historically highest point at 146,221.60 million US dollars. Then in 2006, FDI inflows of mining and quarrying have decreased to 50,876.278 million US dollars. A slow recovery began in 2007 and continued in 2008. However, another fall occurred in 2009. By now, FDI inflows of mining and quarrying start to grow moderately and steadily.

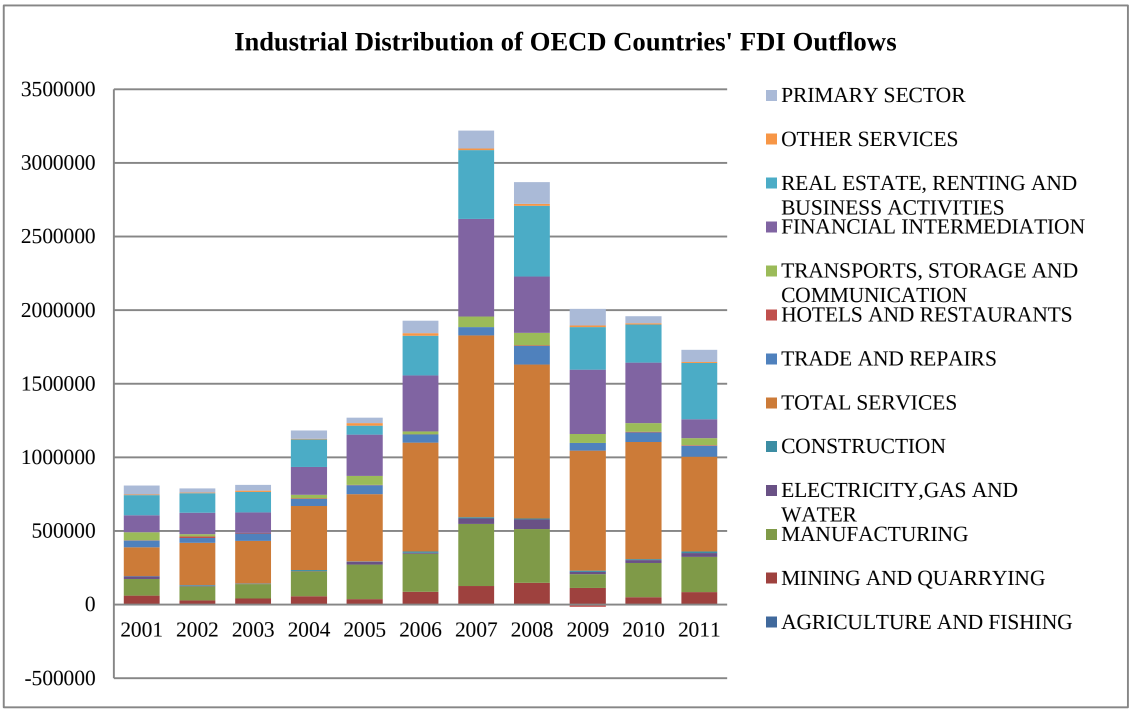
Chart 2.14 Industrial Distributions of OECD Countries' FDI Inflows, 2001-2011



Source: OECD database: http://stats.oecd.org/Index.aspx?DataSetCode=FDI_BOP_IIP. Data accessed in May, 2013.

Chart 2.15 displays the industry distribution of OECD countries' FDI outflows. The services sector remains the most important sector of OECD countries' FDI outflows during the past ten years. Although the services sector keeps declining after 2007, the value of the services sector FDI remains above 640,000 million US dollar. Compared to 2006, the FDI outflows from OECD countries to the rest of world have not decreased dramatically in the post-2007 period. Financial intermediation and real estate, renting and business activities are the major services industries that tend to invest abroad. Notably, the global financial and economic crisis seems to have tremendous impacts on the manufacturing industry. The FDI outflows of manufacturing dropped to 91,773.74 million US dollars, only one third of that in its peak time of 2007. However, mining and quarrying FDI outflows reached their peak by the year of 2008, one year after the financial crisis, with a value of 125,396.88 million US dollars.

Chart 2.15 Industrial Distributions of OECD Countries' FDI outflows, 2001-2011

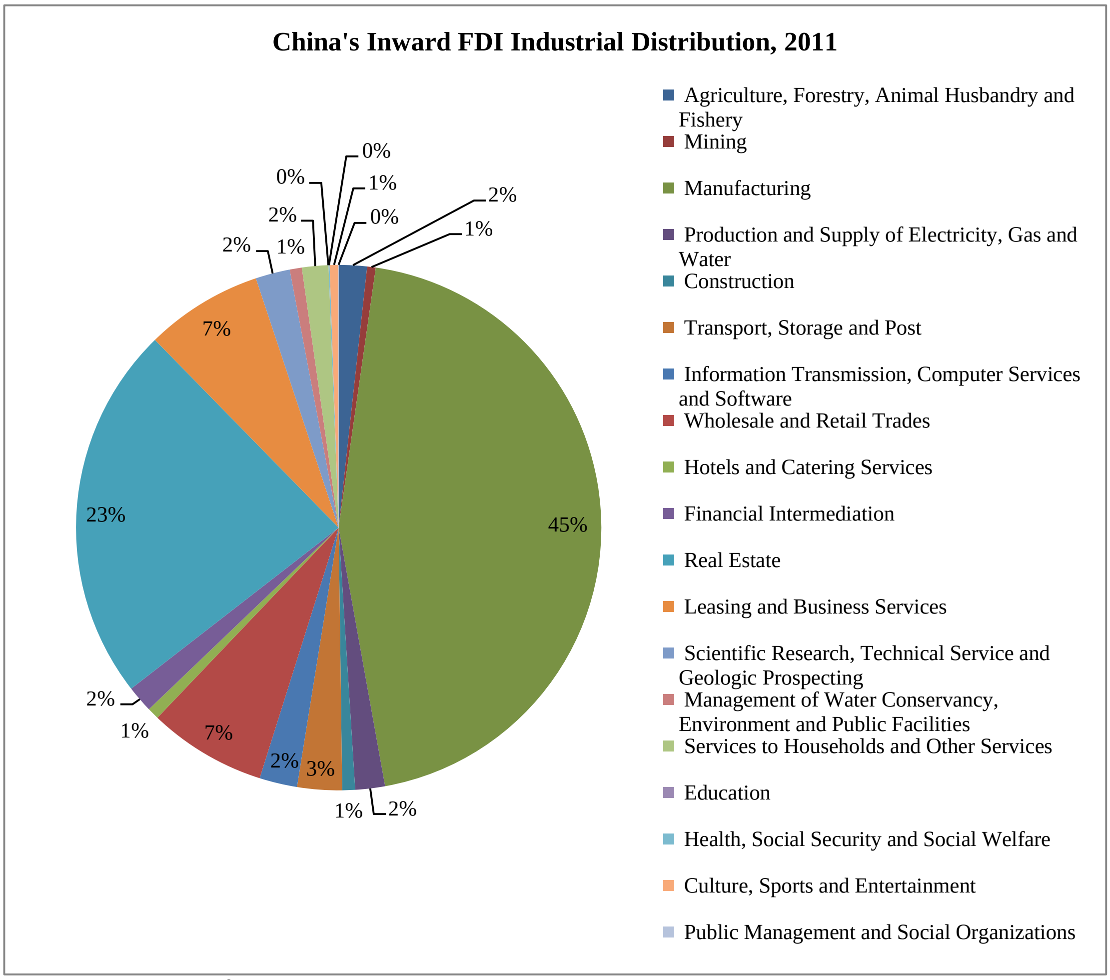


Source: OECD database: http://stats.oecd.org/Index.aspx?DataSetCode=FDI_BOP_IIP. Data accessed in May, 2013.

As the most important developing countries, FDI inflows to China have climbed by 1.11 per cent in 2011 compared to 2010. However, the growth rate slows down compared with the growth rate of approximately 11 per cent in 2010. Chart 2.16 demonstrates China's industry distribution of inward FDI in 2011. China receives 116.01 billion US dollars worldwide in 2011, with 52.10 million US dollars in manufacture, accounting for 44.91 per cent and 26.88 billion US dollars in real estate, accounting for 23.17 per cent. FDI inflows are also attracted to wholesale and retail trade with a value of 8.42 billion US dollars, and leasing and business services industry with a value of 8.38 billion US dollars. Both of these industries hold around 7 per cent of total inflows. Transport, storage and post also account for more than 3 per cent of total inward FDI of China with a value of 3.19 billion US dollars.

However, with continuously rising wages and production costs, investment of labour-intensive manufacturing has slowed down. Therefore the growth in total inward FDI that China has received slows down as well. Moreover the FDI inflows in scientific research, service and geo-survey have been increased (World Investment Report, 2011). In general, China has achieved fast development in economic status and has endeavoured to transit its economic structure from low cost industries to high-tech industries.

Chart 2.16 China's Inward FDI Industrial Distribution, 2010



Source: Data accessed from http://www.stats.gov.cn/tjsj/ndsj/2012/html/R0616e.htm in May, 2013.

By the year of 2011, the China's outward investment increases by 8.49 per cent compared to 2010, with a value of 74.65 billion US dollars. Table 2.9 reports China's industry distribution of outward FDI in 2011. In 2011, 34.29 per cent of total outward FDI of China goes to leasing and business services, decreased by 15.47 per cent. China's outward FDI in the mining industry accounts for 19.35 per cent of its total outward FDI, with a value of 14.45 billion US dollars. 13.83 per cent of China's outward FDI is in the whole sale and retail trades industry, with a value of 10.32 billion US dollars. The manufacturing industry also shows a great increase of 50.96 per cent, which accounts for 9.43 per cent of total outward FDI. Outward investment in financial intermediate drops to 6.71 billion US dollars, a decrease of 99.30 per cent compared to 2010.

Other industries that make up outward FDI are as follow: transport, storage and post industry with 3.43 per cent, real estate taking up 2.64 per cent, production and supply of electricity, gas and water with 2.51 per cent, construction accounts for 2.21 per cent, agriculture forestry, animal husbandry and fishery with 1.07 per cent, information transmission, computer services and software with 1.04 per cent, scientific research, technical service and geologic prospecting with 0.94 per cent, management of water conservancy, environment and public facilities accounting for 0.34 per cent, and hotels and catering services accounting for 0.16 per cent. Among these industries, agriculture, forestry, animal husbandry and fishery, mining, production and supply of electricity, gas and water, construction, management of water conservancy, environment and public facilities, information transmission, computer services and software, and wholesale and retail trades industries have all experienced great increases compared to 2010. Outward FDI in some industries, such as management of water, conservancy, environment and public facilities, construction, and mining even has increased by more than 100 per cent.

Table 2.9 China's Outward FDI Industrial Distribution, 2004-2011 (Million US$)

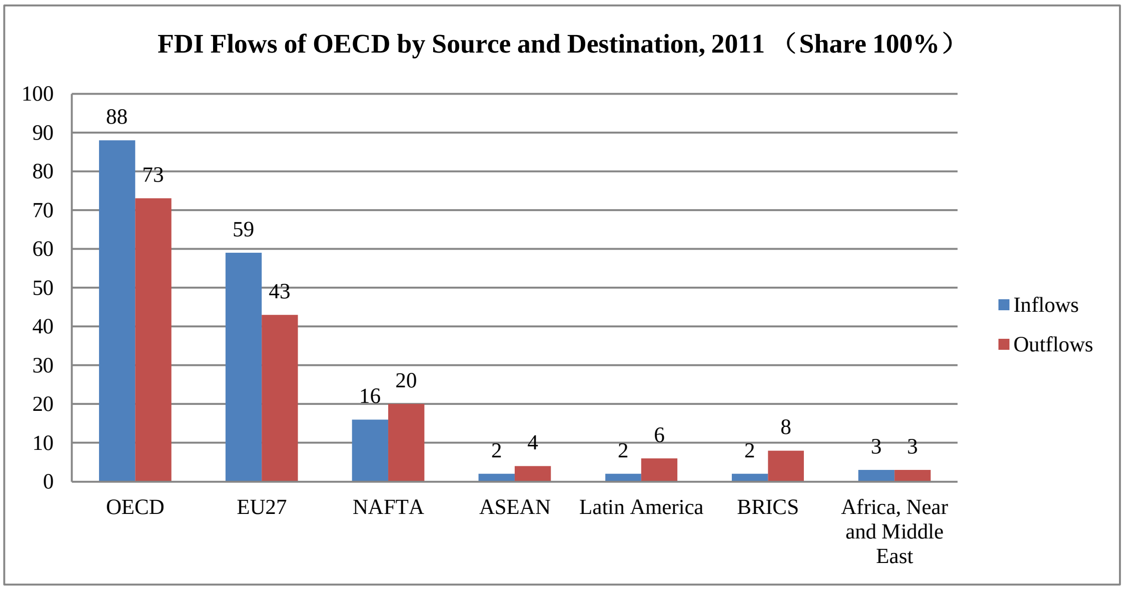
Industry	2004	2005	2006	2007	2008	2009	2010	2011
Agriculture, forestry, animal husbandry and fishery	288.66	105.36	185.04	271.71	171.83	342.79	533.98	797.75
Mining	1800.21	1675.22	8539.51	4062.77	5823.51	13343.09	5714.86	14445.95
Manufacturing	755.55	2280.40	906.61	2126.50	1766.03	2240.97	4664.17	7041.18
Production and supply of electricity, gas and water	78.49	7.66	118.74	151.38	1313.49	468.07	1006.43	1875.43
Construction	47.95	81.86	33.23	329.43	732.99	360.22	162.826	1648.17
Transport, storage and poste	828.66	576.79	1376.39	4065.48	2655.74	2067.52	5655.45	2563.92
Information transmission, computer services and software	30.50	14.79	48.02	303.84	298.75	278.13	506.12	776.46
Wholesale and retail trades	799.69	2260.12	1113.91	6604.18	6514.13	6135.75	6728.78	10324.12
Hotels and catering services	2.03	7.58	2.51	9.55	29.5	74.87	218.20	116.93
Financial intermediation	-	-	3529.99	1667.80	14048	8733.74	862739	6070.50
Real estate	8.51	115.63	383.76	908.52	339.01	938.14	1613.08	1974.42
Leasing and business service	749.31	4941.59	4521.66	5607.34	21717.23	20473.78	30280.70	25597.26
Scientific research, technical service and geologic prospecting	18.06	129.42	281.61	303.90	166.81	775.73	1018.86	706.58

Management of water conservancy, environment and public facilities	1.20	0.13	8.25	2.71	141.45	4.34	71.98	255.29
Services to households and other services	88.14	62.79	111.51	76.21	165.36	267.73	321.05	328.63
Education	-	-	2.28	8.92	1.54	2.45	2.00	20.08
Health, social security and social welfare	0.01	-	0.18	0.75	0	1.91	33.52	6.39
Cultural, sports and entertainment	0.98	0.12	0.76	5.10	21.8	19.76	186.48	104.98
Public management and social organisations	0.04	1.73	-	-	-	-	-	-
Total	5497.99	12262.17	21163.96	26506.09	55907.17	56528.99	68811.31	74654.04

Source: *2010 Statistical bulletin of China's Outward FDI*; *2009 Statistical Bulletin of China's Outward FDI*; *2006 Statistical Bulletin of China's Outward FDI*, and http://www.stats.gov.cn/tjsj/ndsj/2012/html/R0620e.htm. Data accessed in May, 2013.

Chart 2.17 shows the regional distributions of FDI inflows into, and outflows from, OECD countries. Similar to trade, most of OECD countries' FDI is made between OECD countries. Around 88.00 per cent of FDI inflows of OECD countries come from the member countries, and roughly 73.00 per cent of FDI outflows are received by the members of OECD. Many countries of EU27 are also the members of OECD countries, so a large percentage of FDI is taken by EU27 countries. EU27 countries undertake more than 59.03 per cent of the inward investments and receive 603.56 billion US dollars investments, accounting for around 42.67 per cent of total OECD countries' FDI inflows. North America Free Trade Agreement (NAFTA) is the third largest source region of FDI inflows of OECD countries and the second largest destination of FDI outflows of OECD countries, with a value of 158.69 billion US dollars and 206.55 billion US dollars respectively.

Chart 2.17 FDI Flows of OECD by Source and Destination, 2011



Source: OECD database：http://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_PARTNER# and *OECD International Direct Investment Statistics 2013*. Data accessed in September, 2013.

Most members of Association of Southeast Asian Nations (ASEAN), countries in Latin America, Africa, Near and Middle East, and the BRICs countries of Brazil, Russian, India, and China are developing and emerging economies. These regions are FDI receivers rather than FDI investors, as developing and emerging economies. Africa, Near and Middle East are the regions that receive least FDI from OECD countries, accounting for only 3 per cent. They rank the second smallest direct investor in OECD countries with a 3 per cent share. About 4 per cent of FDI outflows of OECD countries go to ASEAN countries, while only 2 per cent of OECD inward FDI comes from ASEAN countries.

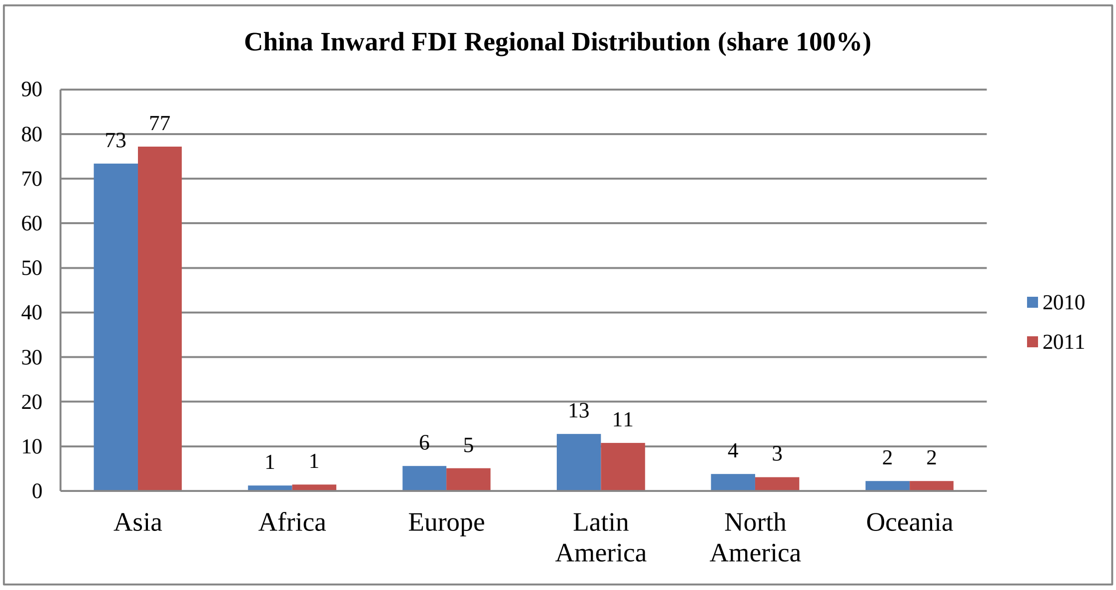
In the case of Latin America, the differences between inflows to and outflows from OECD countries get even greater. Latin America receives direct investment of 74.45 billion US dollars, accounting for about 6.05 per cent, from OECD countries; nevertheless, the FDI inflows from Latin America to OECD countries are only 17.15 million US dollars, and the percentage it takes is less than 2 per cent. Referring to BRICs countries, which include the most popular and largest four developing countries in the world, this share difference between FDI inflows and outflows is the biggest among all regions. Only 2.44 per cent FDI inflows of OECD countries come from BRICs; however, BRICs receives more than 8 per cent of total OECD countries' outward FDI.

So the developed regions play more important roles as major investors, such as OECD itself and EU27; while the developing regions are more welcomed as FDI receivers, such as ASEAN, Latin America, BRICs and Africa, Near and Middle East. Moreover, by the end of 2011, the FDI inflows from ASEAN, Latin America, BRICs and Africa, Near and Middle East to OECD countries account for 10.39 per cent, compared to 3.26 per cent in 2010, which is a great increase. Therefore, developing countries are more involved as the investors of the world FDI.

Chart 2.18 exhibits the regional distributions of FDI inflows into China. In 2011, Asia remains the most important FDI source area of China. The share Asia takes rises from 73.39 per cent to 77.16 per cent, with the value being increased by more than 12 billion US dollars compared to 2010. Asia is the only region where direct investment to China has grown tremendously. The FDI inflows from Africa and Oceania have also experienced somewhat increase. African investment in China has increased from 1.28 billion US dollars to 1.64 billion US dollars; moreover, the percentage it accounts for has increased by 0.2 per cent. Similarly, FDI from Oceania has also experienced a slight increase in value and a small increase in share. Its investment to China rises from 2.33 billion US dollars to 2.62 billion US dollars and the share rises from 2.20 per cent to 2.26 per cent.

China is not a favoured choice by investors from Europe, Latin America and North America in 2011 relative to 2010. The value of investment from these areas to China is decreased by 0.05 billion US dollars, 1.02 billion US dollars, and 0.43 billion US dollars respectively from 2010-2011. The share they account for also decreases greatly. These regional changes make Asia the crucial and largest investor in China. Combined with China's outward FDI regional distribution, Asia not only plays a vital role as an investor in China, but a significant FDI receiver as well. Among all Asia economies, Hong Kong is the momentous region that China's outward and inward FDI flows go into and come from. It accounts for more than 60 per cent of all China's FDI flows itself.

Chart 2.18 China Inward FDI Regional Distribution, 2011



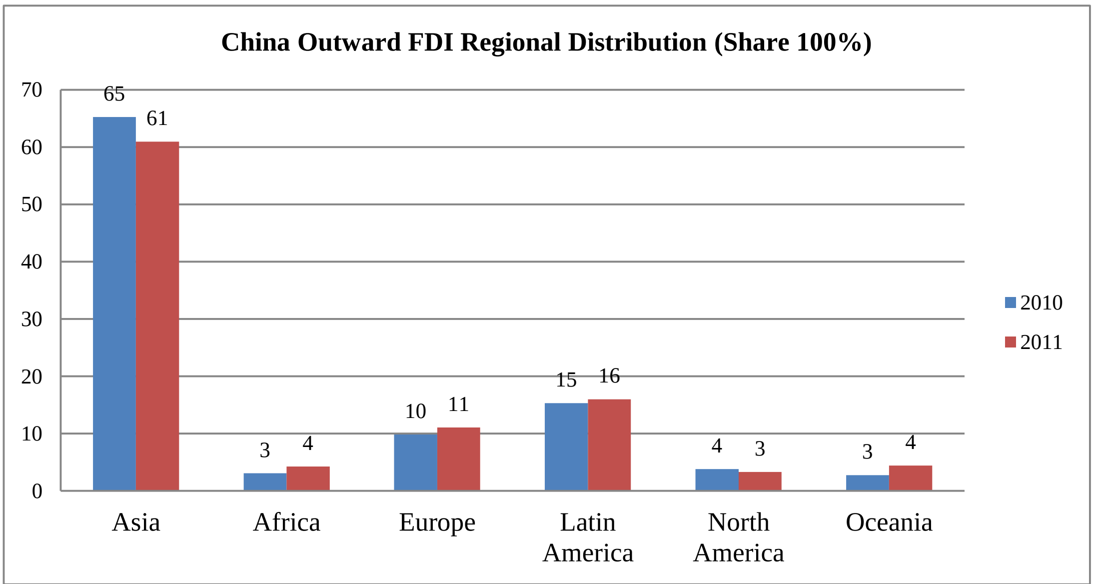
Source: *2012 China Statistical Yearbook*. http://www.stats.gov.cn/tjsj/ndsj/2012/indexch.htm

Chart 2.19 displays the regional distributions of FDI outflows from China. China's outward investment in Africa, Europe, Latin America and Oceania has all experienced rapid growth. In 2011, investment from China to Europe reaches 8.25 billion US dollars, being increased by 21.02 per cent compared to 2010. Most of China's FDI outflows in Europe go to the UK, France, Germany and Russian, altogether accounting for 8.21 per cent of total FDI outflows from China in 2011; they have increased by 6.27 per cent compared to 2010. FDI of 11.94 billion US dollars goes to Latin America from China in 2011, accounting for 15.99 per cent in total, and has increased by 13.26 per cent compared to last year.

FDI outflows from China to Africa and Oceania also experience great increases. China FDI outflows to Africa have increased by 50.24 per cent compared to 2010, with the total value of 3.17 billion US dollars. With the value of more than 3.32

billion US dollars, Oceania takes 4.44 per cent of total inflows from China, which has increased by 75.66 per cent. Asia, as the largest FDI destination region of China, accounts for 60.94 per cent of total China's outward FDI in 2011, which is approximately 4 per cent less than that in 2010. Investments worth 45.49 billion US dollars go to Asia in 2011 with a growth rate of 1.35 per cent. North America is the only region that receives less FDI from China in 2011 than 2010. Compared to 2010, only 2.48 billion US dollars go to North America, which has decreased by 5.35 per cent and accounts for 3.32 per cent in total.

Chart 2.19 China Outward FDI Regional Distribution, 2011



Source: *2012 China Statistical Year Book*. http://www.stats.gov.cn/tjsj/ndsj/2012/indexch.htm

Most of OECD countries' FDI inflows come from the inside of this organisation as revealed by Table 2.10. Eight out of top ten inward FDI partners of OECD countries' are members of OECD, and altogether they account for more than 80 per cent of total OECD inward FDI flows. Excluding OECD countries, the top ten major source countries or regions are Uruguay, Venezuela, Syrian Arab Republic, Virgin Islands, Bermuda, Myanmar, Kuwait, Bhutan, Bangladesh and Peru. However, excluding Uruguay and Venezuela, they only account for approximately 10 per cent of total OECD countries' inward FDI altogether, even less than a single OECD country, for instance, the Netherlands, which ris anked as one of the top three major source countries of FDI inflows to OECD countries.

Uruguay, as the first largest source country outside OECD where FDI comes from, is ranked number five, with the total investment of 83983.36 million US dollars.

However, compared to the largest source country of OECD, the Netherlands invests more than 160055.55 million US dollars in OECD area, and the investment from Uruguay is only half of that of the Netherlands. So there is a large difference between OECD investors and non-OECD investors when the investment destination is OECD countries.

Table 2.10 Major Source Countries of OECD Countries' FDI Inflows, 2011

Country/Region	**Value (Million US$)**	**Share (100%)**
Top Ten Countries (Including OECD Countries)		
Netherlands	160055.55	18.15
United States	154003.56	17.46
United Kingdom	105108.47	11.92
Belgium	92846.67	10.53
Uruguay	83983.36	9.52
Germany	69502.78	7.88
Luxembourg	66231.55	7.51
Venezuela	58940.83	6.68
Switzerland	58166.84	6.60
France	56547.11	6.41
Excluding OECD Countries, Top Ten		
Uruguay	83983.36	9.52
Venezuela	58940.83	6.68
Syrian Arab Republic	41562.97	4.71
Virgin Islands, British	20579.92	2.33
Bermuda	15012.76	1.70
Myanmar	14911.44	1.69
Kuwait	9235.20	1.05
Bhutan	7663.38	0.87
Bangladesh	6338.70	0.72
Peru	5279.17	0.60

Source: OECD database: http://stats.oecd.org/Index.aspx?DataSetCode=MON20123_2. Data accessed in May, 2013

If we look at the major destinations of OECD countries' FDI outflows, this difference between OECD countries and non-OECD countries seems to become smaller. Table 2.11 presents the relevant figures. Among the top ten major destinations, four of them are non-OECD countries, Uruguay, Venezuela, Syrian Arab Republic and Turks and Caicos Islands. Altogether, they account for more than

40 per cent of total OECD outward FDI. Putting top ten non-OECD destinations all together, the share they hold are more than 50 per cent. Although this number is still quite below the total share of top ten countries of all destinations, the differences are much smaller than the source countries.

Table 2.11 Major Destinations of OECD Countries FDI Outflows, 2011

Country/Region	Value (Million US$)	Share (100%)
Top Ten Countries (Including OECD Countries)		
United States	211360.59	16.38
Uruguay	177127.66	13.72
Venezuela	162123.05	12.56
United Kingdom	154262.71	11.95
Syrian Arab Republic	140320.86	10.87
Luxembourg	133640.11	10.35
Netherlands	118946.53	9.22
Belgium	104298.02	8.08
Canada	71362.39	5.53
Turks and Caicos Islands	66612.30	5.16
Top Ten Countries (Excluding OECD Countries)		
Uruguay	177127.66	13.72
Venezuela	162123.05	12.56
Syrian Arab Republic	140320.86	10.87
Turks and Caicos Islands	66612.30	5.16
Virgin Islands, British	58893.64	4.56
Trinidad and Tobago	44493.46	3.45
Bangladesh	44482.42	3.45
Bhutan	22616.20	1.75
Vietnam	21092.82	1.63
Bermuda	20736.03	1.61

Source: OECD database: http://stats.oecd.org/Index.aspx?DataSetCode=MON20123_2. Data accessed in May, 2013.

However, China does not appear in both Table 2.10 and Table 2.11. In 2011, China's outward investments in OECD countries worth of 759.69 million US dollars, and the share it holds is only 0.90 per cent. China is ranked the 61st source countries of OECD inward FDI while it is ranked the 55th as the major destination of OECD outward FDI (including OECD countries), receiving investment of 4,382.54 million US dollars from OECD countries, with the share of 0.34 per cent. In general, OECD plays more important roles as the major source country and destination of China's outward FDI and inward FDI, while China is not that important as the source country and destination of OECD countries' FDI.

Table 2.12 presents top ten FDI investors of China in 2011, reporting their investment values and shares. In 2011, inward FDI in China has reached 116.01 billion US dollars, which has increased by 9.72 per cent compared to 2010. Hong Kong remains the largest investor in China. Investment of more than 77.01 billion US dollars flows into China from Hong Kong, taking up approximately 66.38 per cent of all inward FDI of China. Following regions or countries are Taiwan, Japan and Singapore, with the value of 6.73 billion US dollars, 6.35 billion US dollars and 6.33 billion US dollars respectively.

Besides the above three countries or regions, the rest top ten investing countries in China are all members of OECD. They are the US, Korea, the UK, Germany, France and Netherlands. Altogether, these countries and Japan take up about 14 per cent of total inward FDI of China. This share is remarkable if Hong Kong is excluded. Therefore, OECD is the major source of China's inward FDI. Moreover, OECD countries are also the important destinations of China's outward FDI. Excluding Hong Kong, British Virgin Island, Cayman Island, Singapore, Sudan and Russian Federation, the rest of top ten destinations of China's FDI outflows are all OECD members as well.

Table 2.12 Top Ten Investors in China, 2011

Country/Region	Value (Billion US$)	Share (100%)
Hong Kong	77.01	66.38
Taiwan	6.73	5.49
Japan	6.35	5.47
Singapore	6.33	5.46
United States	3.00	2.59
Korea	2.55	2.20
United Kingdom	1.61	1.39
Germany	1.14	0.98
France	0.80	0.69
Netherlands	0.77	0.66

Source: Data accessed from http://english.mofcom.gov.cn/article/statistic/foreigninvestment/201202/20120207948411.shtml in May, 2013.

Table 2.13 reports the investment values and shares of China's outward FDI into its top ten destinations. Hong Kong of China is the largest destination of China's outward FDI. More than 47.76 per cent of China's total outward FDI goes to Hong Kong, with the value of 35.65 billion US dollars. The investments from China to Hong Kong focus on a varies of industries, such as leasing and business services, finance, wholesale and retailing, transportation, real estate and manufacture industry. British Virgin Island and Cayman Island receive investments of 6.21 billion US dollars and 4.94 billion US dollars from China, which account for 8.32 per cent and 6.62 per cent respectively. Most of the investments are concentrating in the leasing and business service industry.

Different from the above mentioned region and countries, China's outward investment to Australia and the US mainly focus on the manufacture industry, mining, wholesale and retailing. Therefore, China's investments to OECD countries are different from that to non-OECD countries. 4.66 per cent of China's outward FDI, worth 3.48 billion US dollars goes to France; while approximately 4.25 per cent, worth 3.17 billion US dollars goes to Australia. The US receives 2.42 per cent of all China's FDI outflows, with the value of 1. 81 billion US dollars; and the UK receives 1.90 per cent of all China's FDI outflows, with the value of 1.42 billion US dollars.

Table 2.13 Top Ten Destinations of China's Outward FDI, 2011

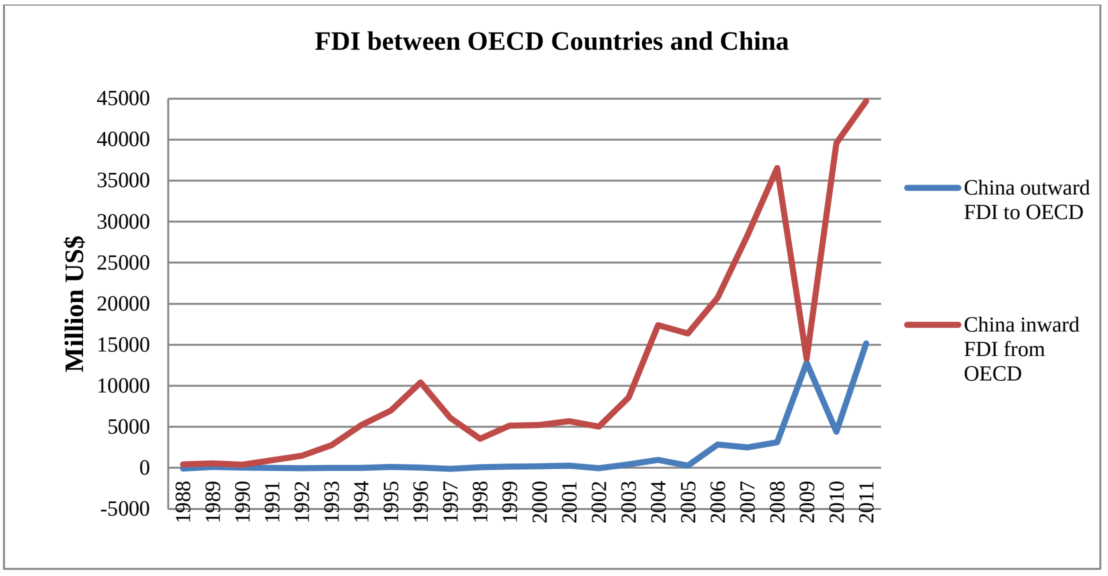
Country/Region	Value (Billion US$)	Share (100%)
Hong Kong, China	35.65	47.76
British Virgin Island	6.21	8.32
Cayman Island	4.94	6.62
France	3.48	4.66
Singapore	3.27	4.38
Australia	3.17	4.25
United States	1.81	2.42
United Kingdom	1.42	1.90
Sudan	0.91	1.22
Russian Federation	0.72	0.96

Source: *2012 China Statistical Year Book*. http://www.stats.gov.cn/tjsj/ndsj/2012/indexch.htm

In summary, OECD countries usually trade and make investments inside OECD countries, while China shares more trade volumes and FDI flows with Asian countries and regions. This is mainly because of culture proximity, geographical proximity and the close economic ties between the China and Asian countries or OECD. Moreover, China is more important as a trading partner of OECD countries than the source country and destinations of OECD countries' FDI. OECD countries are the major partners of China in both trading and FDI.

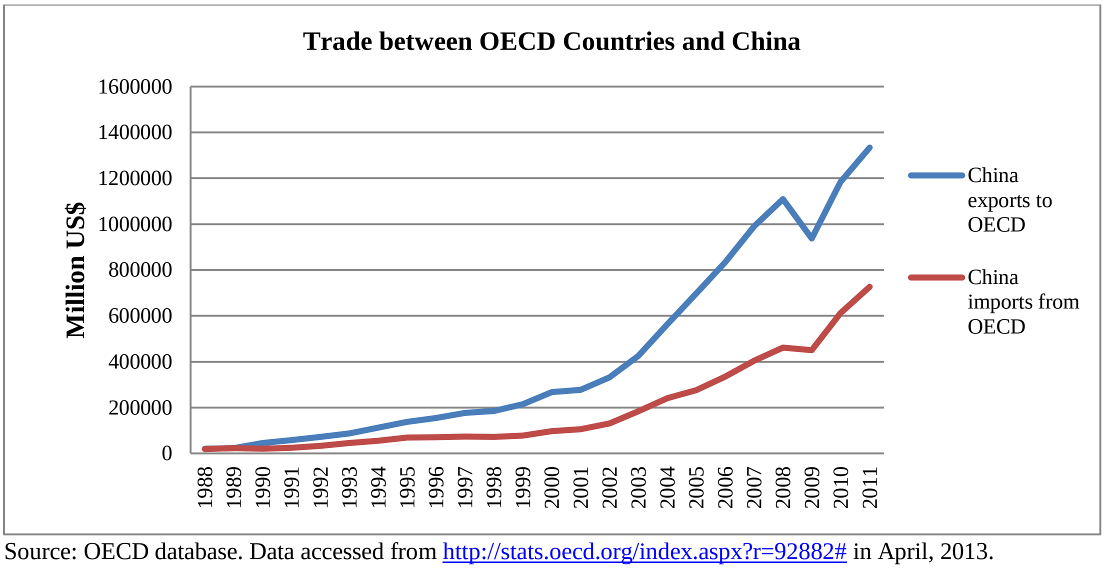
2.4 FDI and trade between OECD countries and China

Chart 2.20 FDI between OECD countries and China



Source: OECD database. Data accessed from http://stats.oecd.org/index.aspx?r=92882# in April, 2013.

Chart 2.21 Trade between OECD Countries and China



Source: OECD database. Data accessed from http://stats.oecd.org/index.aspx?r=92882# in April, 2013.

Chart 2.20 and Chart 2.21 show the FDI flows and trade volume between OECD countries and China. Compared to the trade volume between China and OECD countries, the FDI flows are relatively small. Moreover, the fluctuation in FDI flows between OECD countries and China is also more violently than that in trade. The inward FDI from OECD countries to China keeps growing until 1997. Then the inward FDI decreases dramatically. From 1998 to 2007, both the outward FDI flows and inward FDI flows have experienced a relatively smooth growth. While in 2008 and 2009, the outward FDI from China surges greatly and the inward FDI of China have experienced a sharp decline due to the global financial crisis. In addition, there are no big changes in the outward FDI flows from China to OECD countries until 2003. However, even after years of growth, the outward FDI of China is still significantly smaller than its inward FDI flows from OECD countries, except 2009. As indicated in Chart 2.21, the trade volume between OECD countries and China is going with an upward trend smoothly during a long period from 1988 to 2008. Although shocked by the financial crisis seriously in 2008, the trade volume between China and OECD countries starts to recover in 2009 instantly.

In our analysis, in order to eliminate the disruption of the financial crisis, a sub-sample regression from 1988 to 2006 is conducted. Since the fluctuation around 1997 is relatively smaller than that of 2008 and in order to keep the number of sufficient observations, we do not split the sub-period further and run another sub-sample regression for the time period from 1988 to 1998 or from 1998 to 2006.

3 CHAPTER 3: LITERATURE REVIEW I: DETERMINANTS OF TRADE AND FDI

The main issues addressed in this chapter are the determinants of trade and FDI, and the factors that influence the relationship between trade and FDI. The chapter reviews the trade literature with deliberation first, followed by an examination of FDI to the same effect correspondingly. It has been noted that there exist a few common factors that contribute to both trade and FDI, albeit in varying ways. The initial review of the determinants of trade and FDI paves the way for an in depth scrutiny of the relationships between trade and FDI, which is one of the major focuses in this study. Finally, the chapter progresses to deal with the interactions between trade and FDI that forge the changing relationships between them at various stages of trade-FDI cycles.

3.1 Determinants of trade

The ways in which various factors determine and influence trade is of interest to firms and nations alike. For instance, firms and nations exploit their comparative and competitive advantages in an attempt to optimise and rationalise production and sales, achieving greater wealth thereby. Factor endowment differences are the cause of such comparative advantages, and are usually seen as the basis of most trade theories (Mundell, 1957; Ruffin, 1984). The Heckscher-Ohlin (H-O) model, Ricardian theory, and many other theories based on H-O model (Samuelson, 1949; MacDougall, 1960) all deem factor endowment differences as the foundations of why trade occur and occur with certain patterns.

Including factor endowment, all the determinants of trade can be classified into country level factors, industry level factors and firm level factors. Country level factors include primary gravity elements, country specific characteristics, commonalities and relativities in the importing and exporting countries, and FDI effects on trade. Studies in this regard include Zhang and Wittloostuijn (2004), Baier and Bergstrand (2007), Felbermayr and Toubal (2010), Gullstrand (2011), CalÌ and Velde (2011), Hanson and Xiang (2011), Wu *et al.* (2012), just to name a few belonging to this category.

Commonalities and relativities play an important role, and a special branch of research featuring the gravity model has emerged based on commonalities and relativities (Linnenman, 1966; Zwinkels and Beugelsdijk, 2010). The use of gravity model involves the identification of variables that determine the size of trade flows between countries and, in doing so, the relative importance of different trade-driving forces is analysed (Tinbergen 1962, Gul and Yasin, 2011). The model usually produces a good estimation fit (Anderson, 1979, Zhang and Witteloostuijin, 2004). According to the traditional concept of the gravity equation, bilateral trade can be explained by GDP and GDP per capita figures and both trade impediment and preference factors. One of the typical trade impediment factors is distance, and preference factors include common language, common border, RTAs (Regional Trade Agreements), natural resource endowment. This study summarises these country level determinants of trade and tries to define whether these factors also influence FDI and the relationship between trade and FDI.

Furthermore, firm level factors of trade are concerned with such questions as whether a firm exports, how much it exports and where it exports to. Several authors, including Bahmani-Oskooee (1986), Wakasuki (1997), Kandogan (2003), Lawless (2010), Breinlich and Criscuolo (2011), Cassiman and Golovko (2011), and Gullstrand (2011), have investigated the effect of firm level factors. A country's export is an aggregation of exports by its firms. Nevertheless, aggregation in modelling has been debatable. Aggregation of firms' production and sales functions, which are based on firms' behaviour and objectives, for country level examinations of trade, are prevalent in empirical studies though (Filippini and Molini, 2003; Kien, 2009). Thus, caution has to be taken in viewing the pertinent results and findings. Industry level factors deal with price and production policy in an international arena where empirical research is relatively rare (Kogut and Singh, 1988; Brülhart, 2001). In many cases, industry level factors are mingled with country level studies. Among them are Stern and Maskus (1981), Balassa and Bauwens (1988), and Vogiatzoglou (2005). Therefore, considering the context of our research, the firm level and industry level inquries will not be addressed in this study.

By nature, research in this area is featured by cross-section analysis (Kandogan, 2003; Helpman *et al.,* 2008; Tansey and Touray, 2010) or a dimension of cross-section as a necessity in a panel data set (Egger, 2000; Papazoglou, 2007). As panel data sets involve a time dimension, dynamics can be generated in the modelling (Kien, 2009; Hatab *et al.* 2010; Gul and Yasin, 2011; Filippini and Molini, 2003; Stern and Maskus, 1981; Huot and Kakinaka, 2007). Therefore, in this research, pooled panel data is adopted. It can reflect both cross-section differences and time varieties.

This section reviews the determinants of trade literature that is concerned with country level factors first, in the order of the primary gravity model of trade elements, country specific characteristics, commonalities and relativities in the importing and exporting countries and FDI effects on trade. It then evaluates industry level factors, followed by the factors that are associated with firm characteristics. The country level factors that influence trade are addressed in more detail, due to that our research is conducted at country level.

A large number of empirical studies are conducted at country level to analyse the crucial factors of trade (Frankel, 1997; Bougheas *et al.*, 1999; Egger, 2002; Kandogan, 2003; Dow and Karunaratna, 2006; Baier and Bergstrand, 2007; Helpman *et al.*, 2008; Lawless, 2010; Sheng and Mullen, 2011; Wu *et al.*, 2012). Country level factors can be generally classified into four categories, primary gravity model elements (Rothaermel *et al.*, 2006; Bastos and Silva, 2010), country specific characteristics (Egger, 2002; Li and Samsell, 2009), commonalities and relativities of importing and exporting countries (Bell and Pavitt, 1997; Filippini and Molini, 2003), and FDI effects (Root, 1994; Sheng and Mullen, 2011). Each category contains many factors and is discussed below in detail.

In the first category, primary gravity model elements consist mainly of market size of both importing country and exporting country (Chi and Kilduff, 2010; Lawless, 2010), and geographical distance between the countries involved (Dow, 2000; Ojala and Tyrvainen, 2008). Commonly accepted indicators for market size are GDP (Tansay and Touray, 2010), GNP (Gullstrand, 2011), population (Papazoglou, 2007), and physical size (Lawless, 2010), while common index for geographical distance is the distance between the capital cities of trading countries. The market size and geographical distance are the most examined factors. Most empirical studies cover the market size and geographical distance in modeling and tests (Balassa and Bauwens, 1988; Root, 1994; Russow & Okoroafo, 1996; Filippini and Molini, 2003; Rothaermel *et al.*, 2006; Huot and Kakinaka, 2007; Lawless, 2010).

In addition, numerous studies have explored the factors from the perspectives of the country's specific characteristics, such as economic development (Frenkel, 1997; Kandogan, 2003), government environment (Egger, 2002; Calì and Velde, 2011; Wu et al., 2012), market openness (Bergstrand, 1985; Kien, 2009; Hatab, *et al.*, 2010), infrastructure (Anderson and Van Wincoop, 2003; Sheng and Mullen, 2011), costs of processing imports (Lawless, 2010), island or landlocks (Helpman *et al.*, 2008), and labour quality measured by literacy (Chi and Kilduff, 2010). These factors describe what kind of characteristics a country should have to be favored by exporters. In summary, trade tends to happen between countries with great infrastructure, higher level of economic development, open market and friendly government environment. These specific characteristics can apparently be observed in most developed countries and large emerging countries, such as BRICs (Brazil, Russian, Indian, and China).

Furthermore, factors affect trade at the country level from both importing and exporting countries' aspects are also crucial. Those factors take the differences and commonalities between trading partners into account, and serve as the main driving forces that lead to trade. Included are technological distances (Bell and Pavitt, 1997; Filippini and Molini, 2003), factor endowment differences (Wakasugi, 1997; Hatab *et al.*, 2010), cultural differences (Felbermayr and Toubal, 2010; Sheng and Mullen, 2011), and exchange rates (Bahmani-Oskooee, 1986, Gullstrand, 2011).

Finally the forth category contains only one but crucial factor, which is the effect of FDI. With ongoing debate on whether trade and FDI are complementary or substitute, FDI exerts a direct effect on trade regardless. The question is not whether FDI has an effect on trade; it is whether FDI increases or reduces trade. Many studies believe that FDI has certain effects on trade volume (Dunning, 1993; Wei *et al.*, 1999; Sheng and Mullen, 2011), but how it exerts the effect remains unsolved, which is also one of the main objectives of this thesis. This study summarises the effects of all the country level factors on trade in Table 3.1.

Table 3.1Summary of all the Determinants on Trade

Group	Factor	Dimension
Primary gravity model elements	Market size	Market size of exporting country
		Market size of importing country
	Geographical distance	
Country specific characteristics	Economic development	
	Institutions	Government environment base
		Viability of contracts
		Aid for trade
	Trade openness	RTAs (Regional Trade Agreements)
		Tariff
		Total trade share in GDP
	Transportation costs	Infrastructure
		Costs of processing imports
		Landlock or island
Commonalities and relativities between importing and exporting country	Technology distance	
	Factor endowment difference	Capital endowment difference
		Human resource endowment difference
		Natural resource endowment difference
	Cultures and commonalitites	Common language
		Common legal system
		Common religion
		Common border
		Political system similarities
		Historical bonds
	Exchange rates	Exchange rate regimes
		Exchange rate volatility
Effect of FDI	FDI flows/FDI stocks	

Table 3.1 highlights key factors which might be examined. However, some issues (e.g. FDI determinants and trade and FDI relationship determinants) are not so well documented. This table helps us to have a clue about what factors are included in determinants of trade, and will be further discussed and compare with the determinants of FDI.

3.1.1 Primary gravity model elements

The gravity model is widely used in the area of international business to explain the determinants of international trade size and geographical distribution. The gravity model has been utilised in many empirical studies and has produced clear results in international business (Frankel, 1997; Pantulu and Poon, 2003). Therefore, the major elements in the gravity model are crucial in determining trade. In the original gravity model, market size of exporting and importing countries and the distance between them are discussed as the crucial factors that strongly pose effect on international trade (Zwinkels & Beugelsdijk, 2010).

3.1.1.1 Market size

It is widely believed that a strong relationship exist between market size and bilateral trade volume (Root, 1994; Russow and Okoroafo, 1996), and the primary gravity model estimates trade between two countries as a positive function of their market size (Sheng and Mullen, 2011). Prior studies, including Rothaermel *et al.* (2006) argue that market size is an important criterion of international expansion. In most of the literature, GDP or GNP, which stands for economic market size, is usually adopted as a proxy for market size. GDP and GNP represent the level of wealth of a country (Ekanayake *et al.*, 2010). International trade theories suggest that wealthier countries trade more. The GDP of the exporting nation measures productive capacity and would result in a larger supply for exports, while that of the importing country measures purchasing power and creates a larger demand for imports (Tinbergen, 1962; Chi and Kilduff, 2010). So, it is expected a positive relationship exists between GDP or GNP and bilateral trade (Ekanayake, *et al.*, 2010). Many studies in the literature prove this conjecture and support a positive relationship (Tansay and Touray, 2010; Bastos and Silva, 2010; Gullstran, 2011).

To a less extent, population, which stands for the absorption ability of international trade, is also used in many studies as another common proxy for market size (Linnemann, 1966; Russow and Okoroafo, 1996; Sakarya *et al.*, 2007). However, how the population variables influence trade flows is indeterminate. It has been pointed out that population size exerts an effect on trade that can be trade inhibiting as well as trade enhancing (Papazoglou, 2007). On the one hand, a large population may indicate a large resource endowment, self-sufficiency, and less reliance on international trade (Papazoglou, 2007). Moreover, if the population is too large in rural areas, the distribution and advertising costs will be much more expensive, which will inhibit trade (Mullen and Sheng, 2007; Sheng and Mullen, 2011). If this effect dominates, then it is expected that the coefficient of the population variable will be negative, reflecting an inversely proportionate relationship between population and trade. In the meantime, it is possible that a large domestic population promotes the division of labour and makes it easy to achieve economies of scale, thereby developing a comparative advantage in their export industries and creating opportunities for trade (Papazoglou, 2007; Ekanayake, *et al.*, 2010). Furthermore, a large population means large demands for a wider variety of goods and can better absorb imports (Venables, 1987; Krugman, 1981). So if this kind of situation is dominant, the relationship between trade and population is expected to be positive (Chi and Kilduff, 2010). This debate is inconclusive in the literature. Thus, this study tries to examine empirically the effects of population on trade, as well as FDI.

Furthermore, a small amount of studies add physical areas into the proxies of market size as well (Lawless, 2010). It is argued that trade volume is related to transport costs, so the physical size of a country is involved, particularly in large physically sized countries or those with poor infrastructure (Lawless, 2010). Physical size of a country is used to capture the easiness the exporting firm can get access to the market, so its coefficient is expected to be negative on trade. The larger the area is, the higher the internal transportation costs are, and thus, less trade. Lawless (2010) has also combined population and physical size together, and has developed an indicator of the share of population in urban areas. This proxy denotes how easy it will be for the exporters to reach a large proportion of the market without having to set up a very large distribution network. However, not many scholars pay attention to the physical size of a country, they emphasise the infrastructure level more often. The infrastructure effect will be discussed in the country specific characteristics category as a dimension of transportation costs.

3.1.1.2 Geographical distance

Geographical distance is a widely accepted crucial determinant of international trade in previous studies (Sheng and Mullen, 2011). Both the geographical distance of a country from world markets and the transportation conditions inside this country, are direct related to three categories of cost – transportation costs, time-related costs, and costs of unfamiliarity (Frankel, 1997), which will determine the engagement in trade.

In accordance with modern trade theory, many empirical studies have shown that transport costs exert negative effects on trade flows (Geraci and Prewo, 1977). As the main determinants of transport cost levels (Yu and Zietlow, 1995; Frankel and Rose, 2002), geographical distance is expected to be negatively related with trade volume.

With regard to the geographical distance between countries, it is believed that long distances between trading countries cause higher costs and lower profit margins to the importer, and reduce the motivation for trade (Papazoglou, 2007). Many empirical works have proven that geographical distance is a negatively significant factor when firms choose target countries for expansion and international trade (Lawless, 2010; Ojala and Tyrvainen, 2008; Frankel, 1997). With a shorter distance, time-related costs such as “just-in-time” inventory are lower (Sheng and Mullen, 2011). Distance is a proxy for transportation time, the longer, and the more difficult for nations to undertake international trade (Ekanayake, *et al.*, 2010). Many scholars' works have proven the conjecture and have indicated that the geographical distance between trading countries influences bilateral trade negatively (Lawless, 2010; Sheng and Mullen, 2011; Ekanayake, *et al.*, 2010).

Another important cost associated with geographical distance is geographical proximity, which can often be equated with a familiar business environment, cultural proximity and lower operating cost (Dow, 2000; Frankel, 1997; Ojala and Tyrvainen, 2008). It implies more knowledge about the foreign market and greater ease in obtaining information (Papadopoulos and Denis, 1988). Therefore, MNCs may prefer to trade with neighbouring countries for cultural or historical proximity. They may not even consider trading with countries that are further afield (Papazoglou, 2007). This is especially true for small- and medium-size firms and those with less international experience and fewer resources when they expand abroad (Sheng and Mullen, 2011). Moreover, Bastos and Silva (2010) find that geographical distance is negatively related with a person's willingness to cooperate with others and positively rears people's intention to deceive business partners, both of which may lead to increased transaction costs.

In a word, a number of previous and recent studies have shown that trade flows decrease with increased distances between bilateral traders (Aitken, 1973; Bergstrand, 1985, 1989; Linnemann, 1966; Soloaga and Winters, 2001; Kandogan, 2003; Zhang and Witteloostuijn, 2004; Helpman, *et al.*, 2008; Sheng and Mullen, 2011). This is because poor infrastructure and country adjacency are usually considered as causes for logistics costs (Bougheas *et al.*, 1999). However, some recent studies suggest that distance is no longer a crucial factor, largely due to the rapid advance of logistics technology (Chi and Kilduff, 2010). This study adopts this idea, and uses the cultural distance to validate the gravity model. Table 3.2 summarises the country level gravity model factors that determine trade.

Table 3.2 Summary of Determinants of Trade - Primary Gravity Model Factors

Factor	Proxy	Country	Sign of coefficient	Literature
Market size	GDP/GNP	Exporting countries	Positive	Lawless, 2010; Filippini and Molini, 2003; Kandogan, 2003; Bahmani-Oskooee, 1986; Balassa and Bauwens, 1988; Huot and Kakinaka, 2007; Bergstrand, 1985; Egger, 2002; Kien, 2009; Papazoglou, 2007; Hatab *et al.*, 2010; Chi and Kilduff, 2010; Gul and Yasin, 2011; Tansay and Touray, 2010; Gullstrand, 2011; Ekanayake *et al.*, 2010; Bastos and Silva, 2010; Wu *et al.*, 2012; Baier and Bergstrand, 2007; Soloaga and Winters, 2001
			Negative	Zhang and Witteloostuijn, 2004
		Importing countries	Positive	Lawless, 2010; Filippini and Molini, 2003; Kandogan, 2003; Bahmani-Oskooee, 1986; Balassa and Bauwens, 1988; Huot and Kakinaka, 2007; Bergstrand, 1985; Egger, 2002; Kien, 2009; Papazoglou, 2007; Hatab *et al.*, 2010; Chi and Kilduff, 2010; Gul and Yasin, 2011; Tansay and Touray, 2010; Gullstrand, 2011; Ekanayake *et al.*, 2010; Bastos and Silva, 2010; Wu *et al.*, 2012; Baier and Bergstrand, 2007; Soloaga and Winters, 2001
			Negative	Zhang and Witteloostuijn, 2004
	Population	Exporting countries	Positive	Chi and Kilduff, 2010
			Negative	Filippini and Molini, 2003; Kien, 2009; Papazoglou, 2007; Ekanayake *et al.*, 2010; Soloaga and Winters, 2001
		Importing countries	Positive	Lawless, 2010; Papazoglou, 2007; Chi and Kilduff, 2010; Sheng and Mullen, 2011
			Negative	Filippini and Molini, 2003; Kien, 2009; Gullstrand, 2011; Ekanayake *et al.*, 2010; Soloaga and Winters, 2001
	Physical area	Importing countries	Negative	Lawless, 2010; Hatab *et al.*, 2010; Soloaga and Winters, 2001

	Share of urban population	Importing countries	Positive	Lawless, 2010
Geographical distance	Distance between capital	Bilateral	Negative	Lawless, 2010; Filippini and Molini, 2003; Kandogan, 2003; Balassa and Bauwens, 1988; Huot and Kakinaka, 2007; Bergstrand, 1985; Egger, 2002; Kien, 2009; Papazoglou, 2007; Hatab *et al.*, 2010; Chi and Kilduff, 2010; Helpman *et al.*, 2008; Sheng and Mullen, 2011; Gul and Yasin, 2011; Tansay and Touray, 2010; Gullstrand, 2011; Ekanayake *et al.*, 2010; Bastos and Silva, 2010; Wu *et al.*, 2012; Baier and Bergstrand, 2007; Soloaga and Winters, 2001; Zhang and Witteloostuijn, 2004

Table 3.2 presents the primary gravity model elements that influence trade at country level. It is found that the market size of both importer and exporter is important in determining trade volume. When expressed by GDP and GNP, the market size of both importing and exporting countries shows similar positive effects. However, when the market size is indicated by population, the market size of exporting and importing countries has different effects on trade volume. Moreover, a few scholars pay more attention to importing countries' market size than exporting countries'. In this study, the market size of both exporter and importer will be analysed.

3.1.2 Country specific characteristics determinants of trade

In most of the literature, economic development, government environment and many other characteristics of importing countries and exporting countries all play crucial roles when firms and entrepreneurs choose their foreign markets. With the fast development of international business, the primary gravity model with only market size and distance could not satisfy the demand of research any more. Therefore many other studies suggest that factors such as economic devlopement, government enviroement, market openness and network links should be put into a gravity model to better analyse patterns in international trade (Bergstrand, 1989; Frankel, 1997; Huot and Kakinaka, 2007). These factors describe a country's specific characteristics that cause changes of trade and better demonstrate the determinants of trade. The country specific characteristics considered in prior studies are mostly concentrating on importing countries (Balassa and Bauwens, 1988; Huot and Kakinaka, 2007; Kien, 2009; Chi and Kilduff, 2010; Sheng and Mullen, 2011; Gul and Yasin, 2011; Wu *et al.*, 2012). Although the characteristics of exporting countries are also vital in estimating trade flows, there is a quite small amount of research paying attention to exporting country's features. Thereby, there is a need to explore exporting countries' specific characteristics. Drawing upon on prior studies, some key characteristics are discussed as follows.

3.1.2.1 Economic development

Economic development and economic intensity of a country are found to be very powerful factors in determining bilateral trade volume (Frankel, 1997), because they represent a nation's economic strength. The economic size of a country is positively related to its attractiveness to exporting firms (Shankarmahesh *et al.*, 2005). Both GDP and GDP per capita are commonly adopted indicators for economic development (Sheng and Mullen, 2011). In most of the international trade analysis literature, the per capita data are preferred, such as the studies of Cavusgil *et al.* (2004); and Ceglowski (2006). This is mainly because GDP per captita captures economic development better than GDP. A number of studies support the existence of a significantly positive relationship between GDP per capita and trade flows (Huot and Kakinaka, 2007; Kandogan, 2003; Gul and Yasin, 2011).

In some studies, such as Sheng and Mullen (2007; 2011), energy and electricity consumption per capita is also utilised as a measurement of economic development.

They claim to have managed to prove that economic development of trading countries positively influences the trade volume. According to Chi and Kilduff's (2010) study, GDP and PPP (Purchase Power Parity) adjusted GDP are more suitable in the gravity model analysis, whereas they use PPP adjusted GDP as a proxy for economic development. No matter which proxy the scholars use, the findings are similar. Most studies support a positive relationship between trade flows and economic development of the importing country (Chi and Kilduff, 2010; Wu *et al.*, 2012; Sheng and Mullen, 2011). It is argued that economic development is an important factor for estimating bilateral trade flows (Frankel, 1997). However, not only the economic intensity of the importing country, but also that of the exporting country is indispensable. GDP per capita or income per capita is commonly used as the proxy for economic development (Egger, 2002). Higher income economies tend to be more interested in product differentiation and specialisation, and so they are able to trade more (Filippini and Molini, 2003).

3.1.2.2 Institutions

In addition, many studies, such as Doh and Teegen (2002), Miller and Loess (2002), Sethi *et al.* (2002) and Sobel (2002), analyse international business activities utilising institutional theory (North, 1990). Anderson and Marcouiller (2002) are one of the important contributors to introduce governance environment to international trade. Viability of contract, aid for trade in exporting countries, and governance environment base type are three main institutional factors that influence the trade volume. It is believed that corruption and poor contract enforcement in a country leads to increasing insecurity of doing business in that country, thereby reducing the enthusiasm of undertaking international trade (Anderson and Marcouiller, 2002). Higher level of rule of law reduces the probability of losing money, since contract breakers have to take their responsibilities and it is costly if they fail to complete the contract (Egger, 2002). So with the increase of level of contract viability, a firm's risk exposure is reduced (Egger, 2002). Thereby higher levels of contract viability reduce the risk in trading for both exporting and importing countries. Furthermore, aid for trade (AfT) has rapidly become a popular notion among trade and donors communities alike. A main objective of this type of aid is to assist developing countries to overcome constraints on trade so as to benefit from increased global trade integration (CalÌ and Velde, 2011). AfT consists of aid for trade facilitation, aid for trade policy and regulations, aid for economic infrastructure and aid for productivity capacity. It is believed that all the kinds of AfT help reduce the cost of trading and therefore promote trade (CalÌ and Velde, 2011).

Governance environment base type is also a factor to indicate the influence of the quality of a country's institutions on trade. Focusing more on informal rules, Li and Samsell (2009) and Wu *et al.* (2012) devleop a framework of governance environments and characterise these environments into rule-based, relation-based, and family-based ones. It is argued that in most developed societies, laws and government regulations are the main rules that firms and individuals mainly rely on to resolve disputes and enforce rights and contracts. Therefore the marginal transaction costs are reduced and trade is encouraged under such a rule-based environment (North, 1990, 2006). On the contrary, a relation-based society means less fair public rules and untrustworthy government and courts. Most importantly, informal networks are closely knitted, which increases the marginal transaction costs and reduce the enthusiasm of trading (North, 1990, 2006). Moreover, a family-based governance environment is the least trust-worthy governance enviroment. It increases the marginal transaction costs dramatically and makes information gathering harder, creating a less fair business environment. Therefore, a family-based governance environment is believed as the most restrictive envirionment for undertaking trade (North, 1990, 2006).

3.1.2.3 Trade openness

Trade openness is a crucial element that makes a difference in the formulation of traditional gravity equations (Hatab *et al.*, 2010). In the literature of international economics, it is argued that trade and economic growth are positively related, and market openness accelerates economic growth and boosts international trade (Hassan, 2005). Some empirical scholars denote trade openness by using the indicator of total exports plus total imports over GDP (Hatab *et al.*, 2010; Gul and Yasin, 2011). They claim that a positive relation between market openness and international trade exists (Hatab *et al.*, 2010; Gul and Yasin, 2011).

Moreover, whether or not a country joins RTAs is also commonly used as an indicator of openness. The number of RTAs or preferential trading arrangements (PTAs) has grown dramatically since the early 1990s (Ekanayake, *et al.*, 2010). As of

15 January 2012, some 511 notifications of RTAs have been received by WTO/GATT, and 319 of them are in force (WTO, 2012). RTAs, in some empirical studies also refer to free trade agreements (FTAs), are a key variable in most gravity models (Sheng and Mullen, 2011). A number of theoretical works have found that RTAs influence bilateral trade strongly (Frankel, 1997; Ceglowski, 2006; Dow and Karunaratna, 2006). However, there still remains no clear and convincing empirical evidence to say whether RTAs promote or impede trade (Baier and Bergstrand, 2007). The RTAs literature has always highlighted that while the merchantile trade provisions of RTAs can boost trade among member countries, it is at the expense of trade among non-members. Therefore, whether it benefits a country to join a RTA depends on the cost structures in partner countries, compared with the cost structures of non-members (Ekanayake, *et al.*, 2010). In most studies, such as Karunaratna (2006), which include FTAs as a "trade enhancement" control variable in their model of bilateral trade, a positive relationship has been proven. Sheng and Mullen (2011), Baier and Bergstrand (2007) also support the positive relationship between market openness and exports.

In addition, tariff and non-tariff barriers are also discussed as an indicator of market openness, which influence the trade volume directly. Some governments even utilise tariffs as an effective tools to regulate import levels. The influences posed on trade flows by tariffs have been extensively studied (Chi and Kilduff, 2010). Papadopoulos *et al.* (2002) have applied a related construct, "trade barriers", with four dimensions: tariff and non-tariff barriers, geographical distance, and exchange rates. They point out that trade barriers strongly affect firms' market selection, thus relating to trade volume. It has also been argued that those industries where import tariffs have been reduced the most have experienced, on average, the largest improvements in the degree of intra-trade specialisation (Alessandrini *et al.*, 2011). This finding is consistent with the view that trade liberalisation promotes competition within the industry, and enhances the average productivity of firms in the sector, and therefore increases trade volume.

3.1.2.4 Transportation costs

Transportation costs are vital when a firm chooses to exports. Transportation costs include a nation's infrastructure development, the costs of processing imports in the importing country and whether the importing country is a landlock country or an island. It is believed that an island country holds more advantages on transportation than a landlocked country (Helpman *et al.*, 2008). According to Helpman *et al.* (2008), two variables are usually developed to indicate the country's geographical conditions. The landlocks variable equals one if both the exporting country and importing country have no coastline or direct access to sea, and zero otherwise, and the island variable equals one if both the importing and exporting countries are islands, and zero otherwise.

Furthermore, improvement in infrastructure can reduce logistics costs, thus cutting the costs associated with trade and boosting trade (Bougheas *et al.*, 1999). Based on prior studies, we can define two kinds of infrastructures, communications infrastructure and transportation infrastructure. In terms of communications infrastructure, easy access to information on the market is likely to enable a firm to investigate the market efficiently and to conduct business productively (Anderson and Van Wincoop, 2003; 2004). So the development of communications infrastructure should be positively related to trade flows. Lawless (2010) uses the extent of telephone and computer usage as a proxy for the easiness of information gathering and running a business abroad, and claims to have verified that both measures have significantly positive coefficients regarding exports. Referring to transportation infrastructure, the availability of railways and highways makes it easier for firms to distribute their products (Sheng and Mullen, 2011). Sheng and Mullen (2011) adopt the length of railways and length of roads as the indicators of transportation infrastructure, and present a positive relationship between the level of this infrastructure and international trade. Chi and Kilduff (2010) also develop a rating of a country's infrastructure, including various factors such as roads, telecommunications and business institutions. A higher rating indicates a better infrastructure. It is believed that better infrastructure leads to higher volumes of trade (Chi and Kilduff, 2010).

Costs of processing imports deal with customs inspections, storage and handling at the port and documentation required in the importing country (Lawless, 2010). These three aspects are all directly related to the costs of trade. Hummels (2001) examines the importance of time delays in trading and the associated costs of storage and depreciation, particularly for time-sensitive products such as fresh fruits. The findings suggest that each day saved in transporting manufactured goods is worth 0.8

per cent ad-valorem. Three variables are used to capture the administrative costs of trade: the number of documents that must be filled in to import the container into the country; the average length of time in days it takes for all the technical and customs procedures to be completed; and the cost of all the fees associated with customs clearance and handling at the port excluding taxes or tariffs. All of the three measures are expected to have an inhibiting effect on exports. They all have the expected sign of coefficients in Lawless' (2010) empirical study. Table 3.3 summarises the country specific characteristics that influence trade volumes on country level.

Table 3.3 Summary of Determinants of Trade - Country Specific Characteristics

Factor	Dimension	Proxy	Sign of coefficient	Literature
Economic development		GDP per capita	Positive	Sheng and Mullen, 2011; Kandogan, 2003; Gul and Yasin, 2011; Wu *et al.*, 2012; Filippini and Molini, 2003
		Per capita income	Positive	Huot and Kakinaka, 2007
		PPP	Positive	Chi and Kilduff, 2010
		Electricity consumption per capita	Positive	Sheng and Mullen, 2011
Institutions	Governance environment base type	Rule based	Positive	Wu *et al.*, 2012; North, 1990; North, 2006
		Relation based	Positive	Wu *et al.*, 2012
			Negative	North, 1990; North, 2006
		Family based	Negative	Wu *et al.*, 2012; North, 1990; North, 2006
	Viability of contract	Level of viability of contract	Positive	Egger, 2002; Anderson and Marcouiller, 2002
	Aid for trade in exporting countries	Aid for trade facilitation	Positive	Calì and Velde, 2011
		Aid for trade policy and regulations	Positive	Calì and Velde, 2011
		Aid to economic infrastructure	Positive	Calì and Velde, 2011
		Aid to productivity capacity	Not significant	Calì and Velde, 2011
Trade openness	RTAs	Equals 1 if belong to RTAs, otherwise 0.	Positive	Balassa and Bauwens, 1988; Huot and Kakinaka, 2007; Bergstrand, 1985; Kien, 2009; Papazoglou, 2007; Chi and Kilduff, 2010; Helpman *et al.*, 2008; Sheng and Mullen, 2011; Gul and Yasin, 2011; Ekanayake *et al.*, 2010; Bstos and Silva, 2010; Wu *et al.*, 2012; Baier and Bergstrand, 2007

			Negative	Zhang and Witteloostuijn, 2004; Felbermanyr and Toubal, 2010.
	Tariffs	Annual tariff rate	Negative	Alessandrini *et al.*, 2011; Chi and Kilduff, 2010; Popadopoulos, *et al.*, 2002
	Total trade share in GDP	Total trade share in GDP of importing country	Positive	Gul and Yasin, 2011
			Negative	Hatab *et al.*, 2010
		Total trade share in GDP of exporting country	Positive	Hatab *et al.*, 2010; Gul and Yasin, 2011
Transportation costs	Infrastructure	Telephone and computer usage	Positive	Lawless, 2010
		Length of railway and road	Positive	Sheng and Mullen, 2011
		Country infrastructure rate	Positive	Chi and Kilduff, 2010
	Costs of processing imports		Negative	Lawless, 2010
	Landlocks or island	Landlocks	Negative	Helpman, 2008
		Island	Negative	Helpman, 2008

Table 3.3 presents the literature that deals with the country specific characteristics' influence on trade volume. Trade openness is the most frequently used factor in empirical works, followed by economic development. Transportation costs and institutional factors are relatively less referred to in previous empirical works. This is possibly due to data availability; transportation costs data and institutional factors are not easy to obtain; and some variables are hard to be expressed by numbers, such as government base type and aid for trade. On the contrary, the openness index is easy to get, and many scholars are interested in finding out whether or not signing an agreement promotes trade. Therefore, this study keeps focusing on market openness.

3.1.3 Characteristics of importing and exporting country commonalities and relativities

3.1.3.1 Technology distance

Technological distance is widely considered as an important factor in the determinants of trade (Filippini and Molini, 2003; Ekanayake *et al.*, 2010). It is usually believed that trade is favoured between two countries with similar technology levels, for they have similar productivity and demand (Filippini and Molini, 2003). With a wider technology gap between two countries, it is getting more difficult for one country to fit into the demand pattern or mode of production of the other (Filippini and Molini, 2003). A different view suggests that technological distance may become an incentive for trade (Bell and Pavitt, 1997; Filippini and Molini, 2003). For example, technological gap has been a motivation for many East Asian countries to trade, such as China. They import higher tech products in order to emulate the technology, to reproduce the products at a lower cost and to shift outward the production possibility frontier in a catching up process. Many Asian countries are even able to compete with developed countries in most of the high tech sector now (Bell and Pavitt, 1997). For example, mobile phones, computers and many other electronics appliances, are increasingly produced in China and India based on their accumulation of technological capabilities.

The proxies used most are average of electricity consumption, telephone penetration and internet users, literacy rates, and Balassa's Relative Comparative Advantage Index (Balassa, 1965). Based on Balassa's (1965) standard comparative advantage explanation of trade, Breuss and Egger (1999), Egger (2000, 2002), and Serlenga and Shin (2007) further develope a similarity index to capture the technology differences between countries in explaining trade patterns. The similarity index is denoted by ln of 1 minus square of each country's GDP divided by the sum GDP of two countries, $SIM_{ij}=\ln\ [1-(GDP_i/GDP_i+GDP_j)^2-(\ GDP_j/GDP_i+GDP_j)^2]$. The similarity index variable is expected to be positive. This is due to the fact that countries that are similar in GDP per capita tend to enjoy similar size of country-specific product diversity in differentiated goods sectors, which lead to an increased trade value, as pointed out by Ekanayake *et al.* (2010). Moreover, sometimes this index is also used to proxy for factor endowment differences.

3.1.3.2 Factor endowment difference

As the fundamental of trade, factor endowment differences are vital in determining the trade volume. Traditional international trade theory argues that if each country has a different pattern of factor endowment, each country specialises in the production into which its relatively abundant production factor is used intensively, and then it realises the benefits of international trade (Samuelson, 1949; Mundell, 1957; Wakasugi, 1997). These include natural resource factor, human resource factor, or capital factor. For example, as one of the important human resource factors, literacy is usually adopted as an indicator for the availability of educated or trained workers or industrial professionals (Chi and Kilduff, 2010). A higher differences percentage of literacy means different levels of experienced and skilled labours, and therefore trade flows from the one with higher literacy rates go to the one with lower literacy rates.

Another proxy commonly used to explain factor endowment differences is the income per capita and the size of national income; both of them mainly focus on the capital factor. Balassa and Bauwens (1988) further suggest that the higher the per capita income, the greater the extent of intra-industry trade between any two countries. Some recent studies define the relative factor endowment variable as the absolute value of the difference between natural logarithm of per capita GDPs between two countries (Egger, 2002; Serlenga and Shin, 2007; Kabir and Salim, 2010). Moreover, the trade conformity index (TCI), another commonly adopted indicator for factor endowment differences, is defined as the measure of trade complementarities between two trading countries (Huot and Kakinaka, 2007). Since a higher TCI implies a higher degree of trade structure complementarities and a smaller difference in factor endowment, we would expect a positive coefficient between TCI and trade volume.

However, the fact that countries with a similar industrial structure do more trade in industrial products and more two-way trade in similar goods contradicts the above argument. Studies of Krugman (1981) and Helpman and Krugman (1985) develope a framework, in which attention is paid to the growing international trade within the same industry sector. It is believed that the less the difference in factor endowment between countries, the higher the share of intra-industry trade (Wakasugi, 1997). Furthermore, by examining the Korea’s trade patterns, a significantly positive coefficient of TCI is verified by Sohn (2005). The study of Elliott and Ikemoto (2004) also shows that a significantly positive relationship between trade complementarities and trade volumes by examining ASEAN countries, which supports the hypothesis that when trading countries share similar factor endowments, the trade flows are increased. Huot and Kakinaka (2007) also support a positive relationship between TCI and trade by examining Cambodia and its trading partners. Therefore, what kind of influence posed on trade by factor endowments remains unsolved, and our research tries to answer the question.

3.1.3.3 Cultures and commonatilities

There is a widespread agreement that cultural proximity plays an important role in determining trade flows between countries (Felbermayr and Toubal, 2010). A key issue in internationalisation is the need to adapt to cultural characteristics (Yeniyurt and Townsend, 2003). In general, cultural and language affiliations can facilitate transaction efficiency and effectiveness in an uncertain environment (Rauch, 1999; Wei, 2000). Dow and Karunaratna (2006) argue that large cultural distance between trading patners tends to cause misunderstandings easily, leading to increases in transaction costs. Sheng and Mullen (2011) also suggest that managerial decisions of market selection are strongly influenced by cultural differences, either in exporting (Dow and Karunaratna, 2006) or undertaking FDI (Kogut and Singh, 1988).

Languages, representing informal institutions, are used to measure institutional distance. In specific, language barriers are frequently analysed in gravity models in the previous studies (Sheng and Mullen, 2011), because they represent an important factor influencing market choice for exporting and are considered as a key driving factor of bilateral trade (Chi and Kilduff, 2010). However, as indicated by Dow and Karunaratna (2006), due to the complexity of language barriers constructure, there is no agreed measurement. For example, the commonly used proxy for language commonality is whether two nations share a particular language. It is believed in many studies that sharing the same language tends to increase the efficiency of international trade and decrease the transaction costs (Frenkel, 1997; Glick and Rose, 2002). More specifically, Frenkel (1997) verifies that if two countries share a common language, their trade volumes are approximately 55 per cent more than they would otherwise. Hutchinson (2005) also finds that a shared language increases communication efficiency and trade flows, whereas language barriers decrease trade flows due to higher transaction costs. Lawless (2010) further argues that exports are positively related to a common language when communication infrastructure is well developed.

Institutional similarity, such as political affinities, is another important factor that has effect on international trade (Loungani, 2000). It is extensively argued that simila political regimes increase bilateral trade volumes (Zhang and Witteloostuijn, 2004). De Groot *et al.* (2004) further captures that governance similarity also positively influences the bilateral trade. In general, countries with similar institutional framework tend to trade more than countries with different institutional framework. This is mainly because similarity in institution minimises the costs of learning and adapting to the new rules and regulations, making the business environment friendlier. Study of Li and Samsell (2009) also lends support to the positive relationship between institution similarity and trade volume empirically. They argue that countries with larger differences in the scores of the governance environment index tend to trade less, while the opposite may not withstand because countries with more similar institutions do not necessarily trade more.

Based on the governance environment type, as what we discussed before, the study of Wu *et al.*, (2012) also reveals that countries with similar governance environments tend to trade more with one another, including both rule-based governance environments and relation-based environments. Moreover, the trade volumes between two rule-based governance environments are much larger than that between two relation-based governance environments. Referring to family-based countries, the trade flows are negatively influenced by the governance environment, due to family-based countries' less efficient governnance. That is, trade volumes between two family-based countries are the smallest.

Other culture related commonalities and relativities that strongly influence trade flows include historical bonds, religious differences, common legal systems and common borders. Historical bonds are a crucial part in the study of international trade (Loungani, 2000). Large immigration between the trading countries in history means ethnic linkages could shorten the cultural distance and therefore reduce the communication costs (Zhang and Witteloostuijn, 2004). If one of the trading countries have colonised the other in history, a colonial tie is said to exist. These colonial ties facilitate the communication between trade partners and help promote the international trade (Helpman *et al.*, 2008). Moreover, although rarely included in the foreign market selection literature, religious differences cannot be ignored (Sheng and Mullen, 2011). Religion is a major cause of international conflict and influences the way that people communicate and interact significantly (Dow and Karunaratna, 2006). So it is expected that if trading countries share similar religions, trading costs will be largely decreased. Furthermore, the common legal system also plays important role in determining trade. It is believed that sharing the same legal origin could make the communication much easier and thus reduces the trade risk (Helpman *et al.*, 2008). According to Papazoglou (2007), common borders mean lower costs and easier market access, thus, sharing common borders is positively relating to international trade. The existence of common borders also contributes to information flows (Balassa and Bauwens, 1988). Moreover, Grubel and Lloyd (1975) suggest that intra-industry trade tends to occur when the involving countries share a common border; this is especially true for the products that are functionally homogeneous but differentiated by location. Therefore, the volume of intra-industry trade between countries that share a common border is much greater than trade between countries that are far away (Balassa and Bauwens, 1988).

3.1.3.4 Exchange rates

Exchange rates influence trade volumes directly, and the effects consist of the exchange rate itself and exchange rate volatility. Since the advent of the current floating exchange rate regime, many developing countries prefer to peg their exchange rates to one major currency or a basket of currencies. However, Bahmani-Oskooee (1984) argues that, major currencies float against one another, which cause the effective exchange rate that facing developing countries to fluctuate, consequently affecting trade flows (Bahmani-Oskooee, 1986). It is believed that the appreciation of the importer's currency increases the trade flow from exporter to importer; if the currency of exporter is appreciated, the trade flow will decreased, and *vice versa* (Bergstrand, 1985; Kien, 2009; Gul and Yasin, 2011).

The impacts exerted on trade by exchange rate volatility have been extensively dicussed both theoretically and empirically (Frankel, 1991; Arize *et al.*, 2000; Huot and Kakinaka, 2007; Gullstrand, 2011). However, the analytical results remain controversial. Theoretically, exchange rate fluctuation would depress trade due to that it increases the risk and uncertainty of international trade and reduces the potential profits of trading. On the contrary, some other studies suggest that trade is encouraged by exchange rate volatility, such as De Grauwe (1988) and Frankel (1991). Additionaly, empirical evidence on the relationship between exchange rate volatility and trade is not uniform either. For example, studies of Arize *et al.* (2000), Huot and Kakinaka (2007) and Gullstrand (2011) all indicate a negative relationship between exchange rate volatility and trade, while Bahmani-Oskooee and Payesteh (1993) and Aristotelous (2001) argue that exchange rate volatility exerts no significant effects on international trade. Table 3.4 summarises the characteristics of importing and exporting country commonalities and relativities that determine trade.

Table 3.4 Summary of Determinants of Trade - Characteristics of Importing and Exporting Country Commonalities and Relativities

Factor	Dimension	Proxy	Sign of coefficient	Literature
Technology distance		Relative Comparative Advantage Index	Positive	Filippini and Molini, 2003
			Negative	Wakasugi, 1997
		Similarity index	Positive	Ekanayake *et al.*, 2010
			Negative	Egger, 2002
Factor endowment difference	Capital endowment difference	Per capita income	Negative	Balassa and Bauwens, 1988; Wakasugi, 1997; Filippini and Molini, 2003
	Human resource	literacy	Positive	Chi and Kilduff, 2010
	Natural resource	Trade conformity index	Positive	Huot and Kakinaka, 2007; Sohn, 2005; Elliott and Ikemoto, 2004
Cultures and commonalities	Common language		Positive	Lawless, 2010; Kandogan, 2003; Balassa and Bauwens, 1988; Egger, 2002; Kien, 2009; Hatab *et al.*, 2010; Chi and Kilduff, 2010; Helpman *et al.*, 2008; Sheng and Mullen, 2011; Gul and Yasin, 2011; Ekanayake *et al.*, 2010; Wu *et al.*, 2012; Baier and Bergstrand, 2007; Soloaga and Winters, 2001
	Common legal system		Positive	Helpman *et al.*, 2008; Felbermayr and Toubal, 2010
	Common religion		Positive	Helpman *et al.*, 2008; Sheng and Mullen, 2011; Felbermayr and Toubal, 2010; Wu *et al.*, 2012
	Common border		Positive	Balassa and Bauwens, 1988; Egger, 2002; Papazoglou, 2007; Hatab *et al.*, 2010; Helpman *et al.*, 2008; Ekanayake *et al.*, 2010; Wu *et al.*, 2012; Baier and Bergstrand, 2007

			Negative	Gul and Yasin, 2011
	Institutional similarities		Positive	Zhang and Witteloostuijn, 2004; Li and Samsell, 2009; Wu *et al.*, 2012; De Groot *et al.*, 2004
	Historical bonds		Positive	Helpman *et al.*, 2008; Tansay and Touray, 2010; Ekanayake *et al.*, 2010; Zhang and Witteloostuijn, 2004
			Negative	Wu *et al.*, 2012
Exchange rate	Relative exchane rate		Positive	Bergstrand, 1985; Kien, 2009; Hatab *et al.*, 2010; Gul and Yasin, 2011; Gullstrand, 2011
			Negative	Bahmani-Oskooee, 1986; Egger, 2002;
	Exchange rate volatility	Ratio of the difference between the highest and the lowest rate to the average rate	Negative	Huot and Kakinaka, 2007; Gullstrand, 2011

Table 3.4 summarises the characteristics of exporting and importing countries' commonalities and relativities that influence trade volumes. It is easy to find that cultural differences are the most examined factors in previous studies. However, technology distance and factor endowment are not examined as much as cultural differences, although the former are the fundamental and driving force of international trade. In this research, we will focus more on technology distance and factor endowment difference, aiming at finding out how these two factors affect trade, FDI, and trade and FDI relationship.

3.1.3.5 Effect of FDI

It is widely accepted that FDI is closely related to international trade (Prime, 2012). As the activities are undertaken by MNCs, FDI has distinctive impacts on the structure of international trade, of both exporting and importing countries (Dunning, 1993; Sheng and Mullen, 2011). However, the effect posed on trade by FDI remains a controversial issue in international economics and business literature. The traditional international trade theory, which is based on factor endowment differences, supports both a positive and a negative relationship between trade flows and FDI subject to different circumstances. On the one hand, when the main motivation of FDI is resource outsouring, such kind of FDI tends to cause an increase in home countries' machinery and intermediate goods exports (Brenton *et al.*, 1999). On the other hand, when the motivation of FDI is to serve the importing country, FDI and trade are substitutes of each other (Root, 1994), because products are introduced to importing countries by direct invest rather than trade. In another word, market-seeking FDI may substitute for the import of host countries, whilst factor-seeking investment may increase exports from to host countries.

Summarising the effect posed on trade by FDI in the previous literature, we conclude that the relationship betweent trade and FDI largely depends on following aspects: (a) the types and motivations of FDI; (b) the nature of the internationalisation strategies of MNCs; and (c) the characteristics of the industries and countries involved. In accordance with expectations, the evidence in previous empirical studies is inclusive. A number of studies confirm that trade and FDI are complementary activities. For instance, Zhang and Witteloostuijn's (2004) empirical study of China reveals that FDI flows strongly impose positive influence on the total trade volume. Wei *et al.* (1999) further point out that a complementay relationship between outward FDI and export is especially true in the case of the developed world. For example, Eaton and Tamura (1994) find that the outward FDI and exports are significantly positively related with each other by analysing the case of the US and Japan. Brenton *et al.* (1999) claim that the positive relationship between bilateral FDI and trade is dominant while the substitute effects posed on trade by FDI is relatively small. Sheng and Mullen (2011) further hypothesise that the relationship between export and FDI outflow is significantly postive. However, their empirical analysis has finally proven a negative relationship. A brief summary table of FDI effects on trade is presented below.

Table 3.5 Summary of Determinants of Trade - FDI Effects on Trade

Literatures	Country involved	Sign of coefficient
Wakasugi, 1997	Japan	Positive
Sheng and Mullen, 2011	US	Negative
Kandogan, 2003	Transition countries	Positive
Zhang and Witteloostuijn, 2004	China	Positive

Table 3.5 presents four typical research settings to study the FDI effects on trade. Two of them research on developed countries (Wakasugi, 1997; Sheng and Mullen, 2010) while the other two (Kandogan, 2003; Zhang and Witteloostuijn, 2004) choose developing countries as the research object. However, Wakasugi's (1997) analysis uses the late 1980s and early 1990s data, by then, Japan is not that developed. Therefore, we could also treat the study of Wakasugi as the developing economy one. Thus, we find that FDI of developed countries tends to sustitute trade while FDI of developing countries tends to complement trade. This research further examines the relationship between trade and FDI based on the development level of participating countries.

3.2 Determinants of FDI

Review of the literature on determinants of FDI is important in identifying and characterizing the relationship between trade and FDI. MNCs' choice of conducting FDI is based on different motives contributed by diverse elements, which constitute the determinants of FDI. Since the goals of various types of FDI are dissimilar, the market they choose to serve and the objective they attempt to achieve change accordingly. Therefore the relationships between trade and FDI also vary with the motives and determinants of FDI.

Empirical studies on the determinants of FDI fall into three categories. The first kinds of studies mainly focus on the core factors influencing the decision to invest in a particular country or an industry. Such an approach is more micro-oriented, relying on firm level data and sometimes interviews and surveys. However, the decision-making process behind any FDI is often very complex and time consuming and involves many different personalities. Therefor, it is hard to rank the various factors of influence according to their importance.The works of Buckley *et al.* (2007c) fall into this group. However, this research is conducted at macro-level; therefore, this kind of research is not covered in this study.

The second type of research is more macro-oriented. These kind of studies rely on published data about one country in relation to various countries abroad or in particular industries. They seek to establish a functional relationship between FDI and possible determinants, including the writing of Scaperlanda (1967) on the effects of tariffs and customs unions, the study of Doytch and Eren (2012) on institutional environment, and the paper of Cavallari and D' Addona (2013) on exchange rate volatility. In the following session, factors that determine FDI are discussed in detail, and compared with those that determine trade.

The third kind of research seeks to explain why FDI is preferred to other forms of investment based on different decisions of resource allocations. For example, what is the cost of foreign investment in terms of forgone investment opportunities at home? Second, why should it take the form of direct rather than portfolio investment? Third, why should direct investment be conducted in certain mode such as exports or licensing agreements? The works of Nagano (2013) and De Jesus Noguera and Pecchenino (2011) belong to this category, seeking to find out why firms conduct FDI and what form of FDI should be undertaken. This study is more related to the third kind of concern, namely why some MNCs choose export while the others prefer FDI. However, a general assumption behind these works is that FDI and export are substitute, which requires further discussion to be presented in Chapter 4.

Among studies of different foci, approaches and results, two main streams of factors are identified; one is firm-specific and the other country-specific. The first types of factors are endogenous factors, including technology advance, R&D intensity, advertising intensity and other micro-specific factors, which motivate MNCs to undertake FDI. The second kinds of elements are exogenous country level or industry level data. According to Dunning (1994) and Bitzenis *et al.* (2009), countries' abilities to attract and exploit the potential economic benefits of inward FDI relate to their institutions, cultures, and infrastructures, together with the economic and political objectives pursued by host governments. For the objectives of this research, exogenous country level and industry level factors are focused, as summarised in Table 3.6.

Table 3.6 Summary of Determinants of FDI

Group	Factor	Dimension
Country specific characteristics	Market size	GDP
	Institutions	Political risk
		Government Corruption
		Protection for property rights
	Physical infrastructure	
	Nature resource endowment	
	Technology	
	Taxes	
	Market openness	Openness to FDI
		Openness to international trade
		Regional Integration
	Inflation rate	
Factors involved both home and host country	Development distance	Income distance
	Geographical distance	
	Institutional difference	
	Cultural distance	
	Relative borrowing costs	Interest rates
	Relative labour costs	
	Exchange rate	Relative exchange rate
		Exchange rate volatility
Bilateral trade effect		

3.2.1 Country specific characteristics and FDI

Country specific characteristics are widely accepted as the main determinants of FDI, especially the factors related to the host country market, are the most examined factors regarding their influence on FDI location decisions (Doytch and Eren, 2012; Kang and Jiang, 2012; Omanwa, 2013; Cavallari and D' Addona, 2013). It is generally believed that characteristics of host markets are major driving factors of FDI flows (UNCTAD, 1998). However, fewer studies focused on home country characteristics. Therefore, the following discussed country specific characteristics are mostly concentrated on the characteristics of the host country. The country specific characteristics of the home country will be specifically singled out.

3.2.1.1 Market size

Market size is consistently considered by empirical research as a driver of MNCs' FDI decision (Flores and Aguilera, 2007; Omanwa, 2013). The larger the host market size, which means higher degree of development, the better the prospects for market growth. Moreover, the greater the prospects for market growth, the more attractive a market is, and the larger the volume of FDI (Bhaumik and Co, 2011). This is primarily because, when conducting FDI in countries with large markets, MNCs are able to exploit their ownership advantages, efficiently utilise resources and easily benefit from economies of scale (Scaperlanda and Mauer, 1969; Cuyvers *et al.*, 2011). Wei and Liu (2001) further augue that inward FDI is a function of the market size of FDI recipient countries. This is especially true if the corresponding outward FDI is for seeking market (Bhaumik and Co, 2011). The study of Buckley *et al.* (2007a) also verifies the importance of market size in determining FDI flows.

Many studies support a positive relationship between host country market size and FDI, arising from large potential demand and low costs by economies of scale (Kravis and Lipsey, 1982; Nigh, 1985; Culem, 1988; Contrator, 1991; Loree and Guisinger, 1995; Sethi *et al.*, 2003; Bevan and Estrin, 2004). With the arising of Chinese MNCs, numerous recent studies, including Taylor (2002), Deng (2004), Buckley *et al.*, (2007b, 2008), Kolstad and Wiig (2012) examine China's outward FDI, and reveal that Chinese outward FDI is driven by market size. Kang and Jiang (2012) also indicate that increased competitive pressures in the home market motivate Chinese firms to explore new markets and brands, thus leading to an increase in Chinese market-seeking outward FDI. Accordingly when a Chinese firm decides to enter new markets through FDI, the market size and economic growth of the host market are relevant issues of concern.

The GDP of a host economy is the most widely employed variable for market size in empirical studies of FDI (Venables, 1999; Bilgili *et al.*, 2012). Market size, usually indicated by GDP, GNP, GDP per capita, or GNP per capita, is significantly positively associated with FDI (Grosse and Trevino, 1996; Wei and Liu, 2001; Cuyver *et al.*, 2011; Bilgili *et al.*, 2012). In addition, the economic growth rate is also utilised as an indicator for market size and is believed to be positively related with inward FDI (Kang and Jiang, 2012). This is mainly because that countries with fast economic development, offer more profit-making opportunites for MNCs than those countreis with a slow or stagnant economic growth. Furthermore, rapid economic growth means a higher level of future potential aggregate demand for product, such as China, thus, greater demand for FDI inflows are stimulated.

Moreover, larger economies also imply greater availability of capital resources and intangible assets such as technical knowledge and marketing expertise that can be utilised to establish foreign affiliation to meet consumer demand in a target country (Kimino *et al.*, 2007). Moreover, affluent countries with numerous competitive multinational entrepreneurs should be able to make larger and more effective investments in the foreign market (Kimino *et al.*, 2007). So a positive linkage between home country market size and FDI is expected. Nevertheless, the evidence is rather mixed. Stone and Jeon (1999) show a significant and positive effect of GDP on FDI flows based on the case of Asia-Pacific economies. Grosse and Trevino (1996) present a significantly positive relationship as well based on the case of the US and its partner countries. On the contrary, the research of Kyrkilis and Pantelidis (2003) and Cuyver *et al.* (2011) argue that the market size of the home country poses a significantly negative effect on FDI flows. Therefore, this study explores the market size and its effect on FDI and trade in the context of China, focusing more on the home countries' market size, aiming to offer an explantion for the relationship between home country market size and FDI flows.

3.2.1.2 Institutions

It is widely accepted that the quality of institutions is an important country level determinant of FDI activity (Flores and Aguilera, 2007), particularly for developing countries (Blonigen, 2005). In developed countries, effective property rights protection ensures that the owner of an asset 'has the discretion over the uses to which the asset is put and is able to appropriate returns from the asset' (Delios and Beamish, 1999:919). On the contrary, a weak legal protection of property rights, which is often perceived in transition economies (Dikova and Witteloostuijn, 2007), increases the chance of losing assets, and makes firms unlikely to undertake investment in the transition economy (Blonigen, 2005). Institutional environment in the host country is served as kinds of rules for the investing game, and all the organisational activity is bounded by these rules (North, 1990). So a well regulated institutional environment, which is less repressive and shows less constraint to FDI and can reduce the costs of doing business, becomes crucial when a firm is making decision whether or not to enter the certain market. Many empirical studies (Grosse and Trevino, 2005; Pajunen, 2008) confirm that high quality institutions of host countries exert a significant impact on FDI inflows. Institutions that are attractive to FDI from MNCs usully consist of stable economic policy, less ownership restriction, effective property rights, and non-corrupt bureaucracy.

Political risk of the host country is a crucial institutional variable in demonstrating the changes in FDI flows (Bilgili, *et al.*, 2012). It is widely acknowleged that a friendly overall investment environment in the host country directly influences its ability to attract FDI (Omanwa, 2013). According to internalisation theory, in countries experiencing high political risk, market-oriented firms tend to substitute arm's length servicing modes (exporting or licensing) for directly owned local production, and resource-oriented firms are discouraged from committing substantial sunk costs in the form of FDI projects (Buckley and Casson, 1981, 1999; Buckley, *et al.*, 2007b). Therefore, in general, high political risk is linked with small flows of inward FDI, while low political risk leads to a higher volume of inward FDI (Chakrabarti, 2001). Nevertheless, preivous empirical studies produce inconclusive analytical results. The studies of Asiedu (2002), Noorbakhsh *et al.* (2001), Wheeler and Mody (1992), Li and Resnick (2003) and Sethi *et al.* (2003) reveal that there exists no significant relationship between political stability of host countries and FDI flows, while research of Jun and Singh (1996) indicates a positively significant relationship between the political stability of host countries and FDI inflows. Moreover, the case of the US, a typically developed country, also supports a siginicantly positive linkage between political stability of host countries and FDI flows (Loree and Guisinger, 1995). Similarly, the positive effects of political stability posed on FDI are also observed in developing economies. Studies of Carstensen and Toubal (2004) and Janicki and Wunnava (2004) both demonstrate that political stability strongly influences the FDI location decisions by examing the data set of Central and Eastern Europe.

However, China's outward FDI shows different patterns. Buckley *et al.* (2007b) claim that Chinese outward FDI is negatively associated with the political stability of host countries. Voss *et al.* (2009) indicate that because Chinese MNCs are able to gain a strong support from domestic institutions, they tend to exploit opportunities in countries where their counterparts from developed countries may regard as too risky (Buckley *et al.*, 2007b, 2008). In this sense, the unique political and institutional environment of China may act as a kind of ownership advantage possessed by their MNCs (Kang and Jiang, 2012). Therefore, Chinese MNCs tend to disregard political risks in the host countries in their attempt to catch up with MNCs from developed countries (Ge and Ding, 2009). The study of Ramasamy *et al.* (2012) on China's outward FDI for the period of 2006-2008 supports these arguments as well. Child and Rodrigues (2005) argue that Chinese firms face a smaller liability of foreignness in such opaque political environment. Some other recent studies fail to provide significant linkages between outward FDI and an unstable political environment (Kolstad and Wiig, 2009).

Empirical studies that analyse the effect of home country risk on FDI are extremely limited and lack solid empirical evidence (Kimino *et al.*, 2007). The work of Noorbakhsh *et al.* (2001) is one of the studies that pay attention to the significance of political risk of the home country. They point out that the explanation for FDI flows should be linked with certain political and economic events of home countries rather than those of host countries. Additionally, in a study of the US and its major industrialised partner countries during the period of 1974 to 1980, Tallman (1988) points out that FDI is attracted to flow into countries with a relatively stable political environment, such as the US, when the home country experiences fierce domestic conflicts and provides a poorer business climate and a risky political environment. However, between developed economies, the impacts of political risk exerted on FDI are ambiguous (Kimino *et al.*, 2007). In addition, by examining the determinants of Mexico inward FDI, Thomas and Grosse (2001) demonstrate that Mexico's FDI inflows are not nesseccarily influenced by the home countries' attitudes toward political risk.

Corrupt bureaucracy is another vital aspect of institutional environment. Inspired by the large volume of inward FDI and high level of government corruption of China, Wei's papers (2000a; 2000b) show a variety of corruption indexes, indicating that those indexes are signicantly negatively associated with FDI, while the study of Wheeler and Mody (1992) provide no support for such correlation.

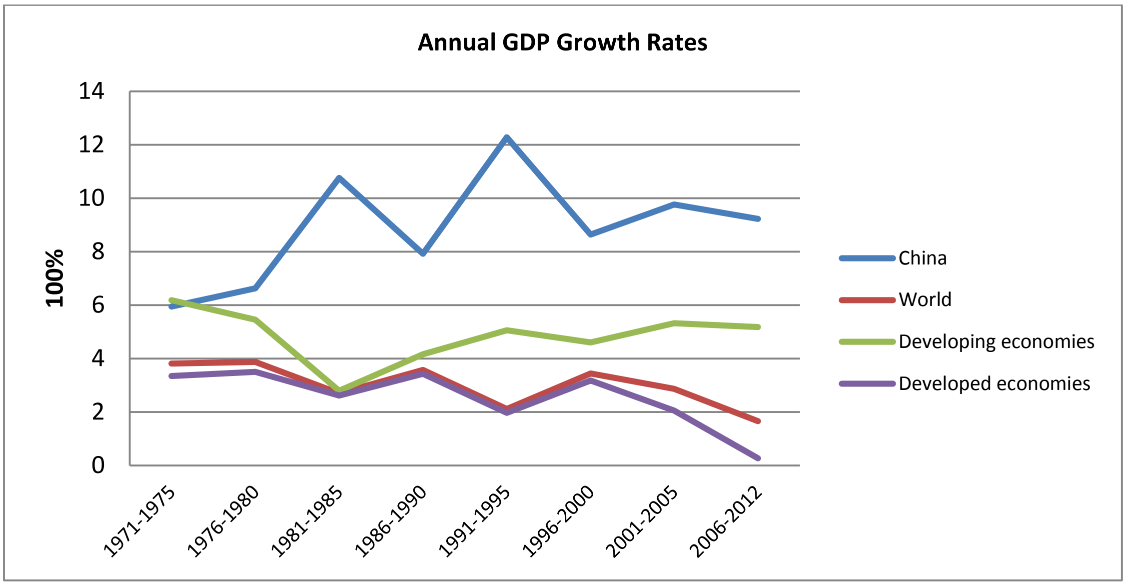
The measurements of institutional environments are quite complex. Mostly used measurements are a composite of a country's legal, political and economic institutions. For example, the World Bank's Governance Indicators provide a score on items such as *voice and accountability* (measuring political, civil and human rights), *government effectiveness* (measuring the competence of the bureaucracy and the quality of public service delivery), *rule of law* (measuring the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence), *regulatory quality* (measuring the incidence of market-unfriendly policies), and *corruption control* (measuring the exercise of public power for private gain). The composite measure ranges from -2.5 to 2.5, with higher scores corresponding to higher institutional advancement. Dikova and Witteloostuijn (2007), and Kaufmann, Kraay and Mastruzzi (2005) have both utilised this index in their analysis and revealed a significant positive relationship between regulative institutions and FDI flows.

3.2.1.3 Physical infrastructure

Several studies (Loree and Guisinger, 1995; Cheng and Kwan, 2000; Asiedu, 2002) point out the essential impact of available physical infrastructure in the host country on FDI decision making. Physical infrastructure is an overarching construct that captures the availability and quality of infrastructure such as roads, airports, ports, and telephone lines (Asiedu, 2002; Flores and Aguilera, 2007). Previous empirical studies demonstrate that this overarching construct significantly affects MNCs' decisions with the expected costs of operations in host countries, the costs of acquiring and moving raw and finished materials between the MNCs' headquarters and affiliates (Loree and Guisinger, 1995).

3.2.1.4 Natural resource endowment of the host country

Chart 3.1 Annual GDP Growth Rates



Data source: UNCTAD database: http://unctadstat.unctad.org/TableViewer/tableView.aspx?ReportId=109. Data accessed in August, 2013.

According to Dunning (1993), acquiring natural resource is one of the major motives for resource-seeking FDI. It is not a surprise that MNCs from both developed and developing countries are attracted to countries with abundant natural resource endowments. Many studies (Deng, 2004; Buckley, *et al.*, 2007; Ramasamy *et al.*, 2012; Kang and Jiang, 2012) examine the outward FDI of China, and point out that natural resource exploitation is the key factor that determines the orientation of Chinese outward FDI. It is because China has been growing at a double digits pace for more than a decade, even nowadays, it still keeps a much higher growth rate than any other countries (See Chart 3.1). It is no wonder that such an enormous country's rapid growth requires plenty of cheap and easily accessible natural resources to sustain the growth. The fact that China seriously lacks natural resources is without doubt (Ramasamy *et al.*, 2012). As per capita availability of natural resources is low in China, acquiring cheap and high quality natural resources to support the phenomenonal growth is set as the key considerations for Chinese outward FDI (Kang and Jiang, 2012), especially in the areas of petroleum, minerals, fishery, timber and agriculture products (Wu and Sia, 2002).

Subsequently, Buckley and Casson (1976) have emphasised the importance of equity-based control in the exploitation of scarce natural resources. A number of resource-based Chinese overseas acquisitions are driven by resource-seeking (Deng, 2004). Such instances include China International Trust and Investment Corporation's (CITIC) purchase of the stakes of Australian mineral and food companies, and the acquisitions of Canada-based PetroKaz by China National Petroleum Corporation (CNPC) (Wu and Sia, 2002). Therefore, natural resource endowments of host countries are expected to be positively associated with FDI flows. Kolstad and Wiig's (2012) study supports the positive relationship as well. They examine the outward FDI of China and reveal that natural resources are the driving factors of FDI to non-OECD countries. The positive coefficient of the resources variable suggests that Chinese FDI is induced to flow to countries with abundant natural resources. Moreover, in other countries, such as Turkey, the energy price is also found to be a prominent factor in the FDI function (Bilgili, Tülüce and Doğan, 2012). Therefore, this study also takes natural resource factor endowment as a very important factor that strongly influences FDI and trade.

3.2.1.5 Technology

The level of technological development is an essential driving factor of FDI (Dunning, 1993). MNCs from high-tech industries tend to penetrate foregin markets to gain market share, take advantage of scale economies, and spread their cost of R&D investments (Harris and Ravenscraft, 1991). MNCs can also transfer and share their advanced technologies, skills and knowledge with indigenous corporations through foreign entry, with the hope of gaining excess profits (Tihanyi and Roath, 2002). In most empirical studies, technology level is often proxied by the ratio of R&D expenditure to total sales (Hennart and Park, 1993; Cho and Padmanabhan, 1995).

It is widely believed in recent studies that technology is one of the major forces that drive Chinese firms to conduct FDI (Deng, 2007; Buckley *et al.*, 2008; Kang and Jiang, 2012). However, they have offered varied explanations to why and how technology drives Chinese MNCs' FDI. Deng (2007), Buckley *et al.* (2008) and Kang and Jiang (2012) all argue that Chinese firms are asset-seeking. Their activities are motivated by acquiring strategy assets from mature MNCs from developed countries to compensate their competitive disadvantages. These strategy assets include proprietary technology, product brands, management know-how, and distribution networks. By conducting FDI, Chinese fims achieve the goal of meeting the strategic need to compete at a global level. Therefore, Chinese firms are more likely to be attacted to countries that have more strategic assets.

In addition, an inefficient legal framework in the home country may push a firm to pursue better environment for innovation in particular (Khanna and Palepu, 2006). Deng (2009) shows how Chinese firms have to adopt an imitator strategy and focus on low end products due to various obstacles in innovation. In other words, a weak local factor market and limited firms' capabilities push the firm to undertake FDI abroad, particularly through M&As (Ramasamy *et al.*, 2012). In addition, the increasing competition imposed on these Chinese firms by their foreign counterparts forces these indigenous firms to look for an option that could improve the ownership advantage that is far less time consuming, Rui and Yip suggest (2008). They further contend that firm specific advantages gained through M&A are additionally complemented by other competitive advantages already established at home, for instance, a low cost manufacturing base and an abundance of experience in low income markets. These arguments imply that Chinese firms would seek to locate their investments in industrialised countries (Deng, 2007).

3.2.1.6 Taxes

Taxes of the host country are considered as one of possible determinants of FDI (Bilgili *et al.*, 2012). An obvious reason is that FDI is reluctant to move to countries with higher levels of tax, since taxes are a cost factor that reduces profitability. This indicates why policy makers try to reduce taxes to attract inward FDI (Aqeel and Nishat, 2005). Hartman (1984; 1985) is among the earliest to debate the issue, followed by Scholes and Wolfson (1990), Swenson (1994), De Mooij and Ederveen (2003). Hartman (1984; 1985) hypotheses that on the one hand, earnings by an affiliate in the foreign country are ultimately subjected to home and host country taxs regardless of whether the earnings are repatriated to the home country or reinvested in the foreign affiliate. There is no way to ultimately avoid foreign taxes on these earnings (Blonigen, 2005). On the other hand, new investment decisions consider transferring new capital from the home country to the affiliate that does not originate from the host country and, thus, has not yet incurred any foreign taxes. His findings reveal that retained earnings of FDI responds significantly to the host country tax rate. Transfer FDI, however, does not respond significantly to host country tax rates.

However, emprical findings for the above argument are rather mixed. Some of them, especially those focus on how the tax reform in 1986 affect inward FDI of the US, confirm a negative response of FDI to tax rates (Slemorod, 1990; Kemsley, 1998). Others, such as Scholes and Wolfson (1990), show that the volume of US FDI has been increased since the tax reform in 1986. Swenson (1994) supports their idea that FDI does indeed increase with greater average tax rates, by examining the industry level panel data. Some other empirical works, however, find no statistical significance of taxes on FDI as shown in Wheeler and Mody (1992) and Porcano and Price (1996). Furthermore, Swenson (1994) even reaches the result that FDI is affected positively by tax rates.

3.2.1.7 Market openness

Market openness consists of openness to FDI, openness to trade, and regional integration. The more open a country is to international investment, the more likely a country is a destination for FDI (Chakrabarti, 2001). Kravis and Lipsey (1982), Culem (1988), Pistoresi (2000) and Aqeel and Nishat (2005) all consider openness to FDI in an economy a potential independent variable to explain FDI inflows. Whereas Schmitz and Bieri (1972), Wheeler and Mody (1992) find no significant correlation between FDI and openness (Bilgili *et al.*, 2012).

The impacts of trade openness in host countries on inward FDI are extensively discussed in previous empirical studies, and remain a controversial question (Tolentino, 2010). International business theory claims that FDI is attracted to the host countries that are easily fit into the global production patterns and trade patterns (Vernon, 1966). Some studies (Kravis and Lipsey, 1982; Culem, 1988; Edwards, 1990; Pantelidis and Kyrkilis, 2005) also provide strong support to the positive relationship between trade openness and FDI. It is alleged that higher levels of trade barriers increase the trade costs and reduce the likeness of trading. Therefore, in order to enter foreign markets, FDI is encouraged in order to avoid the tariff, which is tariff-jumping FDI. Taking China for example, Chinese market-seeking FDI is significantly influenced by the host countries' market openness (Kang and Jiang, 2012). This is mainly due to the rise of tariff and non-tariff trade barriers. Those barriers, such as export quotas and other ‘anti-dumping’ measures against Chinese exporters, increase the difficulty of trading and thereby stimulate Chinese enterprises to establish foreign affiliates to ensure their access to foreign markets (Taylor, 2002; UNCTAD, 2003). In most circumstances, this kind of tariff-jumping FDI undertaken by China is aiming at serving the foreign market of the US and EU countries, although the FDI may not flow into the US or OECD countries directly. Therefore, Chinese outward FDI tends to be attracted to the countries that are widely open and can be served as an exporting springboard. Meanwhile, some other empirical works show a weak linkage between them. For instance, Wei and Zhu (2007) and Chakrabarti (2000) find that openness to international trade is not a significant driving factor of outward FDI.

Referring to the openness to international trade, there are mainly two kinds of indicators or proxies commonly discussed in empirical studies. One of the commonly utilised proxies is the ratio of exports plus imports to GDP. Trade protection or tariff level is another indicator in empirical studies of FDI determinants. However, there are only limited studies that specifically examine ther relationship between FDI flows and trade protection or tariff levels, which can be contributed to the lack of theoretical grounds, and difficulites in obtaining data. This is especially true when referring to the non-tariff forms of trade protection, due to its hardness of quantifying the non-tariff forms of protection in a consistent function across industries. Many firm-level studies have controlled for various trade protection programmes, using industry-level measures. But they often produce mixed results, as in Kogut and Chang (1996) and Blonigen (1997).

The importance of regional economic integration in the determination of FDI is recorded by Cuyver *et al.* (2011). However, there are no agreed explanations to this question. Some studies argue that, with regional integration, the increase of market size makes it more profitable for MNCs to invest in the enlarged area, therefore attracts more inward FDI flows (Cuyver *et al.*, 2011). Moreover, according to Blomström and Kokko (1997), regional economic integration not only brings forward economic benefits for the integrating countries and promotes investment in a short time period; in the long run, the whole regions’ economic growth is also increased, including all the participating countries, due to the larger market size, stronger competitions, more efficient resource allocation, more specialised labour division, and various positive externalities. Therefore, because of the increasing market size and fast economic development, the integrated region becomes more attractive to FDI from outside the integrated region. Thus, regional economic integration leads to the incease of FDI inflows. In addition, the study of Balasubramanyam *et al.* (2002) indicates that the regional investment agreements lead to an autonomous expansion in FDI between the member countries.

However, some other studies believe that, with the RTAs existing, inter region FDI substitutes exports (Brainard, 1997; Markusen and Venables, 2000). Donnenfeld (2003) develops a model showing that a firm utterly transfers its inter-regional trade when it has the option to invest into non-RTA countries, which implicates that an MNC pursues a regional strategy in trade and a global strategy in FDI. Nevertheless, Neary (2007) predicts a complementary relationship between exports and FDI inside the region by focusing on the incentives for lower-cost MNCs to acquire foreign, higher-cost MNCs after a liberalisation programme in the host country. As pointed out by Fratianni and Oh (2009), MNCs can pursue several alternative strategies in a world interlaced with RTAs. For instance, it can be global in the sense that it operates in more than one RTA market; or it can be regional that it only undertakes activities inside certain RTA market without a domestic focus.

Kreinin and Plummer (2008) draw a conclusion that the relationship between regional integration and FDI is not clear-cut. From one angle, the existence of RTAs leads to an increase in FDI flows into a member state. From another angle, RTAs cause a decrease in FDI outflows from partner countries in the preferential trading agreement. Their empirical findings support both positive and negative impacts on FDI exerted by regional integration, and prove that the existence of RTAs complements FDI as well as substitues FDI. The most frequently used indicator is RTAs membership.

3.2.1.8 Inflation

According to Buckley *et al.* (2007b), market-seeking FDI is unattractive to countries with unpredictable and volatile inflation rates. This is because the high rates of inflation add uncertainly to the investments, such as making price-setting difficult and increasing the difficulties in anticipating the profit, causing problems to the long-term coorperation. Moreover, the domestic currency also devaluated by high rates of inflation, which reduces the real value of profits for market-seeking MNCs in turn when using the local currency. Moreover, due to the high rates of inflation, the costs of local source input also increase, which make the investment less profitable, or even make it more difficult to maintain a cost advantage in third makets for MNCs. Thereby, high inflation discourages export-oriented FDI. A summary of country specific determinants of FDI is presented in Table 3.7.

Table 3.7 Summary of Determinants of FDI - Country Specific Characteristics

Factor	Dimension	Proxy		Sign of coefficient	Literature
Market size		GDP	Host country	Positive	Kolstad and Wiig, 2012; Kang and Jiang, 2012; Bhaumik and Co, 2011; Buckley *et al.*, 2007b; Duanmu, 2012; Flores and Aguilera, 2007
				Negative	Ramasamy *et al.*, 2012
			Home country	Positive	Kimino *et al.*, 2007
				Negative	Cuvyer *et al.*, 2011
		GDP annual growth rate		Positive	Ramasamy *et al.*, 2012; Kang and Jiang, 2012
				Negative	Kang and Jiang, 2012
		Population		Positive	Ramasamy *et al.*, 2012; Flores and Aguilera, 2007
		Ration of home country to host country GDP		Negative	Wint and Williams, 2002; Wei, 2005
Institutions	Political risk	Political stability annual indicators		Negative	Ramasamy *et al.*, 2012; Buckley et *al.*, 2007b;
				Positive	Kimino *et al.*, 2007
		Standard deviation of per capita real GDP growth rates		Positive	Bhaumik and Co, 2011
		Ratio of home country's annual country risk ratings to that of host country		Positive	Wei, 2005; Cuyver *et al.*, 2011; Kimino *et al.*, 2007

	Government environment	Governance indicators		Positive	Kolstad and Wiig, 2012
				Negative	Kolstad and Wiig, 2012
		Political and legal regulative regime	Host country	Positive	Kang and Jiang, 2012; Flores and Aguilera, 2007
				Negative	Kang and Jiang, 2012
			Home country	Positive	Kang and Jiang, 2012
		Corruption index		Negative	Bhaumik and Co, 2011
		Quality of political rights		Positive	Bhaumik and Co, 2011
Physical infrastructure		Total number of phone lines		Positive	Flores and Aguilera, 2007; Asiedu, 2002
Nature resource endowment		The share of energy and non-energy minerals in host exports		Positive	Bhaumik and Co, 2011
		Proportion of host country's exports of ore and minerals of all exports		Positive	Ramasamy *et al.*, 2012; Kang and Jiang, 2012; Buckley *et al.*, 2007b
				Negative	Buckley *et al.*, 2007b; Kang and Jiang, 2012; Duanmu, 2012
		Fuels, ores and metals exports as share of GDP		Positive	Kolstad and Wiig, 2012
Technology		Annual number of patents registered in host countries		Positive	Buckley *et al.*, 2007b
				Negative	Ramasamy *et al.*, 2012;
		Proportion of high technology exports to total exports of the host countries		Positive	Ramasamy *et al.*, 2012
Taxes				Positive	Bilgili, *et al.*, 2012

Market openness	Openness to FDI	Ratio of inward FDI to GDP in host	Positive	Buckley *et al.*, 2007b
		Restriction to FDI	Positive	Kang and Jiang, 2007
		Annually assigned bilateral investment treaties	Positive	Wei, 2005
	Openness to international trade	Ratio of export to total trade	Positive	Kang and Jiang, 2012
			Negative	Kang and Jiang, 2012
	Regional integration	Belong to common RTAs	Negative	Cuyver *et al.*, 2011
Inflation rate		Annual inflation rates	Positive	Kang and Jiang, 2012; Buckley *et al.*, 2007b; Kolstad and Wiig, 2012
			Negative	Ramasamy *et al.*, 2012; Kang and Jiang, 2012

Table 3.7 summarises the country specific characteristics that influence the decision of conducting FDI, including market size, institutions, physical infrastructure, natural resource endowment, technology, taxes, market openness and inflation rate. Some of the determinants of FDI influence the trade as well, such as the market size, natural resource endowment, technology, and market openness. Therefore, the common factors that influence both trade and FDI will be further discussed later. Based on those common factors, the determinants that pose effects on the relationship between trade and FDI will be defined.

3.2.2 Characteristics of host and home country commonalities and relativities

3.2.2.1 Distance in development stage

The impact of the development state distance between the host and home countries on the volume of FDI is theoretically indeterminate (Bhaumik and Co, 2011). From one angle, the larger the development gap is, the more FDI flows are attracted. MNCs in developing countries tend to carry out outward FDI to developed countries to facilitate their access to high levels of technology or products that they are unable to produce on their own. From the other angle, it is also widely accepted that MNCs from developing countries tend to undertake FDI in countries with similar development state, where they can utilise their competitive advantages and experiences acquired in their home countries (Cross *et al.*, 2007), and where they are better able to meet the price-quality expectations of the consumers than the rivals from developed countries (Lecraw, 1977). Thus, how the distance in development state between participating countries influences FDI still remains an unsolved question, but it is without doubt that the distance in development stage does have certain effects on FDI.

3.2.2.2 Geographical distance

The geographical distance between the host and home countries has drawn much attention for its importance in determining FDI (Wei and Liu, 2001). Yet no consensus has formed as to whether the geographical distance positively or negatively affects FDI (Cuyver *et al.*, 2011). It is widely believed that the geographical distance represents the transportation costs of operating business aboard (Bevan and Estrin, 2004), so a negative relationship is expected. Helpman (1984) proposes that when the transport cost poses adverse impact on input cost, distance and vertical FDI are negatively related. Wei (2004) further points out that the geographical distance influences FDI flows by increasing monitoring and transportation costs, causing managerial and informational uncertainty, and exposing MNCs to a more risky environment. Thereby, MNCs tends to invest in countries close to the home country. Studies of Grosse and Trevino (1996), Frenkel *et al.* (2004), Gao (2005) and Guerin (2006) all lend support to the significantly negative influences on FDI flows of geographical distance. In contrast, Buckley and Casson (1981) argue that, according to internationalisation theory, market-seeking MNCs tend to enter geographically proximate countries via exports and more distant markets through FDI. Brainard (1997), Horstman and Markusen (1987), and Markusen and Venables (1998) all support this idea that a positive relationship exists between geographical distance and FDI. Because transactions costs of trade are an increasing function of geographical distance, so FDI serves as a substitution for trade. The empirical works of Bevan and Estrin (2004), Wei and Liu (2001) and Pan (2003) all reveal an inverse linkage between geographical distance and FDI between the host and home countries.

3.2.2.3 Institutional difference

According to Flores and Aquilera (2007), host countries with similar institutional framework with home countries are more attractive to MNCs and are able to attract more inward FDI, due to uncertainty tends to be substantially minimised to increase the possibility of success. For instance, different political systems tend to cause the inefficient communication with government, increasing uncertainty of doing business and costs of operation (Dow and Karunaratna, 2006). Therefore, similar political systems are likely to build up a friendly foreign environment for MNCs (Goerzen and Beamish, 2003). Based on US outward FDI samples, Globerman and Shapiro (2003) further point out that US outward FDI tends to flow into countries with legal systems that are rooted in English common law. However, when come to Chinese outward FDI, studies show an inverse answer. The institutional environment between China and Western countries is significantly different (Mayer *et al.*, 2009; Peng *et al.*, 2008). Even after keeping up with "open up" policy for more than thirty years, the market of China is still regulated heavily (Scott, 2002). As pointed out by Kang and Jiang (2012), Chinese outward FDI tend to be attracted to host countries with larger differences in institutional framework and economic regulative regime from China.

3.2.2.4 Cultural distance

Extensive literature has argued that MNCs prefer to invest in host economies that are cultural proximately to the home country (Kogut and Singh, 1988; Flores and Aguilera, 2007). Culture proximity means lower operating business cost and easy communication, as well as similar demand in product (Rauch, 1999; Guerin, 2006; Bhaumik and Co, 2011). Meanwhile, cultural distance is often seen as the main impediment for MNCs to undertake FDI and gain benefits in host economies (Yiu and Makino, 2002). With large differnces between the home and host ecoomies in culture, it increases the costs of doing business and communication for MNCs in the host economies (Kang and Jiang, 2012). Hofstede's index (1980; 2001) is a commonly utilised indicator for measuring the costs that arise by cultural distance (Kimino *et al.*, 2007). However, its theoretical and methodological limitations have been widely criticised (Brouthers and Brouthers, 2001; Cho and Padmanabhan, 2005). Other proxies used to indicate cultural distance include immigration population, common language and common religion.

Johanson and Vahlne (1977) and Vahlne and Johanson (2002) argue that MNCs usually set off their internationalisation process by penetrating culturally proximated countries. When enough knowledge has been accumulated, they will try to expand their business to countries with different cultures. Many studies in the literature show strong evidence that cultural distance has a significant negative influence on FDI location choice (Bhardwaj *et al.*, 2007; Guerin, 2006; Flores and Aguilera, 2007). For instance, Loree and Guisinger (1995), examining the data of US FDI between 1977 and 1982, have found out that FDI flows are negatively related to cultural distance. The example of MNC's location choice in Japan, Western Europe and North America during the period of 1976 to 1986 also reveals a similar negative relationship with cultural distance (Li and Guisinger, 1992). Buckley *et al.* (2007b) suggest that Chinese firms are more likely to undertake FDI in countries with a large resident population of ethnic Chinese. Kang and Jiang (2012) also support the hypothesis that Chinese firms tend to locate their FDI in countries that share similar culture. Therefore, the culture proximity is positively related with the FDI.

3.2.2.5 Relative borrowing costs (Interest rate)

The borrowing costs have been considered as an essential factor that strongly influences direct investment (Cuyver *et al.*, 2011). Tolentino (2010) has considered relative borrowing costs as a measurement for the capital scarcity or abundance of a country, so a relatively low interest rate in the home country means capital abundance, which enhances the profitability of investment abroad. Cushman (1985) argues that when the costs of borrowing in the home economy are relative lower to those in the host economy, MNCs hold a greater cost advantage over indigenous rivals when they establish overseas production plants and services, therefore they choose to enter into foreign market by FDI (Cuyver *et al.*, 2011). Nevertheless, this argument has ignored the possibility of MNCs raising funds within the host country or elsewhere in the world. Kimino *et al.* (2007) point out that if interates rates in the host country are relative lower than world interest rates, MNCs tend to raise more funds inside the host economy, so less FDI will flow in from abroad.

Many empircal studies provide support to this relationshp (Farrell *et al.*, 2004; Pan, 2003). For instance, by analysing the data of Chinese FDI and its borrwoing costs, Wei and Liu (2001) indicate that FDI inflows decrease when the relative borrowing cost in the host economy is higher than that in the home economy. Barrell and Pain (1996) adopt the cost of using capital as a proxy, and suggest that investing countries with a higher level of costs of using capital are willing to engage in outward FDI. However, the analysis of FDI inflows to Africa and to East and Central European transition economies fail to support this conjecture (Bevan and Estrin, 2004). Hong and Kim (2003) further confirm that relatively low interest rates in European Union countries are important driving forces of attracting Korean MNCs' FDI. Nonetheless, Chowdhury and Wheeler (2008) show that the influences of interest rates on FDI are not uniform across host economies.

3.2.2.6 Relative labour costs

According to the traditional trade theory, the relative labour costs are essential determinants that influence trade volumes. Similarly, the relative labour costs also significantly influence FDI. The proxies most often used for relative labour cost are differences in wage rates and the average labour productivity, which is calculated by GDP divided by employment. Because of international labour immobility, wage differentials between home and host economies are commonly utilised as a main driving force of FDI flows (Kimino *et al.*, 2007). It is widely accepted that higher wages in the host economy defer inward FDI flows, *ceteris paribus*, which is especially true for MNCs that engage in labour-intensive production; while lower wages can reduce potential costs abroad and make the host country more attractive to FDI (Culem, 1988; Jun and Singh, 1996; Bilgili *et al.*, 2012). For firms that mainly depend on labour intensity in the production process and firms whose labour costs take up a large proportion of total costs, low-labour costs in the host country provide a cost advantage compared to potential rivals from the home country (Dunning and Lundan, 2008). Therefore, in order to attract more inward FDI, many governments of host countries, especially governments of developing countries, often endeavour to keep wages at a relative low level, either by manipulating the exchange rate or imposing certain wage limits (Meyer, 2004).

However, an increasing number of studies bring forward different ideas (Wheeler and Mody, 1992; Miller, 1993; Love and Lage-Hidalgo, 2000). They believe that higher wages do not necessarily impede FDI, because lower wages not only means lower labour cost, it also represents unskilled workers and lower productivity, or poor infrastructure (Miller, 1993; Kimino *et al.*, 2007). Especially in the high-tech industry, the high quality of labour is much more important than cheap costs associated with unskilled labour. Culem (1988) argues that the relative lower labour costs in developing countries attract FDI from industrialised countries, while between developed countries, the lower labour cost is not that crucial in determining FDI flows.

The empirical results also show an unclear relationship between relative costs of labour and FDI flows. On the one hand, some studies have revealed strong evidence to support the hypothesis. By analysing the data of British and German bilateral FDI flows with OECD partners, Hatzius (2000) concludes that British MNCs are attracted to countries with lower costs of labour worldwide, while German MNCs are only interested in Europe countries with relative low labour costs. Barrel and Pain (1999a) study the examples of Japanese outward FDI in the US and EU, and show that higher labour costs in the host country do have a significant negative influence on FDI. Kumar (1994) and Taylor (2000) also support this negative relationship, following their examination of US FDI flow changes and the wage rates of their host country. Likewise, Goldsbrough (1979), Culem (1988), Barrell and Pain (1998; 1999b), Wei and Liu (2001), and Bevan and Estrin (2004) all present further evidence of such negative linkages between relative labour cost and FDI flows.

On the other hand, a few researches argue that the negative linkage between labour costs and FDI is not convincible (Jun and Singh, 1996). Biswas (2002) indicates that despite lower wages, many other factors are much more crucial, for example, natural resource endowment, market size, and technology. Meyer (1995) also argues that relative low labour costs are not the main motivation for MNCs in Central and Western Europe. Veugelers (1991) further shows that labour costs are not important in explaining FDI activities. Similarly, Gupta (1983) and Lucas (1993) both find no significant relationship between wages and FDI. Sethi *et al.* (2003) find the negative relationship is only significant for certain regions by analysing the driving factors of US FDI flows between 1981 and 2000. Studies of Caves (1974), Wheeler and Mody

(1992), Wang and Swain (1997), and Love and Lage-Hidalgo (2000) even reveal that labour costs and FDI are significantly positively associated with one another, and indicate that higher labour costs do not necessarily impede FDI.

Referring to outward FDI of China, due to the abundant supplies of relatively cheap labour, natural resources and other factor endowments, compared to its competitors, Chinese firms hold certain comparative advantages in labour intensive production. Therefore, great efficiency is not necessarily a major motivation for Chinese outward investment (Buckley et al., 2008). Although countries with lower-costs of labour are more attracted to FDI (Sethi, *et al.*, 2003; Wei and Liu, 2001; Bevan and Estrin, 2004), as to China, other factors, such as natural resource endowment or technology level, are playing more important roles in the determination of outward FDI location choice (Kang and Jiang, 2012).

3.2.2.7 Exchange rate effects

The exchange rate effects on FDI flows have drawn much attention for a long time. Most studies analyse the exchange rate effects from two aspects, one is the changes in relative exchange rates, and the other one is the volatility of exchange rates (Blonigen, 2005). From theoretical perspectives, it is generally recognised that appreciation of the home country's currency promotes outward FDI (Aliber, 1970), and depreciation of a country's currency promotes exports and defers outward FDI (Stevens, 1998; Benassy-Quere *et al.*, 2001). It is hypothesised that with the appreciation of the home country currency, *ceteris paribus*, the foreign currency denominated assets will become cheaper, the MNCs could hire more labour, have more endowments or more equipment, therefore more profitable outward investment opportunities will emerge (Clegg and Scott-Green, 1999; Walsh and Yu, 2010). Thus, the diversion of exchange rates from an undervalued position to rapid appreciation will be more likely to encourage outward FDI (Buckley, e*t al.*, 2007b). However, some other researchers bring forward opposite ideas. They point out that with the appreciation of the home country currency, the cost of foreign assets get lower, at the same time, nevertheless, the expected nominal return goes down as well when calculated in the home country currency (Blonigen, 2005). Nevertheless, in an early study of Blonigen (1997), the idea has been already debated. He argues that if the motivation of FDI is inspired by technology and managerial skills, rather than capital assets, the appreciation of the home country currency will lower the costs of those assets in the home country currency, but will not necessarily lower the returns. Blonigen (1997) analyses the data of Japanese FDI into the US, and has found strong evidence that US dollar depreciation has increased the FDI flows from Japan to US.

Therefore, empirical studies on the effect of exchange rates on FDI offer different results (Wei and Liu, 2001; Pain and Van Welsum, 2003; Kimino, *et al.*, 2007; Cuyver *et al.*, 2011). Froot and Stein (1989; 1991) claim that the depreciation of the US dollar encourages foreign firms to invest in the US. In other words, the depreciation of the host country currency tends to casue an increase in inward FDI, whereas an appreciation of the host country currency results in a decrease in FDI. Blonigen and Feenstra (1996), Grosse and Trevino (1996), Wei and Liu (2001), Kiyota and Urata (2004), and Kimino, Saal and Driffield (2007) all show a positive effect of depreciation of the host country currency on inward FDI of the host country. Yet, other studies find either the inverse result or no clear evidence to support such a relationship between exchange rates and FDI (Pain and Van Welsum, 2003; Cuyver *et al.*, 2011). Research of Edwards (1990) and Campa (1993) demonstrates that appreciation of the host country's currency increases FDI in the host country. Blonigen (1997) and Tuman and Emmert (1999), on the other hand, find no statistical significance of exchange rates on FDI.

Exchange rate volatility is also seen as a crucial factor that exerts effect on FDI. Exchange rate volatility is usually seen as an indicator of business risk, so a number of academic studies have highlighted the relationships between FDI flows and the volatility of exchange rates (Tolentino, 2010). However, existing studies in this area are even more ambiguous than other factors concerning the determinants of FDI due to different countries, various types of investment and observation time (Kimino *et al.*, 2007; Pain and van Welsum, 2003). Cushman (1985) is one of the pioneer studies that deal with exchange rate volatility and FDI. He finds that an increase in exchange rate volatility encourages FDI, due to the preference of FDI to trade as a way of serving foreign markets under such exchange rate uncertainty. Similarly, Goldber and Kolstad (1995) point out that short-run exchange rate volatility facilitates FDI outflows by risk-averse MNCs. Other studies that support the positive impacts of exchange rates volatility on FDI include Swenson (1994), Kogut and Chang (1996), and Blonigen (2005), based primarily on the cases involving the US. However, some other researches indicate that exchange rate volatility is negatively associated with FDI flows (Kimino *et al.*, 2007). Baek and Kwok (2002) observe that MNCs prefer to invest abroad always have a stronger home currency. Qin (2000) argues that volatile exchange rate fluctuations indeed increase the ratio of FDI to exports; however, the reduction of exchange rate risk would motivate two-way FDI under certain conditions. Amuedo-Dorantes and Pozo (2001) also reveal strong negative relationship between FDI and exchange rate volatility, including both short-run and long-run effects. Moreover, some other works show that no clear relationship can be found between FDI outflows and currency volatility. Russ (2007) believes that MNCs' response to exchange rate volatility is largely depending on where the currency risk arises, from the host country or home country. Crowley and Lee (2003) and Gorg and Wakelin (2002) observe that outward FDI and curreny volatility are insignificantly related with one another. Table 3.10 summarises the determinants of FDI involving both home and host countries.

Table 3.8 Summary of Determinants of FDI – Characteristics of Host and Home Country Commonalities and Relativities

Factor	Dimension	Proxy	Sign of coefficient	Literature
Development state distance		Ratio of logarithmic form of GNP per capita of host to home	Positive	Wint and Williams, 2002
		Ratio of per capita GDP of host to home	Positive	Kang and Jiang, 2007
Geographical distance		Distance in kilometres between host and home country capital cities	Positive	Buckley *et al.*, 2007b; Wei, 2005
			Negative	Ramasamy *et al.*, 2012; Kimino *et al.*, 2007; Cuyvers *et al.*, 2011; Kolstad and Wiig, 2012; Bhaumik and Co, 2011
Institutional difference		Ratio of home country's annual country risk ratings to that of the host country	Positive	Wei, 2005
Cultural distance		Indicator invented by Grosse and Trevino (1996)	Positive	Kimino *et al.*, 2007
		Percentage of same language spoken	Positive	Bhaumik and Co, 2011
		Proportion of same ethnic immigration population	Positive	Ramasamy *et al.*, 2012; Buckley *et al.*, 2007b;
		Scores invented by Hofstede	Positive	Kang and Jiang, 2012
			Negative	Kang and Jiang, 2012; Wei, 2005
Relative borrowing costs		Logarithmic form of bank lending rates	Negative	Wint and Williams, 2002
		Ratio of host country's real interest rate to the real interest rate of home country	Negative	Cuyvers *et al.*, 2011
		Real lending rate of home country minus lending rate of host	Positive	Kimino *et al.*, 2007

		country		
		The ratio of home country's nominal lending interest rates adjusted by consumer price index to that of host country	Positive	Wei, 2005
Relative labour costs		Relative index of nominal compensation costs for production workers in manufacturing of home countries to host countries	Negative	Kimino *et al.*, 2007
		Average wage in the manufacturing industry of host country	Positive	Kang and Jiang, 2012
			Negative	Kang and Jiang, 2012
		The ratio of home country's monthly nominal wage deflated by consumer price index to that of host country	Positive	Wei, 2005
Exchange rate	Relative exchange rate	Host country annual average exchange rate against home country	Positive	Cuyvers *et al.*, 2011; Buckley *et al.*, 2007b
			Negative	Kimino *et al.*, 2007
		Home country annual average exchange rate against host country	Positive	Duanmu, 2012
	Exchange rate volatility	The coefficient of variation of real monthly average exchange rate of home country against host country	Positive	Kimino *et al.*, 2007

Table 3.8 summarises the commonalities and relativities between home and host countries that exert effects on FDI, including development state distance, geographical distance, institutional differences, cultural distance, relative borrowing costs, relative labour costs and exchange rate. Among those factors, the development stage distance, geographical distance, cultural distance, exchange rate and relative labour costs also influence trade volume, while the relative borrowing costs are only related with FDI, due to FDI is more sensitive to capital related factors.

3.2.3 Bilateral trade effects on FDI

The relationship between trade and FDI has been a focus of debate in the international business literature for decades (Kimino *et al.*, 2007). Without doubt, empirical studies always present conflicting results and no uniform conclusions are reached. However, one thing is for sure, that there are certain linkages between bilateral trade and FDI flows. In section 3.1.1.4, the effects of FDI on trade are discussed. It is suggested by traditional trade theories that FDI inspired by market exploration or jump trade barriers tends to substitute trade; while if FDI is motivated by resource extraction, trade volume will increase accordingly (Kimino *et al.*, 2007). Moreover, those kinds of relationships are particularly factual for FDI motivated by resource-seeking and market-seeking firms (United Nations, 1993). This section examines the previous studies that focus on the trade effects on FDI. Table 3.9 summarises the studies that examine the bilateral trade effects on FDI, and suggests that, in developing countries, trade usually complements FDI, for instance, India, Cambodia and China. However, in Kolstad and Wiig's (2012) studies, trade and FDI are found to be substitution of each other based on the example between China and OECD countries. Moreover, the trade of Japan also substitutes its FDI. In summary, the effects exerted on FDI by bilateral trade remains a controversial question, but relatively, the positive relationship between trade and FDI prevails, particularly for developing countries.

Table 3.9 Summary of Bilateral Trade Effects on FDI

Literature	Country involved	Sign of coefficient
Kimino *et al.*, 2007	Japan	Negative
Bhaumik and Co, 2011	China	Positive
Buckley *et al.*, 2007	China to OECD	Positive
	China to non-OECD	Positive
Wei, 2005	China	Positive
	Indian	Positive
Ramasamy *et al.*, 2012	China	Positive
Cuyvers *et al.*, 2011	Cambodia	Positive
Kang and Jiang, 2012	China to developed countries	Positive
	China to developing countries	Positive
Kolstad and Wiig, 2012	China to OECD	Negative
	China to non-OECD	Positive

4 CHAPTER 4: LITERATURE REVIEW II: RELATIONSHIPS BETWEEN TRADE AND FDI

This chapter attempts to present an overview of existing theoretical inquiries and empirical studies that shed light on the relationship between trade and FDI. Based on and extending the previous chapter, the main factors that determine the relationship between trade and FDI will be reviewed and explored. On the one hand, the works that support a substitution relationship tend to draw their theoretical rationale from the relative factor endowments theory of international trade and from the firm-based theories of FDI. On the other hand, the studies that believe a complementary relationship draw support from the theory of comparative advantage, various strands of the new trade theories, and the theory of industrial networks.

Moreover, while many of the firm-based theories of FDI indicate a substitute relationship between trade and FDI, others suggest the possibility of a complementary relationship between trade and FDI. Most empirical studies stand by the complementary relationship doctrine, and there has been growing evidence in recent works. So on the whole, there seems to be more studies that support a complementary relationship between trade and FDI than the substitute relationship. However, no matter what kind of relationship these studies advocate, different factor endowment, technology advances, market size, market openness and network linkages are the main factors that make differences.

4.1 Determinants of both trade and FDI and their interactions - An overview

4.1.1 Determinants of both trade and FDI

Based on the previous review, we have observed that the main factors that contribute to trade are market size, geographical distance, economic development state, government environment, market openness, transportation cost in the importing country, literacy in the importing country, technological distance between the exporting and importing countries, factor endowment differences between the exporting and importing countries, cultural differences between the exporting and importing countries, educational differences between the exporting and importing countries, economic structure similarities between the exporting and importing countries, and exchange rate effect.

Furthermore, this work has identified the factors that affect FDI flows, for instance, market size, political risk, institutions, physical infrastructure of the host country, natural resource endowments of the host country, technology in the host country, taxes of the host country, market openness of the host country, inflation of the host country, development state distance between the home and host countries, geographical distance between the home and host countries, institutional difference between the home and host countries, cultural distance between the home and host countries, relative borrowing costs, relative labour costs and exchange rate effect.

Therefore it is helpful to identify and summarise the factors that determine both trade and FDI. Then it is logical to identify and assess the factors that shape the relationships between FDI and trade accordingly. This section addresses the former – determinants of both FDI and trade, while the next section deals with the latter – factors that shape the relationships between FDI and trade. As demonstrated in Table 4.1, although technology and natural resource endowments are stated differently in the determinants of trade and the determinants of FDI, we could not deny their importance in determining both trade and FDI. The factors that affect both trade and FDI are summarised as follows.

Table 4.1 Summary of Factors that Influence both Trade and FDI

Factor	Influence trade	Influence FDI	Influence trade and FDI
Market size of home	√	√	√
Market size of host	√	√	√
Institutions of home	√	√	√
Institutions of host	√	√	√
Institutional distance		√	
Political risk of home		√	
Political risk of host		√	
Physical infrastructure of host	√	√	√
Nature resource endowment of host		√	
Factor endowment difference	√		√
Technology of host		√	
Technological distance	√		√
Economic development of home	√		
Economic development of host	√		
Economic development distance		√	
Cultural distance	√	√	√
Geographical distance	√	√	√
Relative borrowing costs		√	
Relative labour costs		√	
Exchange rate	√	√	√
Taxes of host		√	
Inflation rate of host		√	
Market openness	√	√	√
Educational difference	√		
Economic structure similarities	√		

As presented in Table 4.1, market size, institutions, physical infrastructure, factor endowments, technological distance, cultural distance, geographical distance, exchange rate and market openness all exert great influences on both FDI and trade. Zwinkels and Beugelsdijk (2010) point out that the economic size of the target market is one of the crucial characteristics that influence trade and FDI. Moreover, richer home countries have greater ability to serve foreign markets (Kimino *et al.*, 2007). In conclusion, market sizes, of both home and host countries, are essential determinants of trade and FDI, and their relationship as well. In addition, the high quality institutions of the host country, for instance, the viability of contract, the security of assets, and the corruption of government, are seen as the premier of successful foreign related operations (Blonigen, 2005). Political stability is also considered to positively affect trade and FDI elements (Brainard, 1997; Sethi *et al.*, 2003; Tadesse and Ryan, 2004; Zwinkels and Beugelsdijk, 2010). Furthermore, physical infrastructure has been deliberated in many studies due to its importance in distribution of products (Chi and Kilduff, 2010; Papazoglou, 2007; Lawless, 2010). Higher quality of physical infrastructure can reduce exporting costs, therefore increase trade. Furthermore, it makes distribution of products and communication between foreign affiliates and headquarters much easier as well. Put it simply, physical infrastructure is expected to be positively related to both trade and FDI. Therefore, market size, institutions and physical infrastructure are the country specific characteristics that influence both trade and FDI.

Factor endowments include natural resource endowment and labour resource endowment. The influence of factor endowments on trade and that on FDI are slightly differed. On the one hand, abundant natural and labour resources of a country often make it more attractive to MNCs (Bhaumik and Co, 2011; Ramasamy *et al.*, 2012; Kang and Jiang, 2012). On the another hand, countries with sufficient resource endowments tend to export products as they may depend on those resources they are lack of, which could be explained as comparative advantages. Additionally, technological distance between the host and home countries is often treated as a kind of comparative advantage when referring to trade, and ownership advantage when referring to FDI. Without doubt, no matter what the identification is, technology plays a crucial role in determining trade and FDI (Dunning, 1993; Cassiman and Golovko, 2011). Large technological distance, from one side, promotes MNCs searching for larger markets to gain economies of scale by either trading or investing; from another side, it can also become an incentive to attract more inward FDI. Therefore, factor endowments and technological distance are the fundamental of international activities.

Furthermore, many previous studies (e.g. Bhaumik and Co, 2011; Buckley *et al.*, 2007b; Wei, 2005; Sheng and Mullen, 2011; Helpman *et al.*, 2008) have highlighted the significance of cultural distance when discussing the determinants of trade and FDI. It is commonly believed that giant cultural distance impedes FDI due to higher communication costs and unfamiliarity, so trade is usually utilised to serve those unknown foreign markets at first (Vernon, 1966; Rauch, 1999; Guerin, 2006; Bhaumik and Co, 2011; Kang and Jiang, 2012). Therefore, cultural distance is expected to positively affect trade, especially exports, but to be negatively related to FDI. Similar with cultural distance, geographical distance has also drawn much attention in both trade and FDI literature (Brainard, 1997; Pan, 2003; Gao, 2005). Far geographical distance implies higher transportation costs (Bevan and Estrin, 2004). Therefore, it is believed to pose negative impact on trade and FDI. However, Buckley and Casson (1981) suggest that firms usually serve close countries through export, while serve distant countries by FDI. Controversy still remains for the effect of geographical distance on FDI, though the effect is categorically negative on trade.

In addition, the exchange rate is closely related to relative costs of all factors; therefore, it has significant influences on trade and FDI (Kimino *et al.*, 2007). According to Benassy-Quere *et al.* (2001), appreciation of the home currency encourages firms to invest abroad, but increases the cost of local products and therefore impedes trade, so a substitution relationship between trade and FDI is suggested. Conversely, when MNCs use the local market as an export platform, the relationship between FDI and trade will become complementary (Kimino *et al.*, 2007). Moreover, since both trade and FDI are worldwide activities, the level of market openness is closely linked with trade and FDI (Tolentino, 2010). Aizenman and Noy (2006) and Ghosh (2007) have all found a positive correlation between market openness and linear feedback between trade and FDI. Paralleled to market openness, regional integration is another vital factor, whether the RTA has been included or not (Zwinkels and Beugelsdijk, 2010).

However, not all of the factors that influence both trade and FDI pose effects on the relationship between trade and FDI. The exchange rate is one of the examples. If one country's currency appreciates, exports of this country are reduced while its imports are promoted, and its outward FDI is promoted while its inward FDI is impeded. On the contrary, when a country's currency depreciates, its exports are boosted while its imports decrease; its outward FDI is reduced while its inward FDI grows. Therefore, exchange rates pose similar effects on trade and FDI, no matter it is for the home country or host country. Consequently, exchange rates are not influential in determining the relationship between trade and FDI. Other factors that pose similar effects on the relationship between trade and FDI include institutions, infrastructure, and political stability. It is widely accepted by many previous studies that similar and efficient institutions, better infrastructure of host countries and stable political environments of host countries facilitate both trade and FDI (North, 1990; Egger, 2002; Lawless, 2010; Sheng and Mullen, 2011; Wu *et al.*, 2012). Therefore, these factors are not included in our analysis.

Other factors that influence trade and FDI that are not included in our models are trade costs and geographical distance. Trade costs consist of marketing costs and transportation costs (Chi and Kilduff, 2010), where marketing costs are related with the cultural similarity between home and host countries while transportation costs are linked with the geographical distance and market openness. Cultural similarities between home and host countries are included in network links. Due to that the geographical distance does not change with times, geographical distance is neglected therefore in our regression models. But we use cultural distances to denote the distance between home and host countries. Therefore, trade costs are not taken in particularly in our study, for it consists of two parts, and both of them impose different effects on the relationship between trade and FDI. We use market openness and cultural distance to measure trade costs in this study. It has been proved that higher market openness leads to a higher degree of the substitution relationship between trade and FDI, while a shorter cultural distance brings about a closer complementation relationship between trade and FDI.

4.1.2 The determinants and relationship between trade and FDI

In the previous part, the determinants that affect both trade and FDI are discussed. Among those factors, exchange rate effect and physical infrastructure are often dealt with as control variables. Institutions, cultural distance, geographical distance can be summarised as network links, as well as market openness, which are directly related with the costs of operation in the foreign market, thereby influence the firms' choice of foreign market entry. Market size, factor endowment and technology are closely linked with the motivations of MNCs, therefore influence the relationship between trade and FDI. This section is therefore tasked with the relationships between FDI and trade shaped by various pertinent factors and their interaction.

Dunning (1996) has expanded the classification of multinational corporations developed by Behrman (1972), and identified four kinds of FDI; they are: market seekers, resource seekers, efficiency seekers, and strategic asset or capability seekers. Where market seekers are mainly related with market size, resource seekers are mainly linked with factor endowments, and efficiency seekers are often tied with technology. Strategic asset seekers are related to capital assets, which seldom have any effect on trade, are therefore not included for further discussion. It is suggested that if the MNCs are market seekers, market size is the first factor to be taken into consideration. This kind of FDI usually substitutes trade, as the main objective of market seekers is to protect the existing market and explore the new market to gain benefits. If the MNCs are resource seekers, the resource endowments of host countries become the most crucial consideration. FDI undertaken by these MNCs tend to complement trade. If the MNCs are efficient seekers, the country with high level technology and management skills will be the most attractive factors. The relationship between this kind of FDI and trade are suggested to be complementary. Market openness is related to tariff-jump FDI. Tariff-jumping FDI is undertaken to avoid the high level of tariff and thereby reduce the production and transaction costs. Obviously, this tariff-jumping FDI implies a negative or substitute relationship between trade and FDI.

4.1.2.1 Market size

Market size plays an important role in FDI motivated by market seeking, because the main objective of market seekers is supplying the host country with commodities and services. Under most situations, this kind of FDI tends to substitute trade. MNCs may produce finished goods for the host country with raw materials or intermediate inputs imported from the home country. In this case, FDI reduces the host country’s imports of finished products, but raises the host country’s imports of intermediate products. Since there is value added in the production, the price should be differed. As a whole, this kind of FDI is likely to reduce the value of bilateral trade, thereby substituting trade. However, this situation could be more complicated when involving the third country. For example, upstream and downstream suppliers of production are in the third country. This usually happens in those industries with products assembled in different countries, such as the motor vehicle industry. FDI in such industry could both substitute and complement trade. The host country no longer imports the finished products; instead it might import parts or units of the products, so FDI complements trade. Moreover, the host country may export the finished products. So overall, FDI complements trade.

If the MNCs produce finished goods for the host country with raw materials or intermediate inputs produced in the host country, the host country no long imports intermediate products or finished products from the home country. Therefore, the imports of the host country are reduced by this kind of FDI. In general, FDI substitutes trade under such circumstances. Kimino *et al.* (2007) argue that FDI motivated by exploring markets are negatively related with trade, thereby substituting trade. The food and beverage industry is a typical instance in this circumstance. In order to satisfy the consumption custom and tastes of the host country, it’s much better for the MNCs to use the local resources and provide the products and services to local customers. Another industry in this sphere is the chemical and pharmaceutical industry. Because long distance transportation costs or storage costs weigh too much in the whole cost, the company must serve the host country in short distance. In short, FDI dominated by market size generally serves as a substitution for trade. However, many other studies (e.g., Motta and Norman, 1996; Grossman *et al.*, 2006) have identified a different type of FDI called “export-platform” FDI, whereby a firm sets up a production facility in a given market with the objective of serving mainly other destinations in the region. This kind of FDI will not substitute trade, but complement trade.

4.1.2.2 Factor endowments

Resource seeker is the first kind of FDI appeared in the international market and most FDI from developed countries to developing countries belongs to this category (Lemi, 2003). This is because of the different factor endowments between developing countries and developed countries. In order to maintain the stability in gaining natural resources in developing countries, MNCs choose to make direct investment. In early years of the last century, this kind of FDI has been the leading and dominant mode of FDI. After hundred years of direct investment, the resources that MNCs are looking for are no longer confined to natural resources, for instance, minerals, raw materials and natural plants. Other kinds of resources, such as human resources, intellectual resources, capital resources, asset resources and information resources are all included. These resources are the main driving force of FDI.

MNCs can obtain natural resources in resource abundant countries, which cost much less than their home country. The range of resources this kind of FDI is interested in is extensive and varied. They include special products and resources, such as tobaccos and rubber, rare mineral resources with good quality but lower prices, unique tourism resources and political resources, and better educated human resources with lower costs of training. Since the motivation of resource seekers is just acquiring resource, not occupying the market share, most of the products will be exported either back to the home country or to other nations. Resource extraction and outsourcing FDI lead to an increased trade volume, thereby complementing trade (Kimino *et al.*, 2007). It is obvious that this kind of FDI facilitates trade, although some of the trade is accomplished inside the MNCs.

The patterns in FDI and trade relationships can be identified for various industries through inspecting industry characteristics and analysing industry level data. Some industries involve high labour cost and FDI provides opportunity of cutting such costs. Thus MNCs choose to conduct FDI. This kind of FDI is mostly seen in the machinery and transport equipment industry, manufacturing industry, electrical equipment and computing industries. FDI complements trade in some other industries, such as the tobacco industry, rubber and plastic industry, lubricants and related industries, non-metallic mineral industry, where the aim of FDI is to get raw materials or intermediate products to complete production and operations. Of course, in the coal and petroleum industry, mineral fuels industry and metals industry, FDI also complements trade. However, this kind of FDI in certain industry does not clearly affect trade, such as tourism.

What worth mentioning is that when FDI is motivated by resource seekers, the FDI-trade relation is affected by the destination of final products. Furthermore, the FDI-trade relationship varies, depending on the relative proportions of the final products being consumed in the local market and exported back to the home country and other markets. FDI may not substitute trade if a relatively large amount of the final products are exported back to the home country or other regions. MNCs may produce finished goods for the host country with raw materials or intermediate inputs produced in the host country. In this case, FDI may reduce both host country's intermediate products' exports to the home country, and the finished products' imports. Because without undertaken FDI in the host country, the host country might import the finished goods from the home country and export its raw materials to the home country. However, when FDI takes place, the host country neither imports the finished goods nor exports the raw meterials. Thus FDI substitutes trade under such circumstances.

When the MNCs produce the finished goods for the home country with inputs of the host country's intermediate products, the home country's FDI raises the host country's final products' export and reduces the host country's intermediate products' export. Since final products value much more than intermediate products, the total trade volume should be increased. So, FDI complements trade. This situation is the mode stipulated by Kojima (1978a, 1978b). He believes that it is profitable to produce products in the host country and import the products back to the home country by investing in a relatively disadvantaged industry thereby creating trade.

4.1.2.3 Technology

The objective of efficiency seekers is to unify MNCs' activities and manage their operations globally to achieve higher efficiency. It is believed that MNCs motivated by efficiency tend to choose locations with a high level of technology as the recipient country. Therefore, FDI by efficiency seekers often takes place among countries with similar developing phases, markets, customs and policies, usually between developed countries. Thus this kind of direct investment is operating at series of locations, efficiently utilising resources from different countries and regions by centralised configuration of production. This always happens in fully matured industries, such as the machinery and transport equipment industry, manufacturing industry, electrical equipment and computing industries. Because the target market of MNCs is worldwide, the core technology is mastered, so the products are produced worldwide. The import and export of intermediate and final products take place frequently, so efficiency seekers complement trade. Firms that seek low-cost inputs, especially labour, as part of their effort to improve efficiency and corporate performance, begin their internationalisation with FDI. Thus, their foreign investment complements exports.

4.1.2.4 Market openness

As pointed out by Kimino *et al.* (2007), FDI motivated by overcoming barriers to trade tends to substitute trade. Therefore, market openness is crucial in determining the relationship between trade and FDI. Because of the existence of tariff and non-tariff trade barriers in the host country and the demand for products and services is beyond the local production efficiency, MNCs choose direct investment to avoid those barriers to reduce the costs of exporting. Horst's (1972) model specifically demonstrates the relationship between this kind of FDI and trade. If the tariff is not high enough, the investors may not choose to invest directly, but just export. What we are discussing here is that the investor finally chooses to invest directly. In other words, when this kind of FDI goes off, it is definitely a substitution to trade. What Mundell (1957) suggests can also be classified into this kind of FDI. The mobility of factors reduces trade volume when international trade impediment exists. The second stage of Vernon's product life cycle model is also another way to express this type of relations between tariff and FDI and trade. Although the explanation is different between what Mundell (1957), Vernon (1966) and Horst (1977), they all believe that, for FDI motivated by the host country's tariff and the scale of demand for product and service, the conclusion is consistent: with sufficiently high trade barriers, multinational corporations will take over trade (Kang, 2002). Because different commodities are charged the tariff dissimilarly, the relationship between FDI and trade is varied among industries with the level of tariff. FDI substitutes trade in those industries facing high levels of tariff. Whereas for industries faced low levels of tariff, no explicit relationship between trade and FDI is found, and occasionally, FDI is not necessarily for circumventing tariff chargers.

4.1.2.5 Network links

Network links includes institutional similarities or differences, cultural similarities or distances, historical links and geographical distances. When apply the network to explain the relationship between trade and FDI, a complementary relationship is predicted when the home country and host country share similar network links, while a substitute relationship is more likely to take place when the home country and host country are exercising different network links. It is believed that both FDI flows and trade volumes tend to increase when participating countries share similar network links (Johansson, 1995; Johansson and Westin, 1994). During the process of a firm's internationalisation process, the transaction costs are closely related with the network links. Sharing the similar network links, for example, speaking same language, using similar law and regulation, being geographically close to each other, historically oriented from similar culture and believing the same region, makes the interaction between the two countries easier, thereby reduce the transaction costs. Therefore, trade and FDI are promoted. However, if the network links between the participating countries are quite different from each other, the transaction costs in the foreign market for MNCs increase. Therefore, FDI tends to be impeded. MNCs are more likely to choose trade rather than FDI to achieve their goals, because of potential fewer risks in trade. Thus, FDI and trade can be in a substitute relation. However, if the differences between the participating networks are large enough, trade may be reduced as well.

4.2 Substitution between FDI and trade

4.2.1 Theoretical background

The theoretical notions supporting the substitution relationship between trade and FDI can be classified into two categories. The first kind is based on the traditional international trade theory, which redeems relative factor endowment differences as the foundation for trade and FDI. Whereas other factors, such as market openness, are considered less important in determining the relationship between trade and FDI. The second is derived from what may be termed as the import-substituting firm-based theories of FDI, which emphasises the importance of market openness and technology, although it is also based on the hypothesis of different factor endowment differences.

The relative factor endowments theory suggests that direct investment completely or partially replaces trade where the trade refers to both exports and imports of the home country. On the other hand, the import-substituting firms-based FDI theories, as the name suggests, indicate that when the FDI is undertaken, the import will be replaced for the host country or the export will be replaced for the home country.

4.2.1.1 Traditional international trade theory

Among all traditional theories, the Heckscher-Ohlin (H-O) model of international trade is the basic model. The H-O model of international trade mainly focuses on the relative factor endowment; therefore it is based on the following two fundamental observations:

i. Factor endowments vary among countries, and

ii. Production processes use factors of production with different relative intensity.

More specifically, it states that a country will have an advantage in producing products that intensively use factors of production it has in abundance. In its most basic form, the H-O model is a two-commodity, two-factor, and two-country framework with the factors of production being immobile across international borders. This model assumes that two trading countries possess the following features:

i. Country A and Country B have identical technologies;
ii. Country A and Country B have identical demand functions;
iii. Both countries are characterised by constant returns to scale;
iv. Both countries exhibit perfect competition; and
v. There are no other domestic distortions.

In addition to the above assumptions, other crucial factors of the trading countries, such as market size, technology and market openness, are assumed to be similar. Under such conditions, the relatively abundant factor of production is lower priced, and therefore the exportable is intensive in this abundant factor. Thus, this model predicts that a capital rich country exports capital-intensive commodities (Ohlin, 1933). Based on the H-O model, many other models are developed to explain the relationship between trade and FDI, and the most important factors are no longer constrained by factor endowment only.

Robert A. Mundell's model of international trade

The H-O model of trade, in its traditional form, is not suitable to explain movements in FDI and therefore the effects of FDI on trade. However, it has since been adapted to accommodate capital movements. One of the earliest attempts at modifying the H-O model is by the famous economist Robert A. Mundell (1957). Following the traditional H-O model, he starts with a two-country, two-factor, two commodity model and the following hypotheses:

i. Country A and country B share the identical production functions;
ii. Country A is abundant in one factor (capital) while Country B is well endowed with the other factor (labour). Commodity X requires a greater

proportion of capital than commodity Y at all points on any production function, Y is labour-intense commodity;

iii. Both countries produce the commodities according to their comparative advantages. That is Country A focuses on producing X and exports it, and Country B imports X while producing Y.

When countries are relatively abundant in different factors of production, there is a difference in factor prices between them, which leads to trade. However, when the assumption of factor immobility is relaxed, differences in factor endowments decrease and therefore the price differential of factors of production between countries also decreases. This leads to a decrease in the magnitude of trade. Mundell shows that international trade and international capital movements are substitutes, by relaxing the factor immobility assumption of the H-O model. Therefore, under the effect of different factor endowments and relative open markets, trade and FDI substitute each other.

However, in the real world, some of the assumptions could not always be satisfied, such as a relative open market. The existence of trade barriers impedes the free trade between the two countries. If country B imposes a high level of tariff on commodity X imported from Country A, the price of commodity X will raise in Country B, so the production scale in Country B also expands. Thus, demand for the relatively scarce factor is getting seriously, pushing up the price of this factor. Attracted by the high rate of payback of this factor, the factor in Country A will move into Country B through all possible ways. Due to the deduction in this factor, Country A will reduce the production of X, and less X is exported. The mobility of factors thus reduces trade volumes. More generally, Mundell believes that foreign investment is a perfect substitution of international commodity trade, given international trade impediments.

Factor price equalisation theorem

Suggested by Samuelson (1949), the factor price equalisation (FPE) theorem, which is based on the H-O model, shows that trade in goods and factor movements become perfect substitutes. Factor endowment differences and market openness are the main driving factors of the relationship between trade and FDI here. The hypotheses of the theorem are as follows:

i. There are two countries and they produce two commodities;

ii. Each commodity is produced with two factors of production and the production functions of each commodity show constant returns to scale;
iii. The law of diminishing marginal productivity holds: as any one input is increased relative to other inputs, its marginal productivity diminishes;
iv. The commodities differ in their factor intensities;
v. Factors are qualitatively identical inputs in the two countries and the technical production functions are assumed to be the same in the two countries;
vi. All commodities move perfectly freely in international trade, without encountering tariffs or transport costs, and no factors of production can move between the countries;
vii. Both commodities are being produced in both countries with both factors of production. Each country may have moved in the direction of specialising on the commodity for which it has a comparative advantage, but it has not moved so far as to be specialising completely on one commodity.

The FPE theorem states that physically similar factors will have the same price in trading countries in any stable or reasonably likely equilibrium, even though they may not move between the countries (Lerner, 1952). This theorem is derived under the framework of the traditional H-O model that two (or more) commodities are produced in each of two (or more) countries, between which commodities can move and in which the same technical knowledge is available. This implies that free trade will equalise the wages of workers and the rentals earned on capital between trading countries. With factor mobility, the equalisation of prices of factors comes about due to the movements of factors rather than the movements of goods across borders. Thus, capital movements are trade replacing due to the equalisation of factor prices across trading countries. Trade between countries completely ceases when factor prices are equalised (Pantulu and Poon, 2003). Therefore, we could summarise that with high levels of market openness, trade and FDI tend to be substitutes.

The MacDougall model

MacDougall's (1960) model of FDI is basically an extension of the H-O model of international trade. This model has been applied to a theoretical analysis of the benefits and costs of inward FDI in Australia. The hypotheses of the model are as follows:

(i) Perfectly competitive factor and product markets (which means the firm is a price taker in its input and output markets);
(ii) Constant returns to scale (so the returns to labour and capital just exhaust the total value of output);
(iii)A small open economy (so the country takes world prices as given).

Under conditions of perfect competition and constant returns to scale, the efficient allocation of capital across countries increases national income in both supplier and recipient countries of FDI. Therefore, in the supplier country, capital income increases while labour income decreases as a result of capital transfer. On the other hand, in the recipient country, capital income decreases while labour income increases.

When applied to the question of the effects of FDI on trade, this model suggests a substitute relationship between them, due to the equalisation of returns on capital between trading countries. This is because, with an initial condition of different capital endowments, capital moves from a capital-rich country to a capital-scarce country until the return on capital is equalised. This result is very similar to that obtained in Mundell's extension of the H-O model.

Above all, the relative factor endowment based traditional international trade theories are clearly in support the substitute relationship between trade and FDI, no matter how the hypothesis or the context changes. For example, changes in market openness do no alter this relationship. Both Mundell's model and MacDougall's model assume a small open market while the FPE theorem by Samuelson assumes a relatively widely open market. However, based on the differences in factor endowments, although the assumption varies, they all reach the same conclusion – supporting a substitute relationship between trade and FDI.

4.2.1.2 Import-substitution firm-based theories of FDI

In the theory of international trade, one of the crucial hypotheses is that production factors can't transfer freely among countries. The relative factor endowments theory assumes that capital movements take place basically in response to factor price differentials. When factor price differentials diminish overtime, so does trade in commodities and capital movements (Cantwell, 1994). However, the emergences of transnational corporations make factor movements possible, including labour, capital, technology and management. A basket of factors become mobile in the FDI activity, and international trade can be seen as the worldwide movement of production factors carried by products. So the relationship between trade and FDI could not only be explained by the traditional international trade theory, the determinants of FDI and the motivation of FDI also matter.

Grubel (1968) is one of the first to recognise that motivations for FDI flows are more complicated than just capital movements in response to factor price differentials. He identifies cost conditions in an oligopolistic industry and differences in growth rates of economies to be some of the additional reasons for FDI flows between countries. Kindleberger (1969) recognises that under the classical trade theory frameworks, FDI would not take place in a world of perfect competition. If there are no external economies of scale, information is costless, and there are no barriers to international trade, FDI will cease to exist and trade would be the most efficient form of international economic activity. It is the presence of these factors of "market imperfection" that lead to both FDI and trade. Hymer's (1976) thesis on market imperfection is one of the earliest to give importance to firm strategy as a driver of FDI. Basically this thesis states that firms constantly seek market opportunities and their decision to invest abroad is explained as a strategy to take advantage of certain capabilities not shared by competitors in a foreign country.

These initial attempts at recognising the role of the firm have brought to the forefront factors like increasing returns to scale and ownership advantages of firms as determinants of FDI. While these scholars recognise that the relationship between FDI and trade is more complex than suggested by the classical international trade theories, they do not, however, directly address the impacts of FDI on trade. Dunning's eclectic theory (1980; 1993) is a more holistic approach, and is better adapted to address this issue.

Dunning's eclectic theory has been an important contribution in explaining international production and trade as it is based on a combination of many existing theories. In fact, it gets its name, the "eclectic" theory, because it brings together many disparate aspects of firm-based theories of FDI and country-based theories of international trade. In other words, it takes many factors that affect the relationship between trade and FDI into consideration. Dunning's (1980, 1988b, 1993) theory of international production combines three main factors in explaining international production: ownership factors (O) specific to firms, location factors (L) specific to home and host countries, and internalisation factors (I) of the firms, and hence is referred to as the OLI framework.

(i) Ownership factor: A firm owns some unique competitive advantage that overcomes the disadvantages of competing with foreign firms on their home turf. This advantage includes factors like firm size, economies of scale, market power, technological edge, and the availability of inexpensive finance.

(ii) Location factor: a firm undertakes business activity in a foreign location because it is more profitable than any other domestic location. Firms exploit location-specific advantages when they relocate to a certain country to exploit the resources available there.

(iii) Internalisation factor: A firm benefits more from controlling the foreign business activity itself rather than from hiring an independent local company to provide the service. Advantages due to internalisation include firms' abilities to carry their patents, trademarks, raw materials, and marketing techniques to all their establishments abroad without incurring additional costs.

The OLI framework suggests that when firms invest abroad they tend to replace exports from the home country and imports of the host country. This could be due to any of the factors discussed above. For example, if a firm invests abroad to exploit cheap labour or tax rebates, it is exploiting a location advantage and tends to replace home country exports with FDI. Similarly, a multinational is exploiting its ownership advantage when it gains access to the host market due to ownership of subsidiaries. Sales from subsidiaries in the host economy tend to replace exports from the parent company in the home economy. Many large MNCs also invest in subsidiaries in the host economy that produce intermediate products. These multinationals exploit advantages accrued due to internalisation and tend to replace exports of inputs from the home country. A summary of how these OLI characteristics influence the firm to invest abroad rather than export is presented in Table 4.2.

Table 4.2 OLI Characteristics Influencing the Choice between FDI and Exports

	Ownership Advantages	**Location Advantages**	**Internalisation Advantages**	**Illustration of Types of Activity which Favour MNCs**
Trade and Distribution	Market access, products to distribute	Source of inputs and local markets; need to be close to customer, after-sales servicing	Need to protect quality of inputs; need to ensure sales outlets and to avoid underperformance or misrepresentation	A variety of goods, particularly those requiring contact with sub-contractors and final consumers

Source: Adapted from Dunning 1988a, Table 1.3, pp. 30.

The displacement of exports by FDI due to a combination of location factors and ownership advantages of firms under imperfect market conditions, as suggested by Dunning. This has been demonstrated in other studies as well, for example, in Adler and Stevens (1974), Buckley and Casson (1981), and Hirsch (1976).

FDI and trade are seen as alternative modes of serving a foreign market due to the relative costs incurred by the firm. One of the most important location factors that act as an incentive for firms to invest abroad relates to lower cost of production. This could be due to an abundance of a factor in the foreign market, or tax incentives that make production cheaper. In terms of production costs, firms have an incentive to invest abroad rather than export when the cost of production is lower abroad (Dunning, 1988a; Hirsch, 1976). This suggests that a firm's decision will have a pro-export bias in a high-cost host country and a pro-investment bias in a low-cost host country. However, the cost of production in the foreign market is not the only consideration.

A firm trying to make a decision to serve a foreign market also face with other costs like the cost of marketing, which Buckley and Casson (1981) have called variable costs of production. These costs vary with the levels of tariffs and transportation costs faced by firms in different countries. As the level of tariffs increase, costs of marketing increase relative to costs of production abroad, and therefore firms are induced to invest abroad (Buckley and Casson, 1981; Hirsch, 1976; Horst, 1972).

In summary, market openness and factor endowment both impose effects on the cost, either production costs or marketing costs, because the major objective of the firm is to minimise costs and gain benefits. Therefore, when abundant factor endowment and low market openness exist at the same time in the foreign market, compared to trade, FDI costs much less and is more profitable. Thus firms tend to choose FDI to serve the foreign market rather than trade, and thereby FDI tends to replace the trade.

The Horst model mainly focuses on the effect of level of tariffs on the relationship between trade and FDI (Horst, 1972; 1977). In his model, he has supposed that the transnational corporation can sell its product in both host and home country, and hold certain monopoly advantages; the costs per unit depend on the output, the goal of the transnational corporation is profit maximisation, and it's free for the transnational corporation to shift its production between the two countries.

Horst believes the location determination of production is up to the tariff level of the host country. Based on the above hypothesis, the transnational corporation will choose the point where marginal costs equal to marginal profits to produce. Because its monopoly power, the transnational corporation will export its product, the volume is up to the price level after tariff in the host country. If the price is high, the host country will produce the products inside the country and will import fewer products and *vice versa*. The transnational corporation will achieve higher profits by exporting products at a higher price than inside its own country. Because of rising of marginal costs, the transnational corporation will invest in the host country, the products scale should be identical to the turnout when marginal costs equal to price. If the host country raises its tariff level, the price in the host country will rise similarly, so import volume will be reduced, and the transnational corporation will expand the product scale in host country to avoid the high tariff. Thus, the substitution of trade is implemented.

In his empirical studies, Horst (1972) proves that investment and trade are substitutes of each other by comparing and analysing the export volume, taxation, and subsidiary company's production in different industries of United States multinational corporations in the Canadian market. So nowadays, a high level of tariffs is typically adopted by some developing countries as an import-substitution policy to attract FDI. Tariffs are imposed so as to discourage MNCs from exporting their product from their home country and instead encourage them to invest and produce in the host economy. High tariffs may also be supplemented by tax-incentives to further reduce the cost of FDI as compared to exporting. Therefore, a low level of market openness tends to make the relationship between trade and FDI substitute. Likewise, Kang (2002) has developed a model from the multinational corporations' aspect, successfully proved that the determination of export or FDI is related to trade barriers. With sufficiently high trade barriers, multinational corporations will take over trade. This is consistent with the Horst model that FDI are made to avoid tariffs.

Another important factor that accounts for costs incurred by firms is research and development (R&D), or technology. Costs are incurred both due to direct investments in R&D, and due to maintenance of proprietary on income-producing assets that result from R&D. Such costs include past investments in process and product development, and investments in advertising and other outlays that enable firms to create a unique differentiated product. In order to reap the benefits of these costs, firms are induced to internalise their ownership benefits.

Industries with comparatively high export sales of products tend to have a high propensity to invest in manufacturing subsidiaries in the market they serve. This is especially true when these industries are involved with scientific and technical aspects (Buckley and Pearce, 1979; Gruber *et al.*, 1967). Research-intensive industries tend to be highly concentrated due to the existence of strong oligopolistic forces. Seen as an issue of sourcing policy, there are several important reasons for firms with a high degree of R&D to internalise the production. Buckley and Pearce (1979) identify the following five reasons as being the most important. First, products with high R&D intensity usually have a long gestation period, and so the firm can avoid production co-ordination and external time lags by internalising production. Second, internalising exports is better than safeguarding monopoly over the product. Third, the product is considered a public good within the firm. Fourth, internalising the production allows the firm to practice discriminatory pricing policy. Lastly, transferring knowledge between organisations is difficult and expensive and hence more worthwhile to internalise. Thus high-tech industries firms are under pressure to invest in the host country to be able to maintain market share. Such a framework suggests that sales in the local market due to FDI are likely to grow at a higher rate than exports and thus FDI tends to substitute for exports.

While the "servicing cost" perspective is entirely a supply side argument, the extent to which FDI could replace exports also depends on demand conditions in the host economy relative to the home economy (Adler and Stevens, 1974). Adler and Stevens argue that there is an export displacement effect for the home country. Exports are substituted for by foreign sales of subsidiaries, when the products are perfect substitutes under constant returns to scale. However, when the products are not perfect substitutes, the extent to which FDI displaces exports depends on the demand for the products. When a multinational produces two partially substitutable products, one for consumption in the home country and one for a foreign country, there is a substitutable relationship between FDI and trade. This is because when the products are partially substitutable exports and investments compete with each other, and can potentially replace each other. However, when the products are independent in consumption, the extent to which substitution between trade and FDI decreases.

Thus the firm-based FDI theories predict that FDI and exports are alternative modes of serving a foreign market, and are therefore substitutes. While the relative factor endowments theory of international trade predicts substitutability between FDI and trade, the firm-based theories predict that FDI displaces only exports from home countries and imports of host countries.

Both the relative factor endowments theory and the firm-based theories of FDI indicate that the degree of substitutability between FDI and trade would depend on characteristics of home and host countries. The substitutability under the relative factor endowments theory clearly depends on differences in factor endowments between countries. However, under the firm based theories of FDI, the degree to which FDI and trade are alternative depends on market openness in the host economies (like tariffs), distance between two countries (measured by transportation costs), and the research and technology of firms. These theories, then, suggest that while FDI and trade are substitutes, the extent of substitutability depends on varying characteristics of home and host countries. A summary of the theoretical underpinnings supporting the substitutability thesis is presented in the following table.

Table 4.3 The Substitution between Trade and FDI and Driving Factors – Summary of Major Theoretical Studies

Author	Factors Involved	Relationship
Traditional International Trade Theories		
Mundell, 1957	Factor endowment difference, relative low market openness	FDI substitutes trade
Samuelson, 1949	Factor endowment difference, high market openness	FDI substitutes trade
MacDougall, 1960	Factor endowment difference, low market openness	FDI substitutes trade
Import-Substituting Firm Based Theories		
Buckley and Casson, 1981	Factor endowment (cost of production), distance (cost of transportation)	Outward FDI substitutes exports
Dunning, 1988b	Factor endowment (location advantage), technology (owner advantage), market openness (internalisation advantage)	Outward FDI substitutes exports
Hirsch, 1976	Factor endowment (labour cost, production cost)	Outward FDI substitutes exports
Horst, 1972	Low level of market openness (tariff-jumping FDI)	Outward FDI substitutes exports
Kang, 2002	Low level of market openness (Tariff)	Outward FDI substitutes exports
Buckley and Pearce, 1979	Technology advantage(R&D), large market size	Outward FDI substitutes exports
Gruber, *et al.*, 1967	Technology advantage(R&D), large market size	Outward FDI substitutes export

4.2.2 Empirical evidence

Most studies that show a substitute relationship or a negative relationship between FDI and trade are largely conducted in the 1960s (Adler and Stevens, 1974; Baumann, 1973; Gruber *et al.*, 1967; Horst, 1972). One possible reason for this is that there has been a change in the relationship between FDI and trade overtime due to changing motivations for investments and the changing climate of international investment and trade. However, there still are some evidences supporting the substitutability thesis in recent studies. For example, Belderbos and Sleuwaegen (1998) and Gopinath *et al.* (1999) have found that substitution may be seen in industry-specific studies. Pain and Wakelin (1998) also have found a negative relationship between overall FDI and trade for some OECD countries.

While theoretical studies showing a substitution effect find support in the relative endowments theory and import-substituting firm-based theories of FDI, empirical evidence is based largely on the latter. This is fairly obvious due to the highly abstract and stringent conditions of the relative factor endowments theory discussed earlier. Moreover, empirical studies supporting that outward FDI substitutes for exports are mostly focused on developed countries, which is the main source of FDI.

Evidence from empirical studies based on both Japan and the US suggests that tariffs imposed by host countries induce FDI, and therefore FDI is import-substituting for the host country (Belderbos and Sleuwaegen, 1998; Horst, 1972). Horst's (1972) analysis of US subsidiary sales (proxy for FDI) and exports to Canada shows a substitution relationship. His analysis indicates that US subsidiary sales in Canada in 1963 are enhanced due to the imposition of tariffs. Belderbos and Sleuwaegen (1998) indicate that Japanese FDI in the EU during the late 1980s is in response to trade barriers imposed on Japan. Their results confirm an export-substitution effect in an analysis of 86 Japanese electronic firms' exports to Europe in 1989. Controlling for both firm-specific and industry-specific characteristics, the growth in the number of products manufactured in Europe during 1985-1989 is found to have a significantly negative effect on firm-level exports to Europe.

Empirical studies also support a substitution relationship between FDI and export in research-intensive industries (Adler and Stevens, 1974; Gruber *et al.*, 1967; Horst, 1972). Evidence confirms that firms tend to substitute exports by subsidiary sales to internalise costs of production and also to maintain a market share in R&D-intensive industries. This is because firms with higher level of R&D are more likely to be facing oligopolistic conditions, so the firms' needs to pre-empt new entrants that would like to enter into the market have risen. In a cross section analysis of US FDI in 1962, Gruber *et al.* (1967) have found that export replacement is relatively higher in research-intensive industries. Moreover, they found that this export displacement varied with the destination countries. The levels of export displacement are higher in Europe than in non-European countries. These results are interpreted in terms of relatively strong oligopolistic market conditions among the more industrialised countries in Europe. While this regional difference is more profound in the research-intensive industries, a similar behaviour is seen in other industries, too.

The US chemicals and electrical machinery industries have also been found to exhibit a negative relationship between subsidiary sales and exports (Adler and Stevens, 1974). Adler and Steven's conduct a comparative static analysis of US subsidiary sales and exports to Canada, Germany, and Japan in 1966. However, the authors also have concluded that this is a static analysis and they do not take into account trade in intermediate goods, which might potentially reverse the negative relationship.

Based on the analysis of the US food processing industry, the study of Gopinath *et al.* (1999) shows that the nature of the product influences firms' decision to locate close to the end consumer. A panel data set is used for 10 destination countries, all of them being developed countries, from 1982 to 1994. The results of their analysis indicate that, though small, there is a negative relationship between US subsidiary sales and exports in the food processing industry. However, the authors recognise that the intensity of intermediate inputs used in this industry is very high, and unless more detailed data are used, it is difficult to verify whether increased trade in intermediate products will nullify the substitution effects.

Examining exports and foreign affiliate sales of US that covering 52 manufactures sectors across 38 countries, Helpman, *et al.* (2004) have interpreted how firms make up their mind when facing the choice of FDI and exports from the view of firm productivity differences. The empirical analysis of this work proves that the most productive firms choose to invest in foreign markets while the least productive firms choose to export. In this sense, FDI is more likely to substitute trade with the firms possessing higher productivity. Moreover, FDI tend to substitute exports when transport costs are high. They also point out that firm heterogeneity plays an important role in explaining the relationship between trade and FDI as well.

Kimino *et al.* (2007) point out in their paper that, multinationals' activities motivated by market penetration or barriers to trade tend to substitute for trade. Conversely, resource extraction and outsourcing FDI leads to an increased trade volume, thereby complementing trade. They have upheld that Japan's inward FDI is a substitution of source countries' exports by analysing the inward FDI in Japan from 1989 to 1992 in their work. Therefore, exports and direct investments are alternative ways to serve foreign markets.

While most of the empirical studies are supported by the theoretical rationale of the substitution thesis, the study by Pain and Wakelin (1998) remains an exception. They show that not just FDI in specific industries but also total outward FDI is export-replacing; i.e., FDI and export are substitutes. Their study covers 11 OECD countries from 1971-1992. However, their results also indicate that the export-replacing effect of FDI is not uniform for all countries. While they have found an overall small negative relationship for all the 11 countries, the cases of Japan, Italy, and Denmark demonstrate that net outward investment improves export performance. Finland does not exhibit any significant relationship, and the rest of the countries show a negative relationship.

This section shows that there is some empirical evidence that supports the substitution thesis as suggested by the import-substitution firm-based theories of FDI. These studies indicate that FDI has a negative impact on home countries' exports, and this negative impact could vary with the differences between the home country and the host country. This could be due to specific industries/sectors in which the investment is made, tariffs imposed by the host economy, development levels of host countries, and/or costs of transportation. In another word, factor endowments, including labour, capital and natural factor endowments, technology, and market openness, all influence the relationship between outward FDI and exports. Table 4.5 is presented below, summarising the empirical studies that support the substitution relationship.

Table 4.4 The Substitution between Trade and FDI - Summary of Major Empirical Studies

Author	Data Range	Countries and Industries	Major Findings
Adler and Stevens, 1974	1966	• Home country: US • Host country: Canada, Germany, Japan • Chemical and electrical machinery industry	FDI substitutes exports.
Belderbos and Sleuwaegen, 1998	1985-1989	• Home country: Japan • Host country: Europe • Electronic industry	In response of trade barriers, FDI substitutes exports.
Gopinath *et al.*, 1999	1982-1994	• Home country: US • Host country: 10 developed countries • Food industry	FDI is substitution of exports.
Gruber *et al.*, 1967	1962	• Home country: US • Host country: world	In high-tech industries, FDI is more likely to substitute exports; the degree of substitution is higher in developed host countries than other.
Helpman, *et al.*, 2004		• Home country: US • Host country: world • 38 manufactures sectors	FDI is more likely to substitute exports when firms with higher productivity.
Horst, 1972	1963	• Home country: US • Host country: Canada	Tariff enhances the substitution relationship between FDI and exports.
Pain and Wakelin, 1998	1971-1992	• Home country: 11 OECD countries • Host country: world	Except Japan, Italy, and Denmark show positive relationship between outward FDI and exports, rest countries show a negative relationship.
Kimino *et al.*, 2007	1989-2002	• Home Country: 17 Countries • Host Country: Japan	The inward FDI in Japan is rather substitution than complement of its source countries' exports.

4.3 Complementation between FDI and trade

4.3.1 Theoretical background

The research supports a complementary relationship between FDI and trade can be mainly divided into four categories, the theory of comparative advantages, firm-based theories of FDI, new trade theories, and the theory of industrial networks. The comparative advantage theory, like the H-O model, is derived from classical trade theory; however, it has been modified to accommodate capital flows. The main assumption is not the factor endowment differences anymore; instead, the technology differences are the necessities. Therefore, opposite to the traditional international trade theory discussed in previous section, the comparative advantage theory supports the complementary relationship between trade and FDI.

Moreover, the complementary relationship has also found support in the new trade theories. Compared to the traditional theories of trade, the new trade theories accommodate international production and therefore can be directly used to address questions regarding the relationship between FDI and trade. In addition to these trade theories, some of the firm-based theories of FDI also support the complementary relationship between FDI and trade. Finally, the theory of industrial or economic networks, which draws on the culture proximity, also supports the complementary relationship.

4.3.1.1 Theory of comparative advantage

The Ricardian theory of comparative advantages is one of the most fundamental economic theories explaining international trade. This theory states that each country specialises in the production of those commodities in which it has a relative cost advantage and therefore a comparative advantage in production. Such specialisation leads to exports of products that a country has a comparative advantage in exchange for products in which this country has a comparative disadvantage. The frame work of the Ricardian theory of international trade is similar to that of the H-O model, except that trading countries differ in relative efficiency of production, or technology, and hence relative costs, rather than in factor endowments.

The Ricardian theory is based on a framework that assumes that the trading countries have identical demand functions, are characterized by constant returns to scale, exhibit perfect competition, and have no other domestic distortions. Differences in relative cost advantages could stem from differences in technological capabilities between countries. Thus, unlike the H-O model, the Ricardian theory is based on the differences in technologies between trading countries. Under these conditions, the more advanced country tends to have a comparative advantage in the capital-intensive good and therefore exports capital-intensive commodities.

When this framework is modified to accommodate movements of capital across borders, rents in both countries will tend to become equalised and thus the more advanced countries will have higher wage-rent ratios. This means that capital will flow into the country that is already exporting capital-intensive commodities. Therefore, exports and inward FDI are complementary in such a scenario that capital flow increases with trade between two trading countries. In fact, by relaxing the assumption of identical technologies results of the H-O model are reserved. This is because, when technologies are no longer stipulated to be identical, the analysis becomes identical to that of the modified Ricardian framework, and hence international capital movements and trade become complements (Ruffin, 1984)

Purvis (1972) and Wong (1986) have also noted that the conditions under which the H-O model predicts a substitution effect are rather stringent. Further, the prediction is at odds with observations made in the real world. Purvis' model, an extension of the Ricardian theory of trade, assumes the following:

(i) Two countries produce two final goods under constant returns to scale;
(ii) Two homogenous factors of production are involved; and
(iii)There are identical tastes in both trading countries.

His model shows that when the assumption of identical tastes is dropped and the preference of the labour rich country changes in favour of the capital-intensive product, there is a capital inflow into the country. This generates further demand for the capital-intensive product in the labour rich country. The capital inflow, which generates further demand for capital-intensive products, also leads to a higher volume of trade. However, as per this model, complementation between capital flows and trade is only one of the possible results. The sufficient condition for a complementary relationship is that the initial capital outflow generates an excess demand for imports in the labour abundant economy and a simultaneous excess supply of exportables in the capital rich economy. This is ensured only when the capital rich country is exporting a capital-intensive rather than a labour-intensive commodity.

Predictions under the comparative advantage theory of international trade are thus radically different from that obtained under the H-O framework. They tend to indicate that FDI complements trade as capital movements lead to an increase in the volume of trade. Therefore, the theory of comparative advantages has been extended to describe the relationship between FDI and trade between developed and developing countries (Kojima, 1978a, 1978b; Schmitz and Helmberger, 1970). The question raised here is, whether investments from developed to developing countries are trade creating in nature, and therefore if they are beneficial for the developing countries.

Schmitz and Helmberger (1970) have showed that when technologically advanced countries make investments in the primary sector of resource rich countries, it leads to increased exports of capital goods from the home country. The investment is made due to differences in both factor endowments, and differences in demand and production conditions. This leads to the vertical integration of production between developed and developing countries, with the labour-intensive production taking place in developing countries and the capital-intensive production between developing and developed countries is known international division of labour (IDL). FDI undertaken to exploit IDL and thereby vertical integration of production leads to intra-industry trade between countries. The developed country becomes a net exporter of capital-intensive intermediate products and a net importer of labour-intensive final products. Thus, international investment made in resource-based production leads to increased levels of trade, and is therefore trade creating in nature (Cantwell, 1994).

Kojima, a leading Japanese economist in international economics, puts forward the theory of comparative advantages to investment by examining the trade and FDI between the US and Japan (Kojima, 1977). By taking international division of labour into account, the study shows that comparative profitabilities in trade-oriented FDI conform to the direction of potential comparative costs and, therefore, complement each other. In other words, FDI going from a comparatively disadvantageous industry in the investing country, which is potentially a comparatively advantageous industry in the host country, will promote an upgrading of the industrial structure on both sides and thus accelerate trade between the two countries.

When the investments are made in sectors in which the home country has a comparative advantage, exports and foreign investments tend to be substitutes. This is because when an investing country has a comparative advantage in a product; it would create competitive production against its own exportables by investing abroad, and hence destroy trade (Kojima, 1978a). Kojima (1978b) applies this distinction to Japanese and US investments. He shows that Japanese FDI is trade creating as it is invested in sectors in which it has a comparative disadvantage. In contrast, US FDI tends to compete with its own exports and is trade replacing, because its investments are made in sectors in which US has a comparative advantage. Kojima's findings deny the essentiality of monopolistic advantages, and are quite suitable for medium-sized and small enterprises. They also point out a way for the enterprises in developing countries.

Under the comparative advantage theory framework, when trade takes place due to technological differences between countries or due to differences in tastes between countries, FDI is trade creating in nature; i.e., FDI complements trade. Markusen (1983) has shown that in cases where trade takes place due to increasing returns to scale, imperfect market conditions, different production technologies, and other distortions in home and host markets, FDI can be an additional basis for trade in goods. He suggests that differences in factor endowments are not wholly the basis of trade. They tend to be complementary when factors other than differences in factor endowments, such as increasing returns to scale, determine movements of goods and factors. He states that the case when trade in goods and factors are substitutable is a special case, which holds true only for the H-O basis of trade. These factors identified by Markusen, as the basis of FDI and trade, are dealt with in detail while discussing firm-based theories of FDI, new trade theories, and the theory of industrial networks.

4.3.1.2 Trade creating firm-based theories of FDI

While firm-based theories that gravitate towards import-substituting rationale tend to predict a substitute relationship, those that stress firm competitiveness and strategic behaviour tend to support the trade creation premise (Jacquemin, 1989; Patel and

Pavitt, 1991). Patel and Pavitt (1991) recognise the oligopolistic powers of firms, and suggest that this power makes firms use international trade and investments as combined means of exploiting their competitive advantages. Using investment and trade as combined means rather than as alternative means leads to increased levels of both intra-industry and inter-industry trade. This is especially the case when firms in developed countries have a slight competitive edge over their rivals.

Firms are able to develop a competitive edge in a series of closely related, but differentiated products, through innovations, and internalise their competitive advantages. The differentiated products are designed to cater to a wide spectrum of consumer demands. When this innovative success is embodied in nationally differentiated and firm-specific technology and organisation, it leads to both exports and an outflow of FDI. In such oligopolistic markets, FDI can be used to as an entry threat to other firms. By doing so, firms maintain their market share through both exports and foreign investments (Jacquemin, 1989). Such strategic behaviour of multinationals in oligopolistic markets leads to increased levels of intra-industry trade. Thus, FDI and trade are complements.

4.3.1.3 New trade theories

The new trade theories combine theories of FDI and trade, and seek to overcome some of the shortcomings in traditional trade theories. They integrate dimensions of imperfect markets, such as product differentiation and strategic firm behaviour, in a general equilibrium framework to explain the emergence of MNCs and resulting patterns of FDI and trade. This set of theories tries to explain the empirical observations of the growing volume of world trade, the composition of trade, intra-firm trade and FDI, and the large volume of trade between countries with both similar and dissimilar factor endowments.

The following section presents general equilibrium (GE) frameworks used in the new trade theories to explain the FDI-trade relationship. As opposed to partial equilibrium frameworks used in traditional trade theories, GE frameworks facilitate examination of simultaneous changes in intermediate and final goods markets, simultaneous changes in producer and consumer markets, and allow for feedback effects. The various frameworks under the new trade theories predict a complementary relationship between FDI and trade.

A GE framework of horizontally integrated MNCs

Helpman (1984, 1985) and Helpman and Krugman (1985) have presented various models in the early new trade theories within a GE framework of international trade. Inspired by the notion of advantages in Hymer's (1976) work, they indicate that a firm's decision in location choice for subsidiaries and decision to trade result from differences in factor endowments. This framework basically incorporates the operations of MNCs within the relative factor endowments trade theory. Important features of this framework are that firms operate under conditions of product differentiation, economies of scale, and monopolistic competition. Moreover, the capability of firm to internalise factor inputs like management, marketing, and R&D, is recognised. These inputs are therefore available to different product lines of the firm without necessarily being located at each of their plants, making arm's length trade redundant. In fact, this is the key assumption here in predicting the emergence of multinationals and the resulting patterns in international trade.

The simplest model, under this framework, takes the form of a two-sector, two-product model, with identical preferences of consumers across countries (Helpman, 1984). Of the two products, one product is homogenous and the other is a differentiated product. This model assumes that the firms are single product firms so that each firm produces only a single variety of the differentiated product. The production of the differentiated product involves two factors, one being labour and the other a general purpose input. The general purpose input includes all inputs other than labour, like R&D. the cost of production is determined by R&D cost and labour cost put together. This model also assumes that firms do not face any transportation costs or tariffs. Given that a firm does not face any transportation costs or tariffs, and is able to internalise R&D costs, minimizing the labour cost component optimizes the cost of production of each variety. MNCs emerge because of their ability to exploit lower wages abroad without incurring any additional R&D costs. In such a model, multinationals emerge only in the presence of sufficient differences in factor endowments. The production of relatively more labour-intensive products is located in countries abundant in labour, and likewise with capital-intensive products. Thus the emergence of MNCs at different locations due to differences in factor endowments leads to inter-industry trade.

While these models are able to explain the complementary relationship between FDI and trade, they are able to explain only intra-industry investment flows between economies dissimilar in factor proportions. In effect, they support only inter-sectoral trade between developed countries. However, the shortcoming of these models is that they cannot explain intra-industry investment flows between economies with similar factor proportions. Horstmann and Markusen (1987) have proposed a new model, which deals with horizontal integration using imperfect competition to explain the trade and FDI between two countries with similar factor endowments. Conditions proposed here show that horizontal MNCs are more likely to undertake FDI and trade when trading countries are more similar in factor endowments (Horstmann and Markusen, 1987; Markusen, 1984; 1995; Markusen and Venables, 1996; 1998).

Horstmann and Markusen (1987) propose a two- country, two-factor, two-product model in this framework of horizontally integrated multinationals. Assuming that production units are manufacturing identical products in different countries, multi-plant scale economies are generated. Such scale economies encourage centralised production, leading to the emergence of MNCs that serve foreign markets through exports due to increasing returns in R&D intensive production. This implies that horizontal MNCs are more likely to emerge in industries in which firm specific costs and tariff/transportation costs are large relative to plant scale economies. The production structure of horizontal MNCs leads to the reduction of inter-industry trade between developed countries, countries with similar endowments. It is because horizontal MNCs take place only in inter-industry trade and the volume of intra-industry trade continues to grow and complement investments.

In addition to market imperfections, Markusen (1986) proposes a model of horizontal MNCs with the prevalence of non-homothetic demand functions, that is, demand functions with different income elasticities, across countries with similar per-capita income levels. This is a contrast to previous models based on homothetic demand functions, which predict that intra-industry trade will take place between countries with dissimilar income levels. Due to non-homothetic demand functions, both trade and FDI are increased between horizontal MNCs in countries with similar income levels.

The proximity concentration model of MNCs

The proximity concentration model addresses the shortcoming of the Helpman and Krugman models, and tries to explain the conditions that lead to the two-way flow of investment and trade. This model is based on the premise that MNCs are faced with a trade-off between exploiting advantages due to proximity to the consumer and those due to concentration with other producers. The proximity advantages include a reduction in transportation costs and overcoming tariff barriers. On the other hand, benefits due to concentration result from economies of scale. The model indicates that concentration advantages dominate upstream production activities, while proximity advantages dominate downstream production activities (Brainard, 1993; 1997).

This model is based on a two-sector, two-country framework where firms in a differentiated product sector choose between exporting and FDI through multinational activity as alternative modes of servicing a foreign market. The differentiated product sector is characterized by multi-stage production and increasing returns of scale due to R&D activity. The firm undertakes multi-plant production as opposed to single plant production when the proximity benefits outweigh the concentration benefits due to economies of scale. In this framework, Brainard analyses the emergence of FDI and trade patterns as a result of tariff and transportation costs both with and without differences in factor endowments between trading countries.

In the absence of differences in factor endowments, higher transportation and tariff costs lead to proximity benefits outweighing concentration benefits. This leads to multinational activity that takes place in both directions (bi-directional FDI), between two trading countries, in the same industry, and is undertaken by multi-plant firms. Such two-way FDI flows result in intra-industry, intra-firm flows of intermediaries and thus complementation between FDI and trade. The two way trade (bi-directional trade) between firms in countries with similar factor endowments is primarily in corporate services. This is similar to the functioning of horizontal MNCs.

When both differences in factor endowments and proximity/concentration factors are incorporated in this framework the pattern of trade and investment will depend on their relative strength. Relatively higher concentration advantages, along with moderate differences in factor proportions, are more likely to lead to one-way investment flows in the form of single plant multinationals and bi-directional inter-industry trade between the two countries. As the differences in factor proportions increase, manufacturing facilities in the two markets become more unevenly distributed, that is, production facilities in the two-markets will have a much wider difference in technological capabilities. This scenario is similar to that predicted by the Helpman and Krugman model. On the other hand, when proximity advantages dominate with moderate differences in factor proportions, again inter-industry trade takes place but multi-plant MNCs are more likely to emerge. This scenario explains bi-directional flow of FDI and trade between many developed countries. As factor price differentials increase, MNCs are likely to evolve into single plant facilities. This theory then supports a complementary relationship between FDI and trade.

A GE model of vertically integrated MNCs and arm's length trade

Helpman (1985), Gross and Helpman (1989) are the earliest experts that combine vertical integrated MNCs into the model. They introduce intermediates in their studies, and allow the vertical integrated MNCs to split the production process, and place certain stages abroad. Therefore, FDI does not substitute trade completely; instead, it will bring about imports of intermediates.

Helpman (1985) builds upon his earlier model by allowing for multi-product firms. There is no overlap of the varieties produced by different firms in this model, while a single firm produces a set of differentiated products. Here, the production of differentiated products requires three components: headquarter services, labour, and intermediate inputs. As both horizontally and vertically integrated firms are present, they share these inputs. Due to monopolistically competitive conditions, MNCs exploit firm specific assets that result in intra-firm trade in headquarter services and intermediate products. Trade patterns predicted by the model again depend on relative factor endowments. However, this model differs from the earlier version, in which it accommodates both vertical and horizontal integration of MNCs. As factor endowments become more similar, trade does not take place due to the cost minimizing motive of the multinational. Rather, trade takes place due to increasing returns to scale and product differentiation. The model is then able to predict the simultaneous existence and increasing volumes of inter-sectoral trade, intra-industry trade, and intra-firm trade due to FDI.

Further, Grossman and Helpman (1989) modify the earlier models into a dynamic framework. The dynamic model is based on the assumption that multinationals are constantly engaged in R&D and product development. Since the firms incur a cost associated with the introduction of new products, they are motivated to endogenise profits by participating in both FDI and trade. The home country of the MNC, typically a capital rich country, transforms from a net exporter to a net importer of differentiated products and becomes a net exporter of headquarter services and intermediate products. The dynamic model then predicts that, given differences in factor endowments, product development over time will lead to an increased level of both trade and foreign investments, thus increasing their complementtion overtime.

The latest evolution of the vertically integrated GE theory is introduced by Konan (2000). Konan's model is based on a two-country framework with the home country being relatively more abundant in skilled labour. The focus here is on two industries, one an intermediate good, and the other a final good. The intermediate good is homogenous and is produced by unskilled labour-intensive technology in an oligopolistic market. The final product is produced under monopoly conditions using skilled capital-intensive technology in the home country. Thus, the final product is produced within the home country and firms need to decide on the sourcing of their intermediate products where they face oligopolistic mark-ups. The oligopolistic mark-ups and wage differentials determine the trade-off between MNC production and arm's length trade for a firm. Oligopolistic mark-ups faced by firms in turn depend on the share of the multinationals' demand for the intermediate product.

When the multinational's demand for intermediate goods is not a significant share of the total demand, the MNC is a price taker. The oligopolistic producers in low wage countries will have a higher mark-up on the intermediate products. Thus, MNC production will emerge in place of arm's length trade when foreign wages are moderately low and mark-ups are moderately high. This implies that given that low wages exist in the foreign market, the higher the oligopolistic mark-up, the higher is the chance that a firm will vertically integrate its production rather than conduct arm's length trade.

On the other hand, when an MNC's share of intermediate demand is significant, it is no longer forced to take the price set by the oligopolistic producer. As wages increase, the oligopolistic producer is forced to reduce the mark-up. For a given level of oligopolistic mark-ups, MNC production arises with a greater wage differential between the two countries. This implies a higher degree of vertical integration and therefore inter-firm trade, when the wage differentials are greater between countries. Thus, this framework also supports a complementary relationship between FDI and trade. It differs from the earlier ones in that it does not assume the absence of arm's length trade, and is similar to that of Helpman and Krugman (1985) in that it predicts a greater volume of complementation when wage differentials between trading countries are higher.

By examining a US-Japan case, Blonigen (1999) and Head and Ries (2001) both find strong support for complementary trade and FDI. Intermediate goods are the main factors that contribute to the complementary relationship, especially in the automobile industry. However, the vertical integrated story seems only important in certain industries or between certain countries. Moreover, when the vertically integrated MNCs consider whether or not to put certain process abroad, they have already made comparison between trade and FDI based on the assumption of substitution relationships.

A multiproduct multinational reciprocal dumping model

The multiproduct, reciprocal dumping model also supports the complementary relationship between trade in goods and services and FDI undertaken by MNCs (Baldwin and Ottaviano, 2001). The premise for a complementary relationship between FDI and trade in this framework is that multiproduct multinationals find it optimal to produce some varieties of their products in the home country and some other varieties in foreign markets. While this framework is quite different from the proximity-concentration framework of Brainard, it also addresses the issue of not just intra-industry trade but also intra-industry FDI between countries.

Krugman (1981) believe that the rivalry of oligopolistic MNCs is an independent cause of international trade. The models show that the rivalry nature of MNCs will cause the 'dumping' of output in foreign markets. However, this dumping are reciprocal, therefore, two-way trade emerges. In order to maximise the profit, MNCs tend to operate at the point that the marginal cost equals to the perceived marginal revenue, taking the revenue depressing effect and price effect into consideration.

Therefore, as sales are related to the reduced revenue-depressing effect, MNCs prefer to accept a lower price-marginal-cost gap in the markets where it sells little. However, while this model shows how MNCs engage in international trade, it is unable to explain the foreign investment made by MNCs.

Baldwin and Ottaviano (2001) further improve this model. They assume that multinationals are multiproduct firms that supply a range of imperfectly substitutable products. The decision of how many products to produce is a trade-off between revenue generation due to the new product and revenue depression due to the cannibalisation effects. The cannibalisation effect refers to the process where new products of the same firm tend to eat into the market share of existing products. This model assumes that transportation costs are not entirely absorbed by the firms making the imported varieties more expensive to the consumer. It recognises that there will be displacement of exports to some extent, but substitutability is unlikely. Under these conditions, a multiproduct MNC, due to the presence of at least partial barriers between economies, distributes the production facilities to minimize the "cannibalisation effect". Producing the differentiated products in different markets enhances trade between the countries and minimizes the cannibalisation effects.

When similar MNCs exist in two developed countries, there is a two-way FDI flow between them. The operating profits of domestic investments are higher than that of foreign investments because of the cannibalisation effects in the domestic economy. As the operating profits of the domestic investments are higher, the firms incur an apparent higher rate of return in their domestic investment compared to the foreign investment. FDI is viewed as dumping. Hence the two-way FDI between developed countries, under these conditions, is viewed as reciprocal dumping. The multiproduct multinational reciprocal dumping model thus predicts a complementary relationship between FDI and trade. It best explains the complementary for industries in which intermediate goods and vertical integration are dominant features.

The review of new trade theories of trade and FDI in this section shows that these theories largely support the complementary relationship premise between FDI and trade. Different models are proposed to show how FDI and trade evolve and complement each other under different conditions. However, these theories largely focus on the complementation due to FDI undertaken by multinationals. The following theory of industrial networks, on the other hand, proposes conditions under which both smaller firms and MNCs operate, which lead to a complementation between FDI and trade.

A GE model of international trade within the OLI framework

Ethier's (1986) GE model of the multinational firm also supports a complementary relationship between FDI and trade and tries to explain increasing FDI and trade between countries with similar factor proportions. This model, building from Dunning's OLI framework, explains the emergence of multinationals and the resulting increase in both FDI and trade. The three important features of this model are:

(i) The firm possesses ownership advantages;
(ii) Locational conditions force the firm to expand across national borders; and
(iii) Internalisation of transactions is preferable to arm's length transactions across markets.

Ethier (1986) has stressed that internalisation is not only an important factor in determining foreign investments, but also a determining factor in international trade patterns. The GE model of international trade and investments presented by Ethier (1986) consists of two countries, two factors, and two goods with the factors not being traded. Of the two goods, one is a primary product and the other a manufactured one. The manufactured goods are a collection of differentiated products, which involve three stages of production: research, upstream production, and downstream production. The upstream production cost is determined by the quality of the product. The different levels of quality in turn are available to the firm due to research activities. The downstream production is that of a primitive product. The consumers are assumed to have identical tastes in both trading countries.

Given these conditions, when the factor endowments are sufficiently wide apart in two trading countries, all R&D will take place in the home country and therefore there will be no FDI. Inter-industry trade will take place with the capital rich country being a net exporter of R&D intensive products and being a net importer of primary products. However, when the relative factor endowments are more similar and a wide range of products is produced, MNCs undertake FDI to produce some of these products in foreign countries. The convergence of factor endowments will lead to a reduction in inter-industry trade but will promote FDI and intra-industry trade. FDI undertaken by MNCs in this model are bi-directional investment between countries with relatively similar factor endowments. Important factors in this framework that lead to the MNCs undertaking both FDI and trade are the dispersion or the variety of goods that is produced by the firm, combined with the firm’s ability to internalise R&D activities that go into manufacturing these products. This model differs from the Helpman and Krugman (1985) models in that it recognises that MNCs emerge when factor endowments between countries are more similar.

4.3.1.4 Theory of industrial/economic networks

The network theory has been used widely in various branches of social sciences (economics, geography, and sociology), as well as in business and industrial management, such as Rauch (1999) and Rugman and D’Cruz (1994). “Networks” basically describe how economic and non-economic factors interact with each other, with connectivity, reciprocity, and embeddedness, being the key aspects of such interaction (Thrift and Olds, 1996). Thrift and Olds identify four ways in which networks can be used to describe social processes. First, networks can be used to describe a range of governing institutions, from firms in the market to regulatory bodies. Second, networks can be used in the context of social processes like labour markets and the formation of ethnic cliques. Third, networks can be used in the analysis of cultural aspects of a society. Finally, networks can be used in a general sense of connection and separation of bodies.

Network analysis within economic geography is evolving in the context of industrial districts and their spatial organisation (Yeung, 1994). The network analysis of industrial districts has been undertaken at both the micro and macro level. Scholars from the Scandinavian school of industrial networks, in particular, have extensively addressed issues of industrial networks in the context of transportation as well as international trade and investments (for example, Hacker and Johansson, 2001; Johansson and Westin, 1994).

The Scandinavian School of thought contends that economic activities between consumers and suppliers establish links, which leads to the formation of industrial/economic networks. In the context of international trade and FDI, the industrial network theory views such international business activity as an extension of these links to a foreign network (Johansson and Mattson, 1987). In other words, the basic premise of this theory is that all firms are embedded in networks, which are linked via economic agents like buyers and suppliers. The economic agents engage in FDI and trade in order to gain access to strategic capabilities that complement their capabilities or pool their resources with other economic agents possessing similar capabilities. For example, strategic links through foreign investments can gain access to resources in a foreign market. These resources could be natural resources or market intelligence, technological know-how, and market expertise. These strategic links, then, can be interpreted as a combination of location, ownership, and internalisation advantages, as explained by firm-based theories of FDI.

The industrial networks theory also goes beyond the firm-based theories in that this approach considers the co-ordination of market activities to be determined by factors over and above the price-mechanism. This theory does not assume that firms' primary objective is to minimise costs, with which the price is the only one of many factors contribution to the decision-making of, and coordination between, firms. A cost-benefit analysis is no longer the driving force behind decision making (Yeung, 1994). For instance, the proximity factor in exchange of goods and information is considered more organisational than geographical in nature (Burmeister, 2000). Economic and network links can be formed between countries due to a variety of reasons like cultural ties, linguistic similarities, historical links, factors that are sometimes clubbed together as psychic distance special concessions, and long-term commitments. Such psychic distance need not always translate into the physical distance between countries (Aberg, 2001; Johansson and Westin, 1994). Therefore, the network links between firms can be due to non-price factors, like personal relationships, language and other cultural ties, historical ties. According to this industrial networks theory, internationalisation can be achieved in three ways:

(i) By establishing an international extension of national counterparts in a foreign economy;
(ii) By deepening its presence or penetrating into a foreign network through increasing its commitment abroad; and
(iii) By increasing coordination between various national networks, that is, international integration.

This theory also differentiates between the degrees of internationalisation of a firm. A higher degree of internationalisation implies stronger relationships between different national networks and *vice versa* (Johansson and Mattsson, 1987).

Under the purview of the networks theory, firms' position within the national networks determines the internationalisation process (Johansson and Mattson, 1987). This is because the national networks determine a firm's ability to mobilise resources in a foreign market. Under the network theory, it is not just the firm's position in the domestic market, but also the position of the network of firms in the domestic market that determines the internalisation process. In this sense, the network theory goes beyond what firm-based theories interpret as ownership and internalisation benefits. National networks, however, can be very different in nature. For example, while Japanese *Keiretsu*'s (*Keiretsu* – a Japanese word meaning 'series', which is often seen as a thoroughly Japanese form of business practice involving long-term relationships between firms (Aoki and Lennerfors, 2013) use joint power to penetrate foreign markets, loosely structured relatively small and independent Taiwanese firms penetrate the foreign market with their network advantages (Chen and Chen, 1998).

The internationalisation of firms, as viewed by this theory, is an adaptation process, which depends on linkages between the national and foreign market. Hence the internationalisation process of a firm not only depends on its national networks, but also on how the national networks can interact and be coordinated with the foreign market networks. The level of ease with which networks are formed between two countries, then, depends on the degree of homogeneity of networks in two countries. Similarities in participating networks reduce transaction costs by reducing the adaptation process (Johansson and Karlsson, 2001; Johansson and Wiedersheim-Paul, 1975; Johansson and Vahlne, 1977).

The network theory incorporates interaction of linkages between markets at both the micro and macro level. This interaction could be factors that either enhance or dampen the internationalisation process. Factors that are incorporated under this theory are firm-specific advantages at micro level. This can include links formed due to assets, such as technological know-how, managerial expertise, and other strategic assets. The "durability" or the long-term effects of expenditure on such assets is what establish links. Similarly, at the macro level, links are formed due to natural factors like physical proximity, presence of natural resources, or due to policy variables like special incentives offered by economies to encourage investment and trade, trade blocs, and other economic/political policies.

When applied to the FDI-trade relationship, the network theory predicts the links formed between countries will stimulate both investments and trade, and thereby lead to a complementary relationship. The complementation is based on the premise that both FDI and trade use similar links within a network. Hence, once a link is established, it is likely to lead to an increase in both FDI and trade (Johansson and Vahlne, 1977; Johansson and Westin, 1994).

This section reviews the theories that reveal a complementary relationship between FDI and trade can exist under various conditions. These theories also show that the extent of the complementary relationship depends on factors like proximity between home and host countries, differences in factor endowments between the two countries, and production structures of MNCs. A summary of the theoretical works examining the trade creating effects of FDI on trade is presented in the following table.

Table 4.5 The Complementation between Trade and FDI and Driving Factors - Summary of Major Theoretical Studies

Author	Factor involved	Relationship
Comparative Advantage Theory		
The Recardian Framework	Technological differences	Inward FDI complement exports
Purvis, 1972	Technological differences	Inward FDI complement exports
Wong, 1986	Technological differences	Inward FDI complement exports
Kojima, 1978	Technological differences	In comparative disadvantage industry, outward FDI complement exports; in comparative advantage industry, outward FDI substitute exports.
Schmitz and Helmberger, 1970	Technological differences	Outward FDI complement imports
Markusen, 1983	Technological differences	FDI complement trade
Trade Creating Firm-based Theories		
Patel and Pavitt, 1991	Technological differences	Outward FDI complement exports
Jacquemin, 1989	Technological differences	Outward FDI complement exports
New Trade Theories		
Helpman, 1984	Large factor endowment differences	FDI complement inter-industry trade
Helpman, 1985	Relative factor endowment, market size	FDI complement inter-industry trade
Helpman and Krugman, 1985	Factor endowment differences	FDI complement inter-industry trade
Grossman and Helpman, 1989	Factor endowment differences	FDI complement inter-industry trade
Konan, 2000	Large factor endowment differences, technology advance	FDI complement trade
Hosrtmann and Markusen, 1987	Similar factor endowment, low market openness (high tariff)	FDI complement intra-industry trade, reduce inter-industry trade.
Markusen and Venables, 1994	Similar factor endowment	FDI complement trade
Markusen, 1986	Similar factor endowment	FDI complement trade
Either, 1986	Similar factor endowment	FDI substitute inter-industry trade, but promote intra-industry trade.
Brainard, 1993; 1997	Low market openness (high tariff), similar factor	FDI complement trade

	endowment, large market size	
Baldwin and Ottaviano, 2001	Similar factor endowment	FDI complement trade
Theory of Business/Economic Networks		
Johansson and Vahne, 1977	Strong business network (small transaction cost)	FDI complement trade
Johansson and Westin,1994	Strong business network (small transaction cost)	FDI complement trade
Johansson and Wiedersheim-Paul, 1975	Strong business network (small transaction cost)	FDI complement trade

4.3.2 Empirical evidence

There is a fairly large body of empirical studies supporting the complementary thesis between FDI and trade. A summary of empirical studies showing this positive FDI-trade relationship is presented in Table 4.6. Unlike studies that support the substitution relationship, the thesis that supports a complementary relationship covers a much wider set of countries and over a longer period of time. Empirical studies supporting for a complementary relationship shows that the positive relationship stems from the kind of FDI that leads to inter-industry, intra-industry, as well as intra-firm trade.

Overall, empirical studies examining the relationship between US FDI and exports support a complementary relationship (Lipsey and Weiss, 1981; 1984; Meredith and Maki, 1992). Lipsey and Weiss (1981) have showed that US FDI abroad has a positive impact on US exports of manufactured goods. This study, covering 44 destination countries in 1970, is conducted at the industry level with 14 industries. Horizontal and vertical integration of US affiliates with parent companies, as proposed by the new trade theories, explain this complementary relationship. Increased levels of manufacturing exports could be due to trade in both intermediate and/or final products. The results of this study indicate that, in addition to an overall complementary relationship, there is no significant difference in US FDI-trade relationship between developed and developing destination countries of FDI. US foreign production is trade creating in both developed and developing countries. This suggests that, when classified as developed and developing countries, differences in factor endowments between them do not influence the positive effects of FDI on exports.

However, the results have also showed that, while US affiliates abroad increased their own exports, they tended to reduce other countries' exports to the same host country. Thus, by investing abroad, US affiliates do not seem to create competition for their own exports but for other countries' exports. The theoretical basis for this can be found in Patel and Pavitt's (1991) explanation, where they suggest that, when multinationals from developed countries achieve innovative success, their products, their firm-specific technology, and their organisation become nationally differentiated. As a result of nationally differentiated products, MNCs encourage both FDI and trade from their home country but compete with other foreign MNCs.

Subsequently, Lipsey and Weiss (1984) also suggest that foreign production is not only strongly related to exports of intermediate goods, but also positively related to firms' exports of finished products from the US. Meredith and Maki's (1992) analysis of US FDI and exports to Canada also shows support for a complementary relationship. Their study indicates that, both FDI market share and US export market share in Canada are good explanatory variables of each other, implying a complementary relationship. The implication drawn from this finding is that, the presence of FDI in Canada explains a great part of US exports to Canada.

The complementation between FDI and trade exposed by both Lipsey and Weiss (1984) and Meredith and Maki (1992) further supports the theory that the complementation arises from oligopolistic forces within the market. As suggested by Ethier (1986), Patel and Pavitt (1991), MNCs maximize their profits by internalising the foreign markets, thereby leading to a complementary relationship between FDI and trade. The positive relationship between foreign production and exports of finished products is also supported by the theory that the host and home economies have non-homothetic demand functions (Markusen, 1986), thereby leading to FDI and trade of a series of related but differentiated products.

Gubert and Mutti's (1991) study of US affiliates in 33 destination countries for 1982 have showed, in addition to an overall complementary relationship, the positive impact on trade is enhanced when investments are made in countries with low tax rates. Such a business environment is typical in host economies that have adapted export-led growth policies. The authors, however, recognise that while low taxes led to trade creating FDI in that particular host country, such FDI could have a negative impact on exports to other countries. For example, tax incentives offered by a country like Ireland may lead to increased FDI and exports from the US to Ireland; however, such incentives might also divert US exports away from other European countries. While tax-incentives have a positive impact on exports and FDI by creating a location advantage, trade barriers like tariffs may have a negative impact. However, the empirical evidence showing an overall positive export-FDI relationship, suggests that while tariff barriers may dampen the trade creating effects, they are unlikely to lead to overall trade replacement or substitution.

Graham's (1999) analysis of US FDI-trade relationship looked at the possible variations in the relationship in different regions. The analysis, conducted for 1983, 1988, and 1991, revealed complementary relationship for all the years. US FDI is trade creating in Europe, East Asia, as well as in the Western Hemisphere. Following Graham's (1999) work, Pantulu and Poon (2003) also support this complementary relationship between FDI and trade in their work by examining the data between the US and 33 host countries during the years of 1996-1999. Their results endorse Lipsey and Weiss' (1984) earlier study that US FDI is trade creating in both developed and developing countries. By examining the US FDI-trade relationship with Mexico during 1977-1994, Wilamoski and Tinkler (1999) find that US FDI is responsible for the rapid increase in trade (both manufacturing imports and exports) between the two countries, and that the positive effects on US exports outweighed the effects on imports. The results however indicate that this positive effect on the trade balance may reduce over time, which support our guess that the trade-FDI relationship is dynamic and varies with time and development status of participating countries.

Empirical studies on Japanese investments also indicate that they are trade creating in nature (Aberg, 2001; Goldberg and Klein, 1998; Graham, 1999; Head and Ries, 2001; Kimura and Kiyota, 2006; Lipsey *et al.*, 2000; Pantulu and Poon, 2003; Yamawaki, 1991; Yu and Zhao, 2008). Like the US, Pantulu and Poon (2003) examine the data of Japan and 29 host countries from 1996 to 1999, and have found out that Japan's outward FDI, both flows and stocks is significantly positively influence its exports. The study of Lipsey *et al.* (2000) also indicates that Japanese FDI and exports of manufactured goods exhibit complementary effects. Furthermore, the Japanese export-FDI relationship indicates that their complementation has grown stronger over time, especially after controlling for parent firms' size as well as host economy's size and income level. These results find theoretical support in the new trade theories.

In addition to the complementary due to horizontal and vertical integrations of firms, Grossman and Helpman's (1989) dynamic model suggests that the trade creating effects of FDI will strengthen over time. Kimura and Kiyota (2006) examine the relationship between exports, FDI, and firm productivity in their paper. They have used longitudinal panel data on Japanese firms from 1994 to 2004, and found out that the most productive firms engage in exports and FDI, medium productive firms engage in either export or FDI, and the least productive firms neither exports nor invest abroad. They believe that the relationship between exports and FDI should be complementary.

Besides the manufacturing sector, Japanese investments in the wholesale trade sector also show a complementary relationship (Head and Ries, 2001; Yamawaki, 1991). Yamawaki (1991) examines the effects of Japanese FDI on its exports, using a cross-section analysis of 44 Japanese manufacturing subsidiaries in the US in 1986. Regression estimates have revealed that Japanese investments in distributional activities enhanced Japanese exports to the US. Empirical analysis by Head and Reis (2001) corroborate Yamawaki's results. Their analysis of 932 Japanese manufacturing firms over 25 years (1966-1990) shows that FDI in both manufacturing and distribution facilities led to increased exports from Japan at the aggregate level.

The complementary relationship between Japanese FDI and trade exhibits a regional bias (Goldberg and Klein, 1998; Graham, 1999). Using time series data for 15 years (1978-1993), Goldberg and Klein (1998) have found that Japanese FDI in Asian countries (Indonesia, Malaysia, Philippines, and Thailand) is more trade enhancing than Japanese FDI in Latin American countries (Argentina, Brazil, and Chile). Graham's (1999) analysis demonstrates that, like US investments, Japanese investments also have a significant positive impact on exports and imports. However, unlike US investments, Japanese FDI exhibits regional differences in trade creation. Japanese FDI has a positive impact on both exports and imports in both East Asian countries and non-East Asian countries. The regional bias exhibited by Japanese FDI and trade is supported by Brainard's (1993) proximity-concentration theory (within the new trade theories). The trade-off between concentration and proximity for Japanese multinationals in other Asian countries is minimized, and hence leads to a higher degree of complementation.

The bias of Japanese FDI and trade toward other Asian countries is also supported by the theory of industrial networks. Industrial networks have been formed within this region due to both cultural and physical proximity. Aberg's (2001) study, examining the variation in the export creating effects of Japanese FDI in different countries, shows FDI is more export creating in many of East and Southeast Asian countries. However, Aberg's study has also shown that Japanese FDI has high export-creating effects in developed countries like Germany, the UK, and the US. While transaction costs in the industrial networks within Asia are minimised due to cultural factors and physical proximity, transaction costs within the networks in developed countries are minimised due to large markets. Recent study of Yu and Zhao (2008) also supports the complementary relationship between Japanese FDI and trade. They analyse the impacts of Japanese FDI on Sino-Japanese bilateral trade during the period of 1983-2006 by using AR (Autoregressive) model, and find out the Japanese FDI in China facilitate both the exports and imports between China and Japan. That is to say, the relationship between them is complementary.

In addition to Japan and the US, empirical studies examining the FDI-trade relationship of Germany, Spain, Sweden, and Taiwan also support a complementary relationship (Heiduk and Hodges, 1992; Alguacil and Orts, 1999; Blomström *et al.*, 1988; Buck, *et al.*, 2007; Feng *et al.*, 2009; Lin, 1995). Based on a survey of the Ruhr industrial region in Germany conducted in 1990, Heiduk and Hodges have found that 81.5 per cent of the firms are active abroad, and though exporting is the dominant form of internationalisation (81.2%), a fairly substantial percentage of firms are engaged in FDI abroad (22.6%). Compared to MNCs, small medium enterprises (SMEs) are more inclined to exports, and their investments are relatively more concentrated in industrialised countries. However, both German MNCs and SMEs exhibit a high international involvement through both exports and FDI. German MNCs undertake FDI in research-intensive sectors and those in which they have a strong competitive edge in their home economy. The formation of oligopolistic markets in such industry sectors suggests that German FDI should have a positive impact on trade.

Alguacil and Orts (1999) have claimed that, controlling for relative market size and prices, time series analysis of outward FDI and exports from Spain between 1970 and 1992 supported a positive long run causality running from FDI to exports.

Taiwanese FDI in four ASEAN countries (Indonesia, Malaysia, the Philippines and Thailand) have also exhibited complementary effects (Lin, 1995). Lin's analysis shows that while both FDI stocks and FDI flows had a significant impact on Taiwanese exports, only FDI stocks had a significant impact on imports. In the context of the modes of internationalisation, Chen and Chen's (1998) study also indicates that network linkages are an important factor for Taiwanese multinationals, and have helped them undertake FDI directly without going through exports or licensing. However, the impact of such FDI on trade is not addressed clearly.

While few studies that directly address the FDI-trade relationship of China, internationalisation patterns of China MNCs and relationship between Chinese inward FDI, exports and technology spillovers are drawing increasingly attention these years. Liu *et al.* (2001) examine the relationship between trade and FDI in China for the period of 1984-1998, and reveal that China's imports lead to growth in inward FDI, China's exports cause increase in inward FDI, and China's exports and imports are complementary of each other. It is indicated that exports of China lead to increase of inward FDI, which, in turn, cause more imports. They have managed to prove the complementary relationship between inward FDI and trade, but failed to give the explanation of such complementary relationship, and the factors that contribute to the complementary relationship. Moreover, only inward FDI is considered in the study and the effects of outward FDI is neglected. In our study, the above mentioned gaps will be filled in. A dynamic cycle framework between trade and FDI will be proposed stage by stage, and the relationship between trade and FDI will be examined in detail. Buck *et al.* (2007) apply a two-step modelling to investigate if a link has existed between the trade development path and export spillovers by analysing the pertinent export and FDI data during 1998-2001. It is believed that MNCs in China definitely affect local firms' exports, and inward FDI promotes export. Technology spillovers are proven under this circumstance. Feng *et al.* (2009) analyse the status and policy of attracting and utilising FDI in Russia, and make a comparison with China. It is emphasised that the FDI should not only promote the low-technology intensive trade, but facilitate the high level of trade as well. Therefore, the GDP of the country and the welfare will not being distorted.

Table 4.6 The Complementation between Trade and FDI - Summary of Major Empirical Studies

Author	**Data Range**	**Country and Industry**	**Major Findings**
Lipsey and Weiss, 1981	1970	• Home Country: US • Host Country: World	US FDI to both developing and developed countries is trade creating, therefore, the factor endowment differences is not major factors.
Lipsey and Weiss, 1984	1970	• Home Country: US • Host Country: World	US FDI positively affects both intermediate products and final products.
Meredith and Maki, 1992	N.A.	• Home Country: US • Host Country: Canada	Relationship of FDI and trade between US and Canada is complementary, and the degree is up to technology and the factor endowment.
Gubert and Mutti, 1991	1982	• Home Country: US • Host Country: World	Low tax enhances the complement relationship between trade and FDI, while high tariffs reduce such relationship.
Graham, 1999	1983, 1988, 1991	• Home Country: US and Japan • Host Country: World	US FDI is trade creating all over the world, no matter in developing countries or developed countries. Japan FDI is trade creating as well. However, the complement degree varies with the destinations. Distance is one of the important factors here (Proximity-concentration trade off).
Pantulu and Poon, 2003	1996-1999	• Home Country: US and Japan • Host Country: World	FDI of US has a positive and significant effect on US exports and imports. Japan's FDI also has a significant positive influence on exports.
Wilamoski and Tinkler, 1999	1977-1994	• Home Country: US • Host Country: Mexico	US FDI positively affect both exports and imports of US, where the impact on US imports is greater than exports.
Lipsey *et al.*, 2000	1986, 1989, 1992	• Home Country: US, Japan and Sweden • Host Country: World	US allocate labour intensive industries in developing countries while Japan and Sweden tent to allocate capital intensive industries abroad. All of US, Sweden, and Japan export-FDI relationship are complementary, but the impact on Japanese export is larger.
Kimura and Kiyota, 2006	1994-2004	• Home Country: Japan • Host Country: World	FDI complements trade, and with the increase of firm productivity (technology), the complementary relationship is enhanced.

Yamawaki, 1991	1986	• Home Country: Japan • Host Country: US	The distribution of Japanese FDI enhanced the trade creating effect.
Head and Ries, 2001	1966-1990	• Home Country: Japan • Host Country: World	FDI and trade exhibit a complementary relationship, but in those firms that unlikely to ship intermediate products abroad show substitute relationship.
Golberg and Klein, 1998	1978-1993/1994	• Home Country: Japan and US • Host Country: Developing countries in Asia and Latin America	Japanese investment in Asia is more trade enhancing than in Latin America while the US shows an opposite result (network).
Aberg, 2001	1990-1994	• Home Country: Japan • Host Country: World	FDI of Japan is more export creating in many of the East and Southeast Asian countries (network).
Yu and Zhao, 2008	1983-2006	• Home Country: Japan • Host Country: China	Japanese FDI in China increases both exports and imports of Japan. Therefore, FDI complements trade.
Heiduk and Hodges, 1992	1990	• Home Country: Germany • Host Country: World	German FDI positively affects its trade, and the positive impact varies with the technology of sectors.
Alguacil and Orts, 1999	1970-1992	• Home Country: Spain • Host Country: World	Spanish FDI has significant positive impacts on its exports.
Lin, 1995	1986-1991	• Home Region: Taiwan • Host Country: Four ASEAN countries	Taiwan's outward FDI has strong positive effect on both Taiwan's exports and imports, whereas no such impacts are found for Taiwan's inward FDI.
Chen and Chen, 1998	1994	• Home Region: Taiwan • Host Country: US, China, Southeast Asia	Network linkages are driving factors that motivate and facilitate Taiwan FDI growth.
Buck *et al.*, 2007	1998-2001	• Home Country: China • Host Country: World	Inward FDI of China has posed a significant positive impact on Chinese exports, therefore complementary relationship is verified.
Feng, 2009	N.A.	• Home Country: Russian, and China • Host Country: World	FDI should not only promote the low-technology intensive trade, but facilitate the high level of trade as well.

4.4 Mixed evidence of the FDI- trade relationship

Although there are many theoretical and empirical studies prove that there is a positive or negative significant relationship between FDI and trade, other works show that the relationship may be complex. It is hard to explain the relationship between trade and FDI simply by substitution or complementary. The relationship is affected by many elements.

4.4.1 Theoretical background

Vernon's (1966) product life cycle model (PLCM) is the earliest theory of international production and trade that attempts to explain the relationship between FDI and trade at different stages of a product. Based on long-term research on MNCs in the US, Vernon divides the life cycle of production into three stages: introduction of a new product, maturing product, and standardized product. In the early stage of introduction of a new product, the main purpose of production is to satisfy the consumers' demand in the own country. The production will be allocated in the home country; it does not only provide a close connection to the consumer, which helps to improve the product, but also avoids transport consideration. So only a small amount of export would come about in this early stage and no foreign direct investment emerges.

With the maturing of the product, consumers from both inside and outside the home country accept the product, demands expanding. Replica and substitution products have appeared and competed with the original one. Making things worse, tariffs and all kinds of trade impediments are imposed to protect national industry and market. So import of the new product will be limited, frustrating firms involved in exporting. The producer is forced to determine the place of production to reduce the cost and avoid the trade barrier. So commodity trade is replaced by direct investment. Therefore, the relationship between trade and FDI is substitute at this stage.

When comes to the standardised product, entrepreneurs' technological and monopolistic advantage are faded away, the competition between entrepreneurs turns into the competition of price, which transforms into the competition of costs. The result of such competition is that the original entrepreneurs mainly produce their products in developing countries with lower wages and costs. Then, the products will be exported back to the home country or other countries. Actually, this kind of investment substitutes commodity exports of the home country completely and even leads to increase of imports for the home country.

The product life cycle model successfully puts the FDI theory and international trade theory altogether, and relaxes the premise such as allowing the factor to be different and mobile, trade barriers exist in importing countries, production functions change with time. It makes the model much closer to the reality. However, the different trade creating effects at the different stages are not always so well defined because the stages of product life cycle itself are hard to be identified due to increasing rates of innovation (Vernon, 1979). Also, the product life cycle is based on the premise that a country (developed country) has a technological edge over other countries (developing countries). It does not explicitly recognise that the oligopolistic power of firms with a technological edge can lead to both international production and trade between two developed countries.

4.4.2 Empirical evidence

With the fast development of MNCs and the accelerating globalisation of the world economy, the relationship between FDI and trade is getting increasingly complex (Pantulu and Poon, 2003). Since not all the presumptions of economic models could be satisfied in the real world, many empirical studies indicate that the relationship between trade and FDI is mixed or not clear. This is further confounded by the complexity of the status of economies, which involves politics and many other factors. The US and Japan are the most popular countries under scrutiny.

The US is the largest economy in the world. According to the above review, US FDI and trade relationship is expected positive or negative under varied circumstances. However, many studies find mixed results (Swenson, 2004; Goldberg and Klein, 1998). Analysing a panel data set from 1974 to 1994, Swenson (2004) shows that US FDI and trade exhibit a complementary relationship at aggregated levels. However, when broken down into three components-product FDI, industry FDI, and overall manufacturing components FDI, mixed results have emerged. FDI exhibits a substitution effect on trade at product and industry levels, but it exerts a complementary effect on trade at the overall manufacturing components level.

Unlike the above industry specific studies that indicate a negative FDI-trade relationship, Goldberg and Klein's (1998; 1999) analysis shows that the FDI-trade relationship in the US is not clear. Their analysis is focusing on US FDI in Latin America between 1978 and 1993 at the sectoral level, and reaches the conclusion that there is no strong or systematic linkage between trade and FDI in Latin America. Lemi (2003) tests the role of MNCs and its impact on host countries by analysing a sample of US and developing countries. He points out that market, economic and policy uncertainties all posed different effect on the relationship between trade and FDI. However, his work fails to prove the complementary relationship between trade and FDI.

Studies on Japanese FDI and trade also expose a complex relationship. Blonigen's (2001) study focuses on Japanese investments in the automobile sector and consumer products in the US. As might be expected in a vertically linked industry, Japanese production of automobile parts in the US does not enhance exports from Japan. However, Japanese FDI in production of automobiles show a positive and significant impact on exports from Japan. On the other hand, a negative relationship between FDI and trade dominates in the analysis of consumer products. Therefore, the relationship varies with industries. This is further proven by Bedassa's (2003) work. He analyses the Japanese outward FDI and trade with its host countries during 1989-1999. The results indicate that the relationship between trade and FDI depends on the maturity of the industry. In some industries, such as food, beverage and tobacco, the relationship is complementary; while in some other industries, for example, wood, furniture and metal, FDI substitutes trade. There are also some industries where the relationship is not clear.

With the fast development of China, an increasing number of experts choose China to examine the relationship between trade and FDI. Although the results are not uniform and clear, such studies still provide many great ideas, which are valuable to advance research. Wang (2007) reviews the practice of both developing and developed countries in the relationship between FDI and trade. In particular, he analyse the relationship of China's overseas investment and exports. He concludes that the relationship could be substitute or complementary, depending on the industrial sectors, developing phases, and regions. By examining the trade and MNCs in China during the period of 1997-2003, Chen (2006) points out that the relationship between FDI and trade is not uniform across industries. Firm productivity, industry dispersion and concentration, and tax rate differences between home and host countries all affect the performance of trade and FDI. Therefore, the relationship also varies.

Research on other countries also shows hazy results. Svensson (1996) find that Swedish multinationals' sales abroad (proxy for FDI) replace parent exports of finished goods and complement parent exports of intermediary goods from 1974 to 1990. He has found that the net effect on parent exports is negative but this is not statistically significant. FDI in consumer products could also lead to inter-industry trade; it can partially displace exports of the same consumer products from the home economy. A time series analysis between 1969 and 1990 of Austria's FDI-trade relationship also only shows weak complementary relationship (Pfaffermayr, 1994).

Therefore, the relationship between trade and FDI is not simply substitute or complementary. It depends on many other things. When the countries or industries under examination change, different answers appear. A summary table of empirical studies showing mixed results is presented in follow.

Table 4.7 Summary of Major Empirical Studies Showing Mixed Relationship

Author	Data Range	Countries and Industries	Major Findings
Blonigen, 2001	1978-1991	• Home Country: Japan • Host Country: US • Automobile and consumer products	Japanese FDI in automobile sector positively affect its exports, while a negative effect is shown in consumer products.
Golberg and Klein, 1999	1972-1994	• Home Country: US • Host Country: 8 Latin American Countries	No strong evidence shows that US FDI in Latin American countries effect trade, no matter positive or negative.
Pfaffermayr, 1994	1969-1990	• Home Country: Austria	Relationship between FDI and trade in Australia show a weak complementary. The sign is positive, but not significant.
Svensson, 1996	1974-1990	• Home Country: Sweden • Host Country: World	Swedish FDI substitutes its exports of final products but complement its exports of intermediate products.
Bedassa, 2003	1989-1999	• Home Country: Japan • Host Country: World	FDI and trade relationship varies with industry. Substitution, complementary, and not clear relationship are all found in different industries.
Swenson, 2004	1974-1994	• Home Country: US • Host Country: World	US FDI complements trade at the aggregated levels, but substitute trade on the industry levels.
Chen, 2006	1997-2003	• Home Country: China • Host Country: World	Industry productivity level and tax rate differences between home and host countries, as well as the dispersion of industries, all contribute to the relationship between trade and FDI.
Wang, 2007	N.A.	• Home Country: China • Host Country: World	The relationship between trade and FDI could be substitution or complementary, depending on the industrial sectors, developing phases, and regions.
Lemi, 2003	1983-1999	• Home Country: US • Host Country: Developing countries	FDI and trade are not complementary of each other. Their relationship is affected by the political, economic, and marketing uncertainty.

4.5 Summary of Chapter 4

This chapter summarises the common determinants of both trade and FDI, and further verifies the determinants of trade-FDI relationship, including market size, market openness, factor endowment differences, technology distance, and network links. Moreover, this chapter also provides a summary of theoretical underpinnings of the FDI-trade relationship and presents empirical studies that have attempted to estimate the relationship between FDI and trade. The theoretical and empirical studies may be summed up as follows. First, the relationship between FDI and trade could be either substitute or complementary. However, there are more studies that support the complementary relationship between trade and FDI than substitution. Second, no matter how many theories are discussing about the relationship between trade and FDI, or which kind of relationship these studies support, the crucial factors that influence trade-FDI relationship are similar. The factors identified in this chapter are: factor endowments, technology level, market size, market openness and network linkages. These factors pose influences on the trade-FDI relationship by themselves or jointly. Third, in trying to estimate the relationship between trade and FDI, most of the studies focus on the effects of FDI on trade only, especially the effects of outward FDI posed on parent countries' exports. The effect of inward FDI on host countries' trade and the possible effect of trade on FDI are least investigated. Moreover, due to the most works are concentrated on the effects of outward FDI on trade, host countries characteristics are the major concern. Fourth, when considering the relationship between trade and FDI, most studies analyse the cases at one point in time with a cross-sectional data set. Seldom studies are looking into the relationship between trade and FDI from dynamic perspectives, with time series data or panel data. Therefore, they neglect the evolutions of countries and the importance of time when examining the relationship between trade and FDI. Lastly, a large amount of studies are focused on the cases of Japan and the US and other developed countries. The relationship between FDI and trade is less discussed for developing countries. Studies that investigate how FDI and trade interact between developing and developed countries are especially rare.

5 CHAPTER 5: HYPOTHESIS DEVELOPMENT, MODELS AND RESEARCH DESIGN

Based on the literature review in Chapter 3 and Chapter 4, this chapter develops an analytical framework for studying FDI-trade relationships and interactions. It puts forward two main hypotheses on the relationship between trade and FDI for developing countries and developed countries, being inspired by the product life cycle presented by Vernon. Research design follows, in conjunction with discussions of models and their implementation and estimation. The first hypothesis addresses the issue of whether the relationship between trade and FDI is complementary or substitute in the conjecture of a trade-FDI cycle. The second hypothesis focuses on the factors or determinants that contribute to the relationship between trade and FDI, and the ways in which these factors play a role and exert their effects. By developing and testing the pertinent hypotheses, this study attempts to fill in a gap in the existing research in this area. Moreover, this chapter examines empirically the FDI-trade relationship with the adapted models in the derived analytical framework, aiming at offering a unified representation of FDI-trade cycles and phases.

5.1 Hypothesis development

Vernon's product life cycle model provides rational explanations for the relationship changes between trade and FDI from the perspective of firms. Is Vernon's model applicable to demonstrate the relationship changes between trade and FDI at country level? The answer is yes. First, according to the United Nations, more than 70 per cent of world FDI and trade are conducted by MNCs (UNCTAD, 2012). Therefore, world trade and FDI can be considered as the aggregated data of firm level trade and FDI. Second, when the relationship between trade and FDI is addressed at country level, for example, in the traditional trade theory, it is assumed that there are two countries, one country is capital intensive, and the other is labour intensive or natural resource intensive. Therefore, each country exports the products with factors that are relative abundant and imports the products with factors are relative scarce.Trade takes place accordingly. However, in real life, a country cannot conduct either trade or FDI. Firms in that country are the ones who undertake trade or FDI to serve foreign markets. Third, the productivity of a firm is tightly linked with the country's wealth and power. A developed country tends to provide more funds for R&D while developing countries spend a relative small amount of funds on R&D. Moreover, there also exists a large gap between developing countries and developed countries in education provisions. Therefore firms in developed countries tend to own technology advantages over firms in developing countries. Consequently, as well as firms' productivity can be improved by utilising trade and FDI, a country's economic status can also be promoted by trade and FDI, such as Singapore. In general Vernon's product life cycle is appropriate for analysing the relationship between trade and FDI at country level currently, especially for the trade and FDI undertaken between developing and developed countries.

According to my conjecture of trade-FDI cycles, the interaction of export and FDI between developing and developed countries can be complementary and substitute, depending on the phase of the cycle; so are import and FDI. Based on Vernon's product life cycle and combined with other theories, such as horizontal FDI and vertical FDI, it is proposed in this study that there are generally four phases in a trade-FDI cycle. Assume that Country A, a developed country, is comparatively abundant in certain factors than Country B, a developing country. Thereby firms in Country A choose to export their products to Country B at the very beginning. With the maturity of technology and accumulation of knowledge, and in order to satisfy consumers' demands and jump over trade barriers, firms in Country A start to invest in Country B to expand their market shares in Country B. So export leads to outward FDI, and export and outward FDI are complementary at this stage.

Depending on different motivations, the effect of such direct investment on trade varies accordingly. If Country A invests in Country B for the latter's abundant labour resources or natural resources, this kind of FDI tends to increase the exports of Country B. As what Helpman (1985), Grossman and Helpman (1989) and Konan (2000) have suggested in their studies, when participating countries share different factor endowments, vertical FDI tends to take place and thus complement trade. This is mainly because the MNCs split their production process in different countries in order to utilise the relative abundant factors and therefore increase their profit. For example, Country A utilises the resources of Country B to produce the intermediates or the final products, and then imports those products. Moreover, as time going by and with technology spillovers of outward FDI from Country A, domestic firms in Country B start to produce those products themselves and even export their products to Country A. Thereby imports of Country A and outward FDI of Country A are complementary.

However, If firms in Country A choose to invest in Country B just to acquire the market or jump the tariffs, this kind of FDI tends to substitute the exports of Country A. Horst's (1972) model has focused on the effect of levels of tariffs on the relationship between trade and such kind of tariffs-jumping FDI. His model and empirical examination of the cases of the US and Canada support this kind of relationship, affirming that a higher level of tariffs tends to lead to an increase in FDI. FDI will substitute trade completely, given a sufficiently high level of tariffs.

Under the changing conditions such as the upgraded technology capacity, firms in Country B choose to invest in Country A rather than exporting, in order to achieve economies of scale, obtain market share and natural resources, or get close to the customers. Therefore import of Country A leads to an increase in inward FDI at this stage. The proximity concentration model of MNCs brought forward by Brainard (1993, 1997) explains this complementary relationship when proximity advantages overweigh concentration benefits.

As time goes by, the inward FDI into Country A has increased, and its imports have fallen due to the increased labour costs and resource costs in Country B, indicating inward FDI and imports are substitutes. The horizontal FDI theories under general equilibrium also deal with the trade-FDI relationship under this circumstance. After years of development, both technology level and capital intensity have been promoted in Country B. Therefore, certain factor endowments in Country A and Country B tend to become similar. Helpman (1984), Markusen (1986) and Horstmann and Markusen (1987) all suggest that when participating countries are similar in factor endowment, the relationship between outward FDI and exports is substitution. However, if Country A still possesses technology advantages over Country B, or Country A and Country B still differ considerably in factor endowment, the exports of Country A increase with outward FDI. For example, firms in Country A invent new products or improve their production lines, therefore its exports increase, embarking on the very beginning phase in a trade-FDI cycle.We summarise trade-FDI cycles in Table 5.1.

Table 5.1 Trade-FDI Cycles between Developing and Developed Countries

Developed Country A	**Developing Country B**	**Factor Involved**
Chooses exports to serve foreign market, Country B.	Import products from developed Country A.	Factor endowment differences
Starts to invest in Country B. Exports complement outward FDI.	Receives increasing inward FDI from Country A. Imports complement inward FDI.	Accumulation of technology, market openness of Country B, network links
Outward FDI substitutes exports, but increases imports from country B.	Inward FDI increases the exports of Country B, but substitutes the imports of Country B from Country A.	Factor endowment differences, market size of Country B, market openness of Country B.
Increasing imports lead to increasing inward FDI, thereby imports complement inward FDI.	Exports lead to increasing outward FDI, thereby exports complement outward FDI.	Technology spillovers, technology of Country A, market openness of Country A, market size of Country A, factor endowment differences between Country A and B, network links.
Invents new products and exports them to Country B. New cycle starts all over again.	Outward FDI of Country B substitutes its exports.	Technology advance of Country A, market size of Country A, market openness of Country A.

From a country's balance of payments, we can have the following equation and identity:

$$(X_t - I_t) - (OFDI_t - IFDI_t) - (OIPI_t - IIPI_t) - \Delta OR_t = 0$$

Where, $\boldsymbol{X_t}$ is export in year $\boldsymbol{t}$, $\boldsymbol{I_t}$ is import in year $\boldsymbol{t}$, $\boldsymbol{OFDI_t}$ is outward FDI in year $\boldsymbol{t}$, $\boldsymbol{IFDI_t}$ is inward FDI in year $\boldsymbol{t}$, $\boldsymbol{OIPI_t}$ is outward international portfolio investment in year $\boldsymbol{t}$, $\boldsymbol{IIPI_t}$ is inward international portfolio investment in year $\boldsymbol{t}$, $\Delta\boldsymbol{OR_t}$ is change in official reserves in year $\boldsymbol{t}$.

Assume that trade-FDI cycles start from exports, and there are two countries, developed Country A and developing Country B. In many industries and many aspects, Country A holds certain comparative advantages. So Country A exports its products to Country B, X_t increases. With time going by, many factors exert increasing influences on firms in Country A to serve foreign markets and customers in an alternative and more efficient way, by making direct investment and setting up affiliates abroad. These factors include the provision of better services, lower costs and higher trade barriers and so on. Hence $OFDI_{t+\tau}$ increases and fewer products are exported, so $X_{t+\tau+\varphi}$ decreases. Because of technology spillovers, labour in Country B becomes skilled labour but labour costs remain low relative to Country A. Accompanied with further technology maturity and scale effects of production, some of the excess products are exported by Country B and imported back to Country A, $I_{t+\tau+\varphi}$ increases accordingly. Gradually Country A stops producing these kinds of products, and Country B becomes experts in the production of these products. With the imports being increased dramatically, Country A could set up various trade barriers to maintain a robust trade balance or to prevent trade deficits from accumulating. In order to avoid those trade barriers, also to satisfy the market demand of Country A and to provide better services, firms in Country B choose to invest in Country A. Thus $IFDI_{t+\tau+\varphi+\omega}$ increases, which leads to the growth in export and the fall in import. Therefore, $X_{t+\tau+\varphi+\omega+\theta}$ increases, and $I_{t+\tau+\varphi+\omega+\theta}$ decreases in this phase of the cycle. Another round of cycle begins.

Now we can set up a cycle to illustrate the interaction between trade and FDI for a developed country:

$$X_t \uparrow \rightarrow OFDI_{t+\tau} \uparrow \rightarrow X_{t+\tau+\varphi} \downarrow ; I_{t+\tau+\varphi} \uparrow \rightarrow IFDI_{t+\tau+\varphi+\omega} \uparrow \rightarrow X_{t+\tau+\varphi+\omega+\theta} \uparrow ; I_{t+\tau+\varphi+\omega+\theta} \downarrow$$

τ ranges from zero to n years; ω ranges from *zero* to *n* years; $\varphi \geq 1;\ \theta \geq 1$.

As a developing country, its cycle most possibly starts from an increase in imports, such as China. The imports of China increase dramatically since the 1980s, followed by a surge of inward FDI and an accelerating export growth. Now China is experiencing a phenomenal intensification in outward FDI. At the first stage, China imports from developed countries, $\mathrm{I_t}$ increases. In order to reduce transportation costs, jump trade barriers, utilise cheap labour in China, or provide better services, foreign firms switch to an alternative and more efficient way to serve China's market by setting up affiliates in China. Thus inward FDI, $IFDI_{t+\tau}$, grows. Due to technology spillovers and lower labour costs, China starts to export, $X_{t+\tau+\varphi}$ increases accordingly. An increasing number of products are exported abroad, which requires better services. For the sake of reducing the transportation costs and being well adapted to local customers' requirements, corporations in China begin to invest abroad. Thus $OFDI_{t+\tau+\varphi+\omega}$ augments and fewer products are exported. As time goes by, old technologies become obsolete and newly invented technologies are innovated by developed countries, imports of China will increase again. Therefore surges the start of another cycle.

If the developing country is not good at managing corporations in a foreign land, it can also choose to hold the developed country's bonds and non-controlling shares of stocks in the form of portfolio investment to keep its balance of payments balanced, when its exports outweigh too much its imports. Portfolio investment is not a topic of this study though. Only trade and FDI are considered. Nevertheless, we should be aware of the potential effect of portfolio investment on direct investment.

Now, a cycle for the developing country is set up as follows.

$$I_t \uparrow \rightarrow IFDI_{t+\tau} \uparrow \rightarrow X_{t+\tau+\varphi} \uparrow ;\ I_{t+\tau+\varphi} \downarrow \rightarrow OFDI_{t+\tau+\varphi+\omega} \uparrow \rightarrow X_{t+\tau+\varphi+\omega+\theta} \downarrow ;\ I_{t+\tau+\varphi+\omega+\theta} \uparrow$$

τ ranges from *zero* to *n* years; ω ranges from *zero* to *n* years; $\varphi \geq 1;\ \theta \geq 1$.

Thus, based on the above analysis and review, it is expected a cycle exists and evolves between developing and developed countries, and the relationships between trade and FDI can be demonstrated by the evolutionary phases of the cycle. Moreover, how the factors influence the relationship between trade and FDI can also be explained by this cycle and its phases or stages. China and OECD countries are scrutinised in this thesis for FDI and trade relationships and interactions. Therefore, we present our hypotheses from the developing country's perspectives.

Hypothesis 1. Whether trade and FDI are complements or substitutes is subject to the stage of trade-FDI cycles; the trade-FDI relationship changes according to the stage of the cycle.

Hypothesis 2. Factor endowments, technology levels, market sizes, market openness, and network links play significant roles in influencing and determining the relationship between trade and FDI.

While Hypothesis 1 is on the evolving and altering relationship between trade and FDI in different phases in the cycle, Hypothesis 2 augments trade-FDI relationships with the factors that are regarded as gravity variables. Each hypothesis has its specifics in the four phases in the cycle, labelled by a, b, c and d respectively. These hypotheses with phase specifics are developed in the rest of this section, in correspondence to their phases or stages in the cycle.

5.1.1 First stage

The product life cycle model of Vernon (1966) divides the life cycle of production into three stages of introduction of a new product, product maturity, and product standardisation. It is believed in this model that with the maturity of the product, the firm choose producing the products in different places to achieve various objectives. The relationship between trade and FDI alternates with the phases of the cycle accordingly. Vernon's model is considered from one company's perspectives, which can be extended to the cycle at country level. Most technologies are invented in developed countries, so developed countries always produce new products, and developing countries import these new products from developed countries. When technology matures, companies in developed countries start investing aboard. Gradually, companies in developing countries begin producing these products, and developed countries import instead.

As suggested by internationalisation theory (Andersen, 1993; Hedlund & Kverneland, 1983), manufacturing firms are likely to undertake incremental steps to serve unknown foreign markets at first, such as exports. When the sufficient experience is accumulated and necessary knowledge is acquired to operate a direct subsidiary overseas, they start to invest directly. This is because exporting requires less investment in sunk costs than FDI and is the least risky mode of serving unknown overseas markets. Therefore, countries with close network links tend to choose FDI rather than trade. In this context, internationalisation theory postulates that FDI is a substitute for exports only when higher fixed costs associated with foreign production can offset external transaction costs (Buckley & Casson, 1976; Dunning, 1996).

Helpman *et al.* (2004) interpret how firms make up their mind when they facing the choice between FDI and exports from the perspective of firm productivity differences. The most productive firms choose to invest in foreign market while the less productive firms choose to export, and FDI is more likely to substitute trade by firms with higher productivity. This idea is also supported by Kimura and Kiyota (2006). They suggest that the most productive firms engage in exports and foreign direct investment, medium productive firms engage in either exports or FDI, and the least productive firms neither exports nor invest abroad. Furthermore, market size is also one of the factors that influence MNCs' FDI decisions (Flores and Aguilera, 2007). The larger the host market size, the more attractive the market, and the larger the volume of FDI (Bhaumik and Co, 2011). Moreover, according to Dunning's (1993) theory, acquiring natural resources or human resources is one of the major motives for resource-seeking FDI. It is not a surprise that countries with abundant natural resource endowments will attract more inward FDI.

In general, the above arguments make the first stage of trade-FDI cycle possible. Most companies in developed countries are much more productive than those in developing countries. They will firstly export their domestically excess products to foreign countries. They gain experience and knowledge meanwhile, especially from countries with large differences of network links. They then invest aboard to gain the market or cut the cost after sufficient experience and knowledge have been accumulated. Furthermore, the inward FDI into developing countries will increase more greatly when the developing country is a large country and abundant in natural resources or human resources. So here are hypothesis 1a and hypothesis 2a.

Hypothesis 1 a. At the first stage of trade-FDI cycles, import and inward FDI (or net import and net inward FDI) of developing countries are complementary.

$$IFDI_t = \alpha_0 + \alpha_1 I_t + \alpha_2 I_{t-1} + \cdots + \alpha_{n+1} I_{t-n} + \varepsilon$$

at least one of the coefficients α_1, α_2, ……α_{n+1}, is significantly positive, none are significantly negative.

Hypothesis 2 a. At the first stage of trade-FDI cycles, technology advance of developed countries, close network links between developed and developing countries, abundant natural factor endowments of developing countries, labour cost differences between developed and developing countries and the market size of developing countries are all positively related with inward FDI of developing countries.

$$IFDI_t = \alpha_0' + \alpha_1' TECH_t + \alpha_2{}' NW_t + \alpha_3' FEG_t + \alpha_4' LC_t + \alpha_5' SIZEG_t + \varepsilon'$$

where $\boldsymbol{TECH_t}$ is the technology differences between developing and developed countries in year $\boldsymbol{t}$, $\boldsymbol{NW_t}$ is the network link between developed countries and developing countries in year $\boldsymbol{t}$, $\boldsymbol{FEG_t}$ is the natural factor endowment of developing countries in year $\boldsymbol{t}$, $\boldsymbol{LC_t}$ is the labour costs differences between developed countries and developing countries in year $\boldsymbol{t}$, and $\boldsymbol{SIZEG_t}$ is the market size of developing countries in year $\boldsymbol{t}$. All $\boldsymbol{\alpha_1'}$, $\boldsymbol{\alpha_2'}$, $\boldsymbol{\alpha_3'}$, $\boldsymbol{\alpha_4'}$ and $\boldsymbol{\alpha_5'}$ are expected to be significantly positive.

5.1.2 Second stage

At the second stage, the motivations of FDI from developed countries to developing countries are crucial in determining the relationship between trade and FDI. According to Lemi (2003), most FDI activities from developed countries to developing countries are undertaken by resource seekers. Abundant natural resources and low labour costs in developing countries attract even larger amount of FDI from developed countries. Thus, most MNCs from developed countries tend to move their whole or a part of production lines to developing countries to minimise the cost of production. This is consistent with vertical integrated MNCs theory. Helpman (1985), Grossman and Helpman (1989) and Konan (2000) all point out that when the relative factor endowments are different, vertical FDI increases the volumes of inter-sector trade, intra-industry trade and intra-firm trade.

As Yi (2003) and Hummels *et al.* (2001) reveal, MNCs have increasingly conducted different stages of production in different countries. In particular, they have set up operations in low-cost countries for labour-intensive production, and then used them as export platforms. As a result, a significant percentage of export from those low-cost countries is made by foreign affiliates in these countries (Lu et al., 2010). Therefore, developed countries import the finished products or intermediates from developing countries, and thereby resource extraction FDI complements imports of the home country. In other words, inward FDI from developed countries facilitates lagged exports of developing countries, and low labour costs and abundant natural resources of FDI host countries both contribute to a complementary relationship between inward FDI and imports.

Another common kind of FDI is market-seeking FDI. Multinational activities motivated by market penetration or barriers to trade tend to substitute for trade (Kimino *et al.*, 2007). To be accurate, outward FDI tends to substitute for exports. In another word, inward FDI into developing countries is substitution of their imports. If the objective of MNCs from developed countries is to acquire the market, the smaller the relative market size of the home country, the greater the substitution of exports by outward FDI developed countries. When facing higher levels of trade barriers, MNCs tend to choose direct investment rather than export. Therefore, market openness is negatively related to the substitution relationship between FDI and exports.

FDI in market-seeking manufacturing industries replaces exports, and FDI in manufacturing firms that seek low-cost inputs complements exports of host countries (Ayele, 2003). No matter which kind of FDI it is, the second stage of trade-FDI cycle is explained. Inward FDI of developing countries complements their exports, but substitutes their imports. Hypothesis 1b and hypothesis 2b are stated as follows from the developing countries perspectives:

Hypothesis 1 b. At the second stage of trade-FDI cycles, import and inwards FDI (or net import and net inward FDI) are substitutes, and export and inward FDI (or net export and net inward FDI) are complementary. The effect of inward FDI on import is specified as:

$$I_t = \beta_0 + \beta_1 IFDI_t + \beta_2 IFDI_{t-1} + \cdots \beta_{n+1} IFDI_{t-n} + \epsilon$$

at least one of the coefficients $\boldsymbol{\beta_1, \beta_2, \ldots\ldots \beta_{n+1}}$, is significantly negative, none are significantly positive. The effect of inward FDI on export is described by:

$$X_t = \beta_0 + \beta_1 IFDI_t + \beta_2 IFDI_{t-1} + \cdots \beta_{n+1} IFDI_{t-n} + \epsilon$$

at least one of the coefficients $\beta_1, \beta_2, \ldots\ldots\beta_{n+1}$ is significantly positive, none are significantly negative.

Hypothesis 2 b. At the second stage of trade-FDI cycles, market openness of developing countries positively influences the imports of developing countries and the market size of developing countries is negatively related with host countries' (developing countries) imports. Labour cost differences between developed countries and developing countries positively influence the exports of the host country (developing country), while relative factor endowment of developing countries (the host country) is positively related with the exports of the developing country.

$$I_t = \beta_0{}' + \beta_1{}'OPENG_t + \beta_2{}'SIZEG_t + \epsilon'$$

where $\boldsymbol{OPENG_t}$ is the market openness of developing countries in year $\boldsymbol{t}$, and $\boldsymbol{SIZEG_t}$ is the market size of developing countries in year $\boldsymbol{t}$. $\boldsymbol{\beta_1'}$ is expected to be significantly positive and $\boldsymbol{\beta_2'}$ is expected to be significantly negative. The effects of labour costs and natural factor endowments on export are specified as:

$$X_t = \beta_0{}'' + \beta_1{}''LC_t + \beta_2{}''FEG_t + \epsilon''$$

where $\boldsymbol{LC_t}$ is the labour costs differences between developed countries and developing countries in year $\boldsymbol{t}$, and $\boldsymbol{FEG_t}$ is the natural factor endowment of developing countries in year $\boldsymbol{t}$. Both $\boldsymbol{\beta_1''}$ and $\boldsymbol{\beta_2''}$ are expected to be significantly positive.

5.1.3 Third stage

It is believed that FDI may positively affect the productivity of domestic firms mainly in three ways (Gorg and Strobl, 2001). The first is a competition effect. Competition from foreign owned enterprises may force domestic firms to increase their competitive capacity by reforming management approaches and updating production technologies. The second is a linkage effect. Domestic firms may learn from observing FDI affiliates when there are close relationships between them, and may benefit from the technical support, the demand, and the supply provided by the foreign owned enterprises with which they have an upstream or downstream relationship in the business chains (Aitken and Harrison, 1999; Buckley *et al.*, 2002). The third is an employment effect. FDI firms train their employees, who may later move to domestic firms with acquired skills.

Empirical studies, particularly the pioneering works by Caves (1974), Globerman (1979), Blomström and Persson (1983), Blomström (1986), Blomström and Wolff (1994), and Kokko (1994, 1996) all have showed evidence of positive spillover effects of FDI on the productivity of domestic firms. Furthermore, Li *et al.* (2001), Liu *et al.* (2001), Buckley *et al.* (2002) and Liu (2002) have pointed out that a positive spillover effect of FDI is posed on Chinese domestic firms. Multinational enterprises in China positively affect local Chinese firms' exports through various spillover channels, and inward FDI brings significant, indirect spillovers (Buck *et al.*, 2007). Therefore, because of positive spillovers, companies in China become able to produce the products at a lower cost with the same quality. Therefore, they start to export their products.

Many countries have realised that FDI brings superior technology that is previously unavailable in the host country, and have acknowledged FDI as a main channel of technology transfers from more developed countries to less developed countries (Sasidharan and Kathuria, 2011). Therefore, in order to improve the domestic companies' productivity, the governments of many developing countries set a plenty of policies to attract inward FDI (Kosteas, 2004). With the improvement of local firms' productivity and know-how management, domestic firms in developing countries also start to invest abroad in order to acquire the market and market share.

Moreover, the technology spillover effect of FDI can be bi-directional. Technology can spill over not only from foreign enterprises to local firms, but also from local firms to foreign companies if the local firms possess higher technology advantage. As what Signh (2007) points out, local subsidiaries of foreign companies are the significant sources of technology for domestic countries. They are also the effective channel for foreign firms to gain access to the technology of the host country. Therefore, some of the outward FDI from developing countries to developed countries is driven by technology. Motivated by higher technology acquisition, firms in developing countries start to invest in developed countries. This kind of investment from developing countries will not cause technology spillovers to developed countries, but serves as a channel to gain the technology from developed countries (Driffield and Love, 2007).

As discussed above, with the improvement of local firms' productivity and in order to gain the market, exports in developing countries lead to outward FDI. Moreover, in order to obtain further technology, some technology sourcing outward FDI from developing countries also takes place. Technology transfers, including efficiency improvement and total factor productivity improvement, could be the engine of the trade-FDI cycle (Henry, *et al.*, 2009). Similarly with the second stage, lower market openness of developed countries could also lead to tariff-jumping FDI. Furthermore, natural resources, similar network links and large market sizes could also become the factors that attract the FDI from developing countries. Additionally, developing countries have to spend foreign reserves or incomes generated by exports. Nevertheless they cannot spend these incomes or foreign reserves directly without converting them to local currency, which would have certain effect on the exchange rate that the developing country wants to avoid. Therefore, the direct investments would be a better choice and thereby the outward FDI are facilitated. Hypothesis 1c and hypothesis 2c, pertinent to this third stage of the trade-FDI cycle, are put forward accordingly.

Hypothesis 1 c. At the third stage of trade-FDI cycles, export and outward FDI (or net export and net outward FDI) of developing countries are complementary.

$$OFDI_t = \gamma_0 + \gamma_1 X_t + \gamma_2 X_{t-1} + \cdots + \gamma_{n-1} X_{t-n} + \vartheta$$

at least one of the coefficients $\boldsymbol{\gamma_1}$, $\boldsymbol{\gamma_2}$, **……** $\boldsymbol{\gamma_{n-1}}$ is significantly positive, none are significantly negative.

Hypothesis 2 c. At the third stage of trade-FDI cycles, technology differences between developed countries and developing countries, the market size of developed countries, market openness of developed countries, natural factor endowment of developed countries, and the network links between developed and developing countries all positively influence the outward FDI (or net outward FDI) of developing countries.

$$OFDI_t = \gamma_0' + \gamma_1' TECH_t + \gamma_2{}' SIZED_t + \gamma_3' OPEND_t + \gamma_4' FED_t + \gamma_5' NW_t + \vartheta'$$

where $\boldsymbol{TECH_t}$ is the technology level differences between developed and developing countries in year ***t***, $\boldsymbol{SIZED_t}$ is the market size of developed countries in year ***t***, $\boldsymbol{OPEND_t}$ is the market openness of developed countries in year ***t***, $\boldsymbol{FED_t}$ is the factor endowment of developed countries in year t, and NW_t is the network link between developed and developing countries in year t. All γ_1', γ_2', γ_4' and γ_5' are expected to be significantly positive, and γ_3' **is** expected to be significantly negative.

5.1.4 Fourth stage

At the fourth stage, with the increase in outward FDI, especially the outward FDI seeking for markets, and the rise in trade disputes, the exports from developing countries to developed countries are greatly reduced. Moreover, the fast development in developing countries also causes the increase in labour costs and the costs of natural resources in developing countries, which makes the exports even harder. Additionally, the spillover effects of inward FDI stimulate the development in developing countries; thereby the relative factor endowments become similar rather than remain different. According to what Markusen (1984), Horstmann and Markusen (1987) have suggested, FDI that takes place between countries with similar factor endowments tends to substitute trade. On the other hand, if the developed countries are abundant in natural resource endowments, the imports of developing countries from developed countries will increase. Meanwhile, the MNCs in developed countries invent new technology and produce new products. They hold certain technology advance again. As demonstrated at the first stage, the MNCs in developed countries export their newly invented products to serve foreign markets. Therefore, the imports of developing countries increase again accordingly. Thus, the trade-FDI cycles runs again.

Hypothesis 1 d. At the fourth stage of trade-FDI cycles, import and outward FDI (or net import and net outward FDI) of developing countries are complementary, and export and outward FDI (or net export and net outward FDI) of developing country are substitutes. The effect of outward FDI on import is described by:

$$I_t = \delta_0 + \delta_1 OFDI_t + \delta_2 OFDI_{t-1} + \cdots + \delta_{n+1} OFDI_{t-n} + \sigma$$

at least one of the coefficients $\boldsymbol{\delta_1}$, $\boldsymbol{\delta_2}$, …… $\boldsymbol{\delta_{n+1}}$ is significantly positive, none are significantly negative. The effect of outward FDI on export is hypothesised as:

$$X_t = \delta_0 + \delta_1 OFDI_t + \delta_2 OFDI_{t-1} + \cdots + \delta_{n+1} OFDI_{t-n} + \sigma$$

at least one of the coefficients $\boldsymbol{\delta_1}$, $\boldsymbol{\delta_2}$, …… $\boldsymbol{\delta_{n+1}}$ is significantly negative, none are significantly positive.

Hypothesis 2 d. At the fourth stage of trade-FDI cycles, technology differences between developed and developing countries and the natural factor endowment of developed countries positively influence the imports of developing countries, while the openness and market size of developed countries and the labour costs differences negatively influences the exports of developing countries.

$$I_t = \delta_0' + \delta_1{}'TECH_t + \delta_2' FED_t + \sigma'$$

where $\boldsymbol{TECH_t}$ is the technology level differences between developed and developing countries in year $\boldsymbol{t}$, $\boldsymbol{FED_t}$ is the factor endowment of developed countries in year $\boldsymbol{t}$. both $\boldsymbol{\delta_1}$**'** and $\boldsymbol{\delta_2}$**''** are expected to be significantly positive. For export, the following effects are expected:

$$X_t = \delta_0{}'' + \delta_1{}''LC_t + \delta_2{}''SIZED_t + \delta_3'' OPEND_t + \sigma''$$

where $\boldsymbol{LC_t}$ is the labour costs differences between developed countries and developing countries in year $\boldsymbol{t}$, $\boldsymbol{SIZED_t}$ is the market size of developed countries in year $\boldsymbol{t}$, and $\boldsymbol{OPEND_t}$ is the market openness of developed countries in year $\boldsymbol{t}$. $\boldsymbol{\delta_1}$**''** and $\boldsymbol{\delta_3}$**''**are both expected to be significantly positive while $\boldsymbol{\delta_2}$**''**is expected to be significantly negative.

5.2 Models

5.2.1 Models used in existing empirical studies

Various models have been applied in the existing empirical studies that examining the relationship between trade and FDI. They can be classified into four major groups. The first kind of model is specified to examine the changes in the relative shares between FDI and trade. The second kind of model mainly focuses on the estimation of exports and imports volume. The third category of models pays attention to the estimation of FDI flows, especially the locational choice of FDI. The last category of models deals with the relationship between trade and FDI, particularly the FDI effects on trade.

The first kind of model examines the extent of export-substitution when FDI is undertaken in the host country subject to trade barriers, such as tariffs and taxes. The studies of Horst (1972) and Adler and Stevens (1974) both belong to this category. In those models, the dependent variable usually is the ratio of exports to foreign production. The independent variables include trade barriers, usually proxied by tariff rates or tax rates. The results of these studies indicate the extent to which the ratio of exports to foreign production changes due to changes in tariffs or other barriers imposed by the host country. The major drawback of these models is that they are based on assumptions of a substitution relationship between trade and FDI.

The second kind of models is the exports or imports estimation model. Without doubt, the dependent variable usually is exports or imports. The commonly adopted independent variables are the GDP of exporting and importing countries, FDI inflows to and outflows from the importing country, distance between the participating countries and other control variables, such as exchange rates and inflation. The studies of Gubert and Mutti (1991), Lin (1995) and Pain and Wakelin (1998) all fall into this group. However, in these models, FDI flows are usually treated as one of the independent variables that influence the volume of trade flows. Therefore, although FDI and trade are taken into consideration in the models, the relationship between trade and FDI is not addressed explicitly.

Different from the second group of models, the third kind of model is FDI flow estimation models. Therefore FDI flows are the dependent variable. Most of such studies concentrate on firm decisions and location choice, or the determinants of FDI, such as Buckley *et al.*, (2007b) and Blonigen and Piger (2011). The independent variables include trade volume, GDP of home and host countries, distance between participating countries, culture proximity of participating countries, and labour costs. Trade volume is treated as one of the independent variables.Therefore, this kind of model again does not explain the relationship between trade and FDI.

The last kind of model addresses the relationship between trade and FDI, but only concentrates on the FDI effect posed on trade. Studies of Lipsey and Weiss (1981), Johansson and Westin (1994), Aberg (2001), and Pantulu and Poon (2003) can all be classified into this group. In these models, FDI flows are applied as the main independent variable and exports as the dependent variable. The focus here is estimating the effects of FDI on exports, but the effects of trade posed on FDI are neglected. Therefore, a model that concentrates on the relationship between trade and FDI, including both FDI effects on trade and trade effects on FDI, is required for this study.

5.2.2 Gravity model

Although the existing models can be classified into four groups, the basis of these models is similar, which is the traditional gravity model of international trade. Gravity models are a widely used tool in the international business literature to explain country-level trade and FDI flows (Zwinkels and Beugelsdijk, 2010). Gravity models have been first applied to estimating trade interactions in 1954 (Isard, 1954). Followed by Tinbergen (1962) and Linnenman (1966), the gravity model has been used to empirically estimating trade flows. Since then, the gravity model has been gradually accepted by scholars in many other areas, such as marketing and investment (Buckley *et al.*, 2007b; Gul and Yasin, 2011).

As has been borrowed from Newton's model of gravitational interaction between planetary bodies in physics, when adopted in international business, the gravity model also has two basic elements. One is the scale or mass impact, which measures the power and influence of involved countries, where the commonly used variables are GDP, population, and per capita income. Another element is distance, which measures the friction or impediment between the two participating countries. The variables used are usually geographical distance and cultural distance. They could either enhance or impede the interactions between the participants.

$$F = G\frac{m_1 m_2}{r^2} \rightarrow Trade_{ij} = f(Y_i, Y_j, \frac{1}{Distance_{ij}})$$

It is believed in the traditional trade gravity model that larger economies tend to trade more than smaller economies, and an increase in distance between trading countries lead to the decrease of trade due to increased costs in trading. Using the logarithm technique, the traditional trade gravity model could be represented as follow, so that it conforms to the usual linear regression analysis:

$$T_{ij} = AY_i^{\alpha}Y_j^{\beta}D_{ij}^{\gamma} \rightarrow \log(T_{ij}) = C + \alpha log(Y_i) + \beta log(Y_j) + \gamma\log(D_{ij}) + \varepsilon_{ij}$$

where T_{ij} is the trade flow from country i to country j, Y_i and Y_j are GDP, population or national income, D_{ij} is the geographical distance between trading countries, C is a constant, and α, β, γ represent the extent to which Y_i, Y_j and D_{ij} influence trade flows respectively. Noteworthy, γ is usually expected to be negative.

Tinbergen (1962) and Linnenman (1966) are the pioneers who have first conducted extensive empirical research on trade flows using the traditional gravity model. Following their studies, numerous applications of the gravity model in estimating trade flows have mushroomed (Bergstrand, 1985, 1989; Dascal *et al.*, 2002). Moreover, the gravity model has been used to estimate the effects of various factors on trade flows (Eaton and Tamura, 1996; Hacker and Johansson, 2001; Chi and Kilduff, 2010). These factors include the traditional gravity variables such as GDP, population, and additional factors, such as exchange rates and membership of trade blocs. All of them have been integrated in the gravity model (Aitken, 1973; Helpman, *et al.*, 2008; Gul and Yasin, 2011).

While widely applied in empirical studies of trade flows, the lack of theoretical support for this model has been brought forward. A number of studies have attempted to provide a rational of the gravity model. For example, Anderson (1979) is one of the earliest experts who endeavour to offer an economic rationale for the gravity model. His explanation of the theoretical foundation of gravity model is based on the assumption that products are nationally differentiated and consumers have maintained identical homothetic preferences. Bergstrand (1985, 1989) extends Anderson's derivation of the gravity model to incorporate differences in taste or non-homothetic tastes of consumers. He has shown that the gravity model is consistent with the modern theories of inter-industry and intra-industry trade.

The studies of Evenett and Keller (1998, 2002), Feenstra *et al.* (1998) and Anderson and Van Wincoop (2003) also provide support that the gravity model can be derived under the H-O framework. After decades of development, the gravity model has been validated as one of the most empirically successful trade analytical tools in economics with a solid theoretical foundation (Anderson and Van Wincoop, 2003; Chi and Kilduff, 2010).

Further, Johansson and Mattsson (1987) and Johansson and Westin (1994) have extended the theoretical foundation of the gravity model based on the view of a simultaneous growth of FDI. Since then, the gravity model has been largely applied in the estimation of FDI flows and locational choice of MNCs. Numerous studies have used the gravity model to identify the determinants of FDI, notably included are the economic size of participating countries and the stimulating or the discouraging factors for investment between participating countries (Bergstrand, 1985; Brainard, 1997). Usually the former is proxied by GDP, levels of economic development, per capita income, and the latter one is typically proxied by the transportation costs, geographic distances, trade barriers, and sharing of land borders (Helpman, 2008; Lawless, 2010; Sheng and Mullen, 2011).

In recent years, the determinants of trade and FDI have been extended further; cultural and institutional characteristics of participating countries have been taken into consideration. These represented by, for instance, political risk and corruption (Cuervo-Cazurra, 2008; Globerman and Shapiro, 2003; Habib and Zurawicki, 2002; Sethi, *et al.*, 2003), institutions (Clougherty and Grajek, 2008; De Groot *et al.*, 2004; Pajunen, 2008) and cultural distance (Dow and Karunaratna, 2006; Loree and Guisinger, 1995; Frankel and Rose, 2002) and so on.

The popularity of gravity in examining trade and FDI patterns and volumes of both international activities makes the application of the gravity model in the estimation of the relationship between trade and FDI more proliferated and reasonable. Improved theoretical foundations and validated measurements of variables and extended variables allow us to examine how FDI and trade interact with each other. Although the gravity model is not good at analysing panel data which changes with time, this study applies an augmented gravity model to the analysis of pooled panel data. We exclude the geographical distance due to it does not change with time; instead, we use cultural distance to denote the impediments.

5.3 Research design

5.3.1 Choice of variables

In accordance with the hypothesis, the exports and imports of China serve as a dependent variable when the focus of regression is the FDI effects on trade, while they serve as an independent variable when the objective of regression is the trade effects on FDI. Similarly, outward FDI and inward FDI serve as a dependent variable when we are working on the trade effects on FDI, and they serve as an independent variable when we are working on the FDI effects on trade. All the factors that influence the relationship are the independent variables, including market size, factor endowment, technology, market openness, and network links.

5.3.1.1 Market size

Market size is believed to have a strong impact on the bilateral trade and FDI (Root, 1994; Russow and Okoroafo, 1996; Flores and Aguilera, 2007; Bhaumik and Co, 2011). A country with larger market size means it has a larger demand for products as an importing country, and at the same time it also owns a great production potential as an exporting country (Chi and Kilduff, 2010). Moreover, larger market size makes it more attractive to MNCs as a destination (Scaperlanda and Mauer, 1969; Cuyvers *et al.*, 2011).

In most of the literature, GDP or GNP, which stands for economic market size, is usually adopted as a proxy for market size (Venables, 1999; Wei and Liu, 2001; Filippini and Molini, 2003; Kandogan, 2003; Cuyver *et al.*, 2011; Bilgili *et al.*, 2012). To a less extent, population, which stands for the absorption ability of international trade, is also used (Soloaga and Winters, 2001; Filippini and Molini, 2003; Papazoglou, 2007; Kien, 2009; Ekanayake *et al.*, 2010). A small amount of studies add physical areas into the proxies of market size as well (Lawless, 2010). In this study, we use both GDP and population to proxy for market size. The GDP variable is adjusted by PPP and expressed by the share of GDP of all OECD countries. The population vatiable is also expressed by the share of total population in OECD countries.

5.3.1.2 Factor endowment

Factor endowment is another crucial factor that influences the relationship between trade and FDI. Factor endowment in this study includes factor endowment differences, natural resource factor endowments and labour costs. The effects of factor endowments posed on the relationship between trade and FDI are complex. There are mainly three issues that lead to the debate. Firstly, the influence of factor endowment differences on trade is vague. Next, the distribution of the final product of investment is unclear. Finally, what does the labour cost stand for is complex.

Traditional international trade theory argues that if each country has a different pattern of factor endowment, each country specialises in the production by which its relatively abundant production factor is used intensively. Trade takes place when each country exports the goods it is specialised in producing and imports the goods other countires are specialised in making. Hence, the benefits of international trade are realised (Wakasugi, 1997). On the contrary, Krugman (1981), Helpman and Krugman (1985), Huot and Kakainaka (2007) have proposed that countries with similar factor endowments tend to trade more (Huot and Kakinaka, 2007). Since this thesis is studying the relationship between trade and FDI between developing (China) and developed countries (OECD countries), thereby the participating countries are sharing different factor endowments. So the explanation of traditional international trade theory is more suitable for this circumstance.

The proxy commonly used to explain factor endowment differences is per capita income and the size of national income (Linder, 1961; Balassa and Bauwens, 1988). Some recent studies define the relative factor endowment difference variable as the absolute value of the difference between natural logarithm of per capita GDPs between participating countries (Egger, 2002; Serlenga and Shin, 2007; Kabir and Salim, 2010). The trade conformity index (TCI) is another commonly adopted indicator of factor endowment differences. It is defined as the measure of trade complementarities between two trading countries (Huot and Kakinaka, 2007). This thesis applies the difference between the logarithms of per capita GDPs as the proxy for factor endowment difference.

According to Dunning's (1993) theory, acquiring natural resource is one of the major motives for resource-seeking FDI. Therefore, FDI is attracted to countries with abundant natural resource endowments (Deng, 2004; Buckley, *et al.*, 2007; Ramasamy *et al.*, 2012; Kang and Jiang, 2012). When considering the effects of factor endowments on trade and FDI altogether, the distributions of final products are crucial. To put it simply, the FDI flows from developed countries tend to substitute imports from developed countries but complement the exports to developed countries.

The natural factor endowment is usually proxied by the share of energy and non-energy minerals in host exports (Bhaumik and Co, 2011), proportion of the host country's exports of ores and minerals in all exports (Ramasamy *et al.*, 2012; Kang and Jiang, 2012; Buckley *et al.*, 2007b), fuels, ores and metals exports as share of GDP (Buckley *et al.*, 2007b; Kang and Jiang, 2012; Duanmu, 2012), and the energy price (Bilgili *et al.*, 2012). In this thesis, we use the ratio of China's natural material exports to OECD countries to total exports to OECD countries as the proxy for China's natural resource factor endowments. We use the ratio of OECD's natural material exports to China to its total exports to China as the proxy for natural resource factor endowments of OECD countries.

Labour costs are also one of the most important determinants that influence the relationship between trade and FDI (Kimino *et al.*, 2007). It can be regarded as the human resource factor endowment. As Egger and Pfaffermayr (2005) point out, it is widely accepted that higher unit labour costs in developed countries make exports to affiliates less profitable; they therefore reduce the enthusiasm of trading but choose FDI instead. One the other hand, higher labour costs in developed countries also indicate higher capital resources. So countries with higher labour costs have the ability to produce more products and therefore choose to serve foreign market through exporting (Breinlich and Criscuolo, 2011).

Higher unit labour costs in the developing country make the host countries' location less attractive to MNCs, so the need for FDI is weakened, while lower unit labour costs in developing countries can reduce potential costs abroad and make the host country more attractive to FDI (Culem, 1988; Jun and Singh, 1996; Bilgili *et al.*, 2012). Therefore, higher labour costs in developed countries support the substitution relationship between trade and FDI; while higher labour costs in developing countries impede both trade and FDI. The proxy usually used for labour costs is the average annual wage of labours or the differences of average annual wages between home and host countries.

However, an increasing number of studies bring forward different ideas (Wheeler and Mody, 1992; Miller, 1993; Love and Lage-Hidalgo, 2000). They argue that lower wages not only means lower labour costs, they also represent unskilled workers and lower productivity, or poorer infrastructure (Miller, 1993; Kimino *et al.*, 2007). Especially in the high-tech industry, high quality of labour is much more important than cheap costs associated with unskilled labour.

According to what Culem (1988) suggested, relative lower labour costs between developing countries and developed countries are more important than that between developed countries in international activities. Our study is based on China and OECD countries; therefore labour costs are still crucial in influencing the relationship between trade and FDI. In this study the labour cost variable proxy is the difference between China and OECD countries' wages to proxy for the labour costs differences.

5.3.1.3 Technology

Technological distance between the host and home countries is often treated as a kind of comparative advantage when referring to trade, and ownership advantage when referring to FDI. Without doubt, no matter what the identification is, technology plays a crucial role in determining trade and FDI (Dunning, 1993; Cassiman and Golovko, 2011). Large technology distance promotes both trade and FDI, therefore support a complementary relationship between trade and FDI.

A large technological distance, on the one hand, stimulates MNCs to search for larger markets to gain economic scales by either trading or investing, thereby spreading their costs of R&D investments (Hirsch and Bijaoui, 1985; Harris and Ravenscraft, 1991; Hitt *et al.*, 1997). On the other hand, it can also become an incentive to attract more inward FDI or import more high-tech products. Numerous recent studies on China have proved that technology is one of the major forces that drive Chinese firms to conduct FDI (Deng, 2007; Buckley *et al.*, 2008; Kang and Jiang, 2012). Bell and Pavitt, (1997) and Filippini and Molini (2003) have also pointed out that many Asian countries import higher tech products in order to emulate the technology and to compete with developed countries. This is especially evident in the electronic industry, such as computers and cell phones.

In most empirical studies, technology has often been indicated by the ratio of R&D expenditure to total sales, at either the industry or the firm level (Stern and Maskus, 1981; Hennart and Park, 1993; Cho and Padmanabhan, 1995), number of engineers and scientists (Baldwin, 1971), the annual number of patents registered (Buckley *et al.* 2007b), Balassa's (1965) standard comparative advantage explanation of trade (Wakasugi, 1997; Filippini and Molini, 2003), similarity index (Breuss and Egger,1999; Egger, 2000; 2002; Serlenga and Shin,2007), and the proportion of high technology exports in total exports of the host countries (Ramasamy *et al.*, 2012). In this thesis, we use the differences in annual expenditure on R&D between OECD countries and China to indicate technology level differences.

5.3.1.4 *Market openness*

Market openness is an element that makes a difference in the formulation of traditional gravity equations (Hatab *et al.*, 2010). Moreover, it is also an element that strongly affects the relationship between trade and FDI. Many literatures, such as Chi and Kilduff (2010), examine impact on trade flows posed by the market openness, particulary tariff level, and have pointed out that the market openness can serve as kind of regulative tool for the government to control the trade balance. It is also suggested by many studies that low market openness and high levels of tariffs will lead to tariff-jumping FDI, which means FDI and exports are substitute of each other (Blonigen 2002).

Membership of RTAs, annual tariff rate, and the share of exports plus imports to GDP are commonly used as the indicators of market openness. Balassa and Bauwens (1988), Baier and Bergstrand (2007), Huot and Kakinaka (2007), Helpman *et al.*, (2008) and many other studies denote market openness by the membership of RTAs, where the RTAs variable equals 1 if the country belongs to RTAs, 0 otherwise. Annual tariff rate is used in the studies of Popadopoulos *et al.* (2002), Chi and Kilduff (2010), Alessandrini *et al.* (2011) and others. The openness index is the most widely used proxy for market openness, which can be observed in Edwards (1990), Pantelidis and Kyrkilis (2005), Romstad and Huo (2010), and Gul and Yasin (2011) and many other studies. In this work, the ratio of exports plus imports to GDP is used as the indicator for market openness.

5.3.1.5 *Network links*

Network links here mainly refer to cultural distances, such as whether or not the two participating countries speak a common language, share the common religion, or are under the similar rules and institutions. It is widely believed that culture proximities reduce transaction costs, thereby promoting trade (Kogut and Singh, 1988; Hofstede, 1991; Wei, 2000; Rauch, 1999; Yeniyurt and Townsend, 2003; Dow and Karunaratna, 2006). However, the effects of cultural distances posed on FDI are not conclusive in the empirical literature.

Cultural distance is seen as a major barrier for MNC to enter the host market by many studies, due to the communication costs that increase with cultural distance (Kogut and Singh, 1988; Buckley *et al.*, 2007b; Flores and Aguilera, 2007;

Ramasamy *et al.*, 2012). Nevertheless, Johanson and Vahlne (1977), and Vahlne and Johanson (2002) argue that firms usually start their internationalisation process by entering culture proximal countries. When enough knowledge has been accumulated, they will try to expand their business to countries with different cultures.

Hofstede's index (1980; 2001) is often used as a proxy for transaction costs generated by cultural differences in many studies (Kimino *et al.*, 2007). However, it has its limitations and drawbacks. Other proxies often used to indicate cultural distance are immigration population, common language, common religion, and so on. Here in this study, due to none of the OECD countries share the same language with China, we choose the annual immigration population of Chinese to represent the cultural distance.

5.3.2 Augmented gravity model

Based on the traditional gravity model and combined with the objectives of this research, the above mentioned variables are introduced into the gravity model. The augmented gravity model to examining the relationship between trade and FDI could be specified as follows:

At the first stage of trade-FDI cycle, inward FDI of China is positively influenced by its imports, technology of OECD countries, the immigration of Chinese in OECD countries, factor endowment differences between OECD countries and China, which include the capital resources, natural resources and human resources, and the market size:

$$IFDI_{it} = \alpha_0 + \alpha_1 I_{it} + \alpha_2 I_{i(t-1)} + \cdots + \alpha_{n+1} I_{i(t-n)} + \alpha_1' TECH_{it} + \alpha_2' IMGR_{it} + \alpha_3' INC_{it} + \alpha_4' NTC_{it} + \alpha_5' LC_{it} + \alpha_6' GDPC_t + \alpha_7' POPC_t + \varepsilon \quad (1)$$

where $\boldsymbol{TECH_{it}}$ is the difference of annual expenditure on R&D between country $\boldsymbol{i}$ and China in year $\boldsymbol{t}$, $\boldsymbol{IMGR_{it}}$ is the annual Chinese immigration in country $\boldsymbol{i}$ in year $\boldsymbol{t}$, $\boldsymbol{INC_{it}}$ is the annual logarithm GDP per capita differences between China and country $\boldsymbol{i}$ in year $\boldsymbol{t}$, $\boldsymbol{NTC_{it}}$ is the natural resource endowments of China compared with country $\boldsymbol{i}$ in year $\boldsymbol{t}$, $\boldsymbol{LC_{it}}$ is the labour cost differences between country $\boldsymbol{i}$ and China in year $\boldsymbol{t}$, and $\boldsymbol{GDPC_t}$ is the share of China's GDP in year $\boldsymbol{t}$, and $\boldsymbol{POPC_t}$ is the share of China's population in year $\boldsymbol{t}$. $\boldsymbol{\alpha_1, \alpha_2, \ldots\ldots \alpha_{n+1}}$ are regression coefficients; at least one of them is expected to be significantly positive, none of them are significantly negative. All ***α₁'***, ***α₂' α₃' α₄' α₅' α₆'*** and ***α₇'*** are expected significantly positive.

At the second stage of trade-FDI cycles, inward FDI in China leads to an increase of its exports, but causes the decrease of China's imports. Market openness of China positively influences its imports and the market size of China is negatively related with its imports. Labour cost differences between OECD countries and China, and natural resource factor endowments of China are both positively related with the exports of China. The joint effects of inward FDI into China and the grativty factors on China's import are as follows:

$$I_{it} = \beta_0 + \beta_1 IFDI_{it} + \beta_2 IFDI_{i(t-1)} + \cdots \beta_{n+1} IFDI_{i(t-n)} + \beta_1{}' OPENC_t + \beta_2{}' GDPC_t + \beta_3' POPC_t + \epsilon \quad (2.1)$$

where $\boldsymbol{OPENC_t}$ is the market openness of China in year $\boldsymbol{t}$, $\boldsymbol{GDPC_t}$ is the share of GDP of China in year $\boldsymbol{t}$, and $\boldsymbol{POPC_t}$ is the share of China's population in year $\boldsymbol{t}$. $\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, ……$\boldsymbol{\beta_{n+1}}$ are coefficients; at least one of them is expected to be significantly negative, none of them are significantly positive. $\boldsymbol{\beta_1'}$ is expected significantly positive while $\boldsymbol{\beta_2'}$ and $\boldsymbol{\beta_3'}$ are both expected significantly negative. The joint effects of inward FDI and the gravity factors on China's export are specified as:

$$X_{it} = \beta_0 + \beta_1 IFDI_{it} + \beta_2 IFDI_{i(t-1)} + \cdots \beta_{n+1} IFDI_{i(t-n)} + \beta_1{}'' LC_{it} + \beta_2{}'' NTC_{it} + \epsilon \quad (2.2)$$

where $\boldsymbol{LC_{it}}$ is the labour cost differences between country $\boldsymbol{i}$ and China in year $\boldsymbol{t}$, $\boldsymbol{NTC_{it}}$ is the natural resource endowments of China compared with country $\boldsymbol{i}$ in year $\boldsymbol{t}$ represented by the ratio of exports of energy and primary products to total exports to OECD countries. Both $\boldsymbol{\beta_1''}$ and $\boldsymbol{\beta_2''}$ are expected significantly positive. At least one of $\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, ……$\boldsymbol{\beta_{n+1}}$ is expected to be significantly positive negative, none of them are significantly positive.

At the third stage of trade-FDI cycles, greater increase in exports and decreases in imports both stimulate an increase in outward FDI flows. The technology differences between China and OECD countries and the GDP and population of OECD countries positively influence the outward FDI from China while the market openness of OECD countries exerts negative effect on the outward FDI from China. Abundant natural resource endowments of OECD countries and the immigration of Chinese in OECD countries also make them more attractive to China's outward FDI. The joint effects of China's export and gravity factors on China's outward FDI are expected in the following way:

$$OFDI_{it} = \gamma_0 + \gamma_1 X_{it} + \gamma_2 X_{i(t-1)} + \cdots + \gamma_{n-1} X_{i(t-n)} + \gamma_1' TECH_{it} + \gamma_2' GDPO_{it} + \gamma_3' POPO_{it} + \gamma_4' OPENO_{it} + \gamma_5' NTO_{it} + \gamma_6' IMG_{it} + \vartheta \ (3)$$

where $\boldsymbol{TECH_{it}}$ is the difference of annual expenditure on R&D between country $\boldsymbol{i}$ and China in year $\boldsymbol{t}$, $\boldsymbol{GDPO_{it}}$ is the GDP of OECD countries in year $\boldsymbol{t}$, $\boldsymbol{POPO_{it}}$ is the population of OECD countries in year $\boldsymbol{t}$, $\boldsymbol{OPENO_t}$ is the market openness of country $\boldsymbol{i}$ in year $\boldsymbol{t}$, $\boldsymbol{NTO_{it}}$ is the relative natural resource endowment of country $\boldsymbol{i}$ in year $\boldsymbol{t}$, $\boldsymbol{IMGR_{it}}$ is the annual Chinese immigration in country $\boldsymbol{i}$ in year $\boldsymbol{t}$. $\boldsymbol{\gamma_1, \gamma_2}, \ldots\ldots \boldsymbol{\gamma_{n-1}}$ are coefficients; at least one of them is expected significantly positive, none of them are significantly negative. $\boldsymbol{\gamma_1'}$, $\boldsymbol{\gamma_2'}$, $\boldsymbol{\gamma_3'}$, ,$\boldsymbol{\gamma_5'}$ and $\boldsymbol{\gamma_6'}$ are all expected significantly positive, while $\boldsymbol{\gamma_4'}$ is expected to be significant negative.

At the fourth stage of trade-FDI cycles, outward FDI of China causes the increase of its imports but substitutes its exports. The technology differences between China and OECD countries positively influence the imports of China, while both the GDP and population of OECD countries and the labour costs of China negatively affect the exports of China. The effects are described as follows:

$$I_{it} = \delta_0 + \delta_1 OFDI_{it} + \delta_2 OFDI_{i(t-1)} + \cdots + \delta_{n+1} OFDI_{i(t-n)} + \delta_1' TECH_{it} + \delta_2' NTO_{it} + \sigma \ (4.1)$$

where $\boldsymbol{TECH_{it}}$ is the difference of annual expenditure on R&D between country $\boldsymbol{i}$ and China in year $\boldsymbol{t}$, $\boldsymbol{NTO_{it}}$ is the relative natural resource endowments of country $\boldsymbol{i}$ in year $\boldsymbol{t}$. At least one of $\boldsymbol{\delta_1, \delta_2, \ldots\ldots \delta_{n+1}}$ is expected significantly positive, none of them are significantly negative; and $\boldsymbol{\delta_1'}$ and $\boldsymbol{\delta_2'}$ is expected significantly positive. The effects of China's outward FDI and the gravity factors on China's export can be represented by the following equation:

$$X_{it} = \delta_0 + \delta_1 OFDI_{it} + \delta_2 OFDI_{i(t-1)} + \cdots + \delta_{n+1} OFDI_{i(t-n)} + \delta_1'' LC_{it} + \delta_2'' GDPO_{it} + \delta_3'' POPO_{it} + \delta_4'' OPENO_{it} + \sigma \ (4.2)$$

where $\boldsymbol{LC_{it}}$ is the labour costs differences between country $\boldsymbol{i}$ and China in year $\boldsymbol{t}$, $\boldsymbol{GDPO_{it}}$ is the GDP share of country $\boldsymbol{i}$ to all OECD countries in year $\boldsymbol{t}$, $\boldsymbol{POPO_{it}}$ is the share of population of country $\boldsymbol{i}$ to all OECD countries in year $\boldsymbol{t}$, and $\boldsymbol{OPENO_{it}}$ is the market openness of country $\boldsymbol{i}$ in year $\boldsymbol{t}$. At least one of $\boldsymbol{\delta_1, \delta_2, \ldots\ldots \delta_{n+1}}$ is expected to be significantly negative, none of them are significantly positive; and $\boldsymbol{\delta_1''}$ and $\boldsymbol{\delta_4''}$ are both expected significantly positive while $\boldsymbol{\delta_2''}$ and $\boldsymbol{\delta_3''}$are both expected significantly negative.

We denote the exports, imports, inward FDI, outward FDI and other variables, such as GDP and population by share, not by volume or level, which is quite different from some of previous studies. The explanation for choosing share rather than volume as the proxy is three fold. First, the volume variable is usually not stationary; therefore it is not suitable to be used in regression analysis. Second, FDI flows, especially outward FDI flows of China are negative in many years, which make using the logarithmic form of volume impossible. Third, due to the large negative numbers in FDI flows, the growth rate of FDI cannot be applied either, mainly due to that it will cause significant errors. For example, in the first year the outward FDI volume is -1000 million US dollars, in the second year the outward FDI is -500 million US dollars. Actually, there is an increase in the flows of outward FDI. However, if calculated by growth rate, it states that there is a decrease of 50%. This leads to errors. Using the share of FDI solves all of the above mentioned problems. It is stationary, it can deal with large negative figures properly, and moreover, it depicts what happens in the real world appropriately. Therefore, the share of exports, share of imports, share of outward FDI, share of inward FDI, share of GDP and share of population are applied in this study. Table 5.2 presented below shows the stationarity test for the variables in share and makes comparison between variables in share and variables in volume. All the *p*-value for variables in share is significant at the 1% level, stating that the variables in share are stationary. It clearly demonstrates that the variables in share are stationary, while the variables in volume are overwhelmingly non-stationary. Moreover, Table 5.3 summarises the definitions and proxies of all the variables in the model. Noteworthy, FDI figures are compiled by OECD who uses a distinguished comprehensive benchmark to measure FDI flows, which is set as the world standard. More detail can be found in the following website: http://www.oecd.org/daf/inv/investmentstatisticsandanalysis/40193734.pdf

Table 5.2 Unit Root Test Summary for Stationarity of Variables

	Variables in Volume				Variables in Share			
	ADF-Fisher Chi-square		PP-Fisher Chi-square		ADF-Fisher Chi-square		PP-Fisher Chi-square	
Variables	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
Exports of China	1.740	1.000	2.341	1.000	76.682***	0.003	179.230***	0.000
Imports of China	17.585	0.999	17.547	1.000	108.142***	0.000	111.041***	0.000
Outward FDI of China	37.541	0.667	32.546	0.852	487.514***	0.000	498.459***	0.000
Inward FDI of China	40.829	0.522	58.900**	0.043	165.045***	0.000	169.478***	0.000
GDP of OECD countries	5.366	1.000	5.929	1.000	254.950***	0.000	269.362***	0.000
Population of OECD countries	29.389	0.929	39.995	0.559	82.612***	0.001	232.146***	0.000

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level

Table 5.3 Summary of Definitions of Variables

Variable	Definition
t	Represents the year
i	Represents the trading and FDI partners of China, one of the OECD countries
$IFDI_{it}$	The share of inward FDI flows from country *i* to China to all inward FDI flows from all OECD countries to China in the year *t*
$OFDI_{it}$	The share of outward FDI flows from China to country *i* to all outward FDI flows from China to all OECD countries in the year *t*
I_{it}	The share of China imports from country *i* to all imports of China from OECD countries in the year *t*
X_{it}	The share of China exports to country *i* to all exports from China to OECD countries in the year *t*
$TECH_{it}$	Annual difference of expenditure on R&D of country *i* and China in the year *t*
$IMGR_{it}$	Annual immigration of Chinese in country *i* in the year *t*, in thousand
$OPENO_{it}$	Share of imports of country *i* plus exports of country *i* to GDP of country *i* in the year *t*
$OPENC_t$	Share of China imports plus China exports to GDP of China in the year *t*
$GDPO_{it}$	The share of the GDP of country *i* to all OECD countries' GDP plus China GDP in the year *t*
$GDPC_t$	The share of the GDP of China to all OECD countries' GDP plus China GDP in the year *t*
$POPO_{it}$	The share of population of country *i* to all OECD countries' population plus China's population in the year *t*
$POPC_t$	The share of population of China to all OECD countries' population plus China's in the year *t*
LC_{it}	The annual wage difference between country *i* and China in the year *t*
NTO_{it}	The share of imports of energy products to total imports of China in the year *t*
NTC_t	The share of exports of energy material to total exports of China in the year *t*
INC_{it}	The difference of logarithm of GDP per capita between country *i* and China in the year *t*

5.3.3 Methodology

The gravity model is usually expressed as a single equation and uses the cross-section data to examine the trade and FDI flows between the participating countries in a specific year (Horst, 1972; Lipsey and Weiss, 1981; Graham, 1999; Lipsey *et al.*, 2000). However, panel data sets have been more widely used in gravity models to estimate trade and FDI relationships and interactions than single year cross-section data in recent years (Head and Ries, 2001; Buck *et al.*, 2007; Yu and Zhao, 2008). As Koo and Karemera (1991) and Koo *et al.* (1994) point out, panel data is much more suitable to estimate trade and FDI flows than single year data. That is because data of a particular year may not provide accurate and enough information, but panel data can provide periodical observations over a defined time frame (Gul and Yasin, 2011).

In this study, a pooled regression using panel data spanning over the time period of 1988 to 2012 and cross approximately 23 OECD developed countries and China is used. Panel data used here instead of time-series data can avoid the stationarity and temporal autocorrelation problems (Greene, 1990). Moreover, compared with cross-sectional data and time-series data, panel data can also increase the degrees of freedom of the model (Dell'Ariccia, 1999). This study covers 23 OECD countries: Australia (AU), Austria (AT), Belgium (BE), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Iceland (IS), Ireland (IR), Italy (IT), Japan (JP), Korea (KR), Luxembourg (LU), Norway (NO), Netherlands (NL), New Zealand (NZ), Portugal (PT), Spain (ES), Sweden (SE), Switzerland (CH), United Kingdom (UK) and United States (US). The pooled panel data set used in the analysis is presented in Table 5.3.

Table 5.4 Panel Data Used for Regression Analysis

Regression Equation	Year	Countries	Number of Observation
1	1992-2010	AU, AT, BE, DK, FI, FR, DE, IT, JP, KR, NL, NZ, NO, PT, ES, CH, UK, US	217
	1992-2006	AU, AT, BE, DK, FI, FR, DE, IT, JP, KR, NL, NZ, NO, ES, UK, US	155
2.1	1992-2010	AU, AT, BE, DK, FI, FR, DE, GR, IS, IT, JP, KR, LU, NL, PT, ES, CH, UK, US	256
	1992-2006	AU, AT, BE, DK, FI, FR, DE, GR, IS, IT, JP, KR, LU, NL, PT, ES, CH, UK, US	183
2.2	1989-2011	AU, AT, BE, DK, FI, FR, DE, GR, IT, JP, KR, LU, NL, PT, ES, CH, UK, US	253
	1989-2006	AU, AT, BE, DK, FI, FR, DE, GR, IT, JP, KR, NL, ES, CH, UK, US	175
3	1992-2010	AU, AT, BE, DK, FI, FR, DE, IT, JP, KR, LU, NL, NZ, NO, PT, ES, UK, US	176
	1992-2006	AU, AT, BE, DK, FR, DE, IT, JP, KR, NL, NZ, NO, PT, ES, UK, US	121
4.1	1991-2011	AU, AT, BE, DK, FI, FR, DE, GR, IE, IT, JP, KR, LU, NL, NZ, NO, PT, ES, UK, US	158
	1991-2006	AU, AT, BE, DK, FR, DE, IT, JP, KR, NL, NZ, NO, PT, ES, UK, US	93
4.2	1989-2010	AU, AT, BE, DK, FI, FR, DE, GR, IS, IE, IT, JP, KR, LU, NL, NZ, NO, PT, ES, UK, US	196
	1989-2006	AU, AT, BE, DK, FI, FR, DE, GR, IT, JP, KR, LU, NL, NZ, NO, PT, ES, UK, US	131

In the analysis of pooled panel data, there are two main models, fixed effects model and random effects model. In the fixed effects model, the intercept of the regression is different across section or time. Therefore, the fixed effect model consists of country-fixed effects model and time-fixed effects model.

In the fixed effects model, each country has a specific intercept, which does not change with time. So the fixed effects model is suitable for the condition that each country has its individual special characteristics. Similarly, each year has its own intercept in the time-fixed effects model, which does not vary with country. Gujrati and Porter (2003) has pointed out that the fixed effects model is appropriate in the situations where the individual specific intercept might be correlated with one or more regressors.

On the contrary, in the random effects model, the intercept of each unit is a random draw from a much larger population with a constant mean (Gujrati and Porter, 2003). The individual intercept is then expressed as a deviation from this constant mean value. It is more appropriate to use the random effects model when the intercept of each cross sectional unit is uncorrelated with the regressors (Gul and Yasin, 2011).

In general, the fixed effects model is a robust method of estimating trade and FDI flows, but it could not reflect the time-invariant effects. The random effects model is better in analysing the time-variance effects. When estimating the impact of both time-variant and time-invariant variables across different countries, random effects models are more preferred (Gul and Yasin, 2011). In this analysis, both fixed effects model and random effects model are applied.

5.3.4 Data collection

The annual data of Chinese exports and imports with OECD countries are collected from OECD databases. The inward FDI flows from OECD countries to China and outward FDI flows from China to OECD countries are also collected from OECD databases, to maintain the consistency between trade and FDI data. The period spans from 1988 to 2012. The data on GDP of OECD countries, population of OECD countries, labour costs of OECD countries, immigration of Chinese and R&D expenditures are obtained from OECD database. Market openness of OECD countries and natural factor endowment are calculated by the data obtained from OECD databases. Data on natural factor endowments of China is also calculated by the data obtained from OECD databases. Market openness of China is calculated by the data of China Statistical Bureau databases. The major sources from which the data are collected are summarised in Table 5.4.

Table 5.5 Major Sources of Data

Variable	Source
China exports to OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=HS1988 Calculated by the share of China exports to one OECD country to all OECD countries.
China imports from OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=HS1988 Calculated by the share of China imports from OECD one country to all OECD countries.
China inward FDI from OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_PARTNER Calculated by the share of China inward FDI from one OECD country to all OECD countries.
China outward FDI to OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_PARTNER Calculated by the share of China outward FDI to one OECD country to all OECD countries.
GDP of OECD countries and China	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DatasetCode=SNA_TABLE1 Calculated by the share of one country's GDP to all countries' GDP.
Population of OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=MIG Calculated by the share of one country's population to all countries' population.
Unit labour costs of OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=ULC_ANN
Immigration of Chinese in OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=MIG
Technology difference	Annual expenditure on R&D of OECD countries and China are extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB Calculated by the difference of annual OECD countries' expenditure on R&D and China expenditure on R&D.
Market openness of OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=MEI_TRD Calculated by the ratio of total OECD imports plus OECD exports to GDP of OECD countries.

Market openness of China	Data extracted from China Statistic Year Book 2012 http://www.stats.gov.cn/tjsj/ndsj/2012/indexch.htm Calculated by the ratio of total China imports plus China exports to GDP of China.
Relative natural factor endowment of OECD countries	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=HS1988 Calculated by the ratio of OECD country exports of ores and mineral products to China divided by the total exports to China.
Relative natural factor endowment of China	Data extracted from OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=HS1988 Calculated by the ratio of China exports of ores and mineral products to OECD countries divided by the total exports to OECD countries.
GDP per capita difference	Data extracted from the OECD.Stat http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1 Calculated by the difference of logarithm GDP per capita between OECD countries and China

6 CHAPTER 6: RESULTS, ANALYSIS AND FINDINGS

This chapter presents the results of hypothesis tests developed in Chapter 5. The evolving relationships between trade and FDI in trade-FDI cycles are examined with a panel data set for OECD countries and China, using the augmented gravity model derived in Chapter 5. The results indicate that there exists a cyclical relationship between trade and FDI that evolves over time, although the relationship is not unambiguous at some of the stages in a trade-FDI cycle. Moreover, the results confirm that market size, technology distance, factor endowment, market openness and network links all contribute to the dynamic relationship between trade and FDI, and the effects they pose on the relationship varies with the stage. Before interpreting the panel data regression analysis results, the descriptive statistics of the variables employed in the model are presented in Table 6.1.

Table 6.1 depicts the descriptive statistics of the variables in the data set. Most of the data are stable, except the inward FDI and outward FDI of China. The maximum of inward FDI and outward FDI are 168.310 and 1379.600 respectively, while the minimum of inward FDI and outward FDI are -84.155 and -628.571 respectively. Moreover, in the original data set, FDI flows, including both inward FDI and outward FDI, are found to have fluctuated violently since 2007. This could mainly be attributed to the financial crisis. Therefore, every set of panel equations is estimated twice, in order to eliminate the effects of the financial crisis and assess the impact of the financial crisis. To be more precise, the whole sample ranges from 1988 to 2012, and the sub-sample excluding the financial crisis covers the period between 1988 and 2006. Both sets of results are reported.

Table 6.2 presents the correlation matrix for the key variables employed in the modelling. It reveals interesting features in the links between these variables. While inward FDI is highly related with a range of variables, the links of outward FDI with other variables are weak. This indicates that China is at an early stage of outward FDI; inward FDI is ripe but outward FDI is undertaken spontaneously in a learning process. Inward FDI is found to be positively associated with imports, exports and the natural factor endowment of China closely, as well as immigration of Chinese. Imports and exports are highly positively related. Both of imports and exports are positively linked to population and GDP of OECD countries closely; they are also positively associated with the technology difference variable. Interestingly, the link between labour cost difference and both of imports and exports is weaker than that between technology difference and imports and exports. There is a similar pattern with regards to inward FDI; it has a higher correlation with technology difference than with labour cost difference. These features in the correlation matrix suggest that the technology difference variable would play a role that is more important than the labour cost difference variable in model estimation with panel data. As expected, China's trade and FDI are not related to the natural factor endowment of OECD countries. Market openness of OECD countries seems to be negatively linked to their sizes, in both terms of population and GDP. To a lesser extent, market openness of OECD countries is negatively linked to China's trade and FDI activities with OECD countries, especially trade, which suggests a supressing effect of this variable on trade.

Table 6.1 Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std. Dev.
Imports of China (share)	4.523	48.840	0.000	7.881
Exports of China (share)	4.431	49.065	0.011	8.543
Inward FDI of China (share)	6.755	168.310	-84.155	16.941
Outward FDI of China (share)	7.825	1379.600	-628.571	147.437
GDP of OECD countries (share)	3.584	33.722	0.022	6.579
GDP of China (share)	9.692	19.631	4.278	4.419
Population of OECD countries (share)	1.634	12.192	0.012	2.533
Population of China (share)	52.588	52.978	51.331	0.456
Income difference	1.091	1.591	0.505	0.239
Technology distance	$-3.180\ e^4$	$2.855\ e^5$	$-2.082\ e^5$	$8.038\ e^4$
Natural factor endowment of OECD countries	6.693	78.608	0.013	13.401
Natural factor endowment of China	2.368	26.860	0.032	3.360
Market openness of OECD countries	5.010	19.614	1.126	2.967
Market openness of China	1.695	2.685	1.083	0.573
Immigration of Chinese in OECD countries (in thousand)	17.234	177.034	0.029	29.481
Labour costs differences	0.542	0.911	0.183	0.159

Table 6.2 Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	-0.047	0.762	0.620	0.372	0.355	-0.190	-0.131	-0.162	0.523	0.377	0.070	-0.197	-0.058	0.419	0.203
2		1	-0.033	0.008	-0.004	0.012	-0.039	-0.030	0.108	-0.063	-0.002	-0.045	-0.040	-0.032	0.010	0.056
3			1	0.780	0.646	0.639	-0.072	-0.053	-0.090	0.300	0.493	0.217	-0.273	-0.019	0.786	0.170
4				1	0.902	0.944	-0.082	-0.060	-0.151	0.126	0.718	0.152	-0.287	-0.021	0.565	0.225
5					1	0.958	-0.007	-0.005	-0.157	0.085	0.684	0.051	-0.445	-0.000	0.530	0.004
6						1	-0.038	-0.040	-0.174	0.016	0.775	0.111	-0.339	-0.023	0.466	0.164
7							1	0.643	0.047	-0.282	-0.019	0.446	0.161	0.072	-0.049	-0.585
8								1	0.110	-0.309	-0.555	0.653	0.259	0.893	0.117	-0.754
9									1	-0.0414	-0.200	-0.186	-0.151	0.084	-0.069	-0.075
10										1	0.182	-0.137	-0.213	-0.312	0.368	0.076
11											1	-0.317	-0.386	-0.555	0.380	0.501
12												1	0.389	0.659	0.216	-0.347
13													1	0.291	-0.330	0.100
14														1	0.168	-0.596
15															1	-0.070
16																1

1, Inward FDI; 2, Outward FDI; 3, Imports; 4, Exports; 5, Population of OECD; 6, GDP of OECD; 7, Population of China; 8, GDP of China; 9, Natural factor endowment of OECD; 10, Natural factor endowment of China; 11, Technology difference; 12, Labour costs differences; 13, Market openness of OECD; 14, Market openness of China; 15, Immigration of Chinese; 16, Income differences.

6.1 The first stage of the cycle (Hypothesis 1a and Hypothesis 2a)

As discussed in Chapter 5, at the first stage in a trade-FDI cycle, MNCs tend to serve foreign markets by exporting first; and they then conduct FDI after sufficient experience is accumulated and necessary knowledge is acquired. This is especially true when the participating countries are with larger differences in cultural and network links with each other (Vernon, 1966; Andersen, 1993; Helpman, *et al.*, 2004). Therefore, increases of China's imports from OECD developed countries are expected to lead to an increase in inward FDI from OECD countries. However, in our estimation of equation (1) for the time period 1988-2012, we find mixed results (See Table 6.3). When equation (1) is examined with the fixed effects model, no significant evidence is found to support the complementary relationship between imports and inward FDI of China. Likewise, the regression result of equation (1) under a random effects specification shows both significantly positive and significantly negative coefficients between imports and inward FDI, which seems to be ambiguous. However, the regression results of equation (1) for 1988-2006 support our hypothesis, no matter whether a fixed effects model or a random effects model is employed (See Table 6.4). Therefore, the global financial crisis does pose certain effects on FDI flows, and thus influences the relationship between imports and inward FDI to a great extent. As Table 6.4 indicates, an increase in imports is accompanied by an increase in inward FDI in the current year. Therefore a complementary relationship at the first stage is confirmed to exist between imports and inward FDI.

F-test values in Table 6.3 and Table 6.4 are both significant at the 1% level, which provides support to the goodness-of-fit of my analytical model. In addition, the Breutsh-Pagan test is conducted to check if the random effects model is better in explaining the relationship than OLS model at this stage. As indicated in Table 6.5, the test statistic that obeys a Chi-squared distribution is significant at the 10% level. Therefore, the random effect model is proved to be better fitted for the analysis of the relationship during the period of 1988-2006. The results for the period reasonably support our conjecture. The Hausman test is carried out to examine whether the fixed effects model or the random effects model better explains the regression. A significant test statistic rejects the random effects model in favour of the fixed effects model. As shown in Table 6.5, the test statistic that obeys a Chi-squared distribution is significant at the 1% level for the period of 1988-2006 and significant at the 5% level for the period of 1988-2010. Thus the fixed effects model is preferred for both time periods. Therefore, no obvious relationship between inward FDI and imports is observed for the period of 1988 to 2012 due to the global financial crisis, while the complementary relationship between inward FDI and imports is confirmed for the period of 1988 to 2006, and fixed effect model is proved to be the best to analyse the first stage relationship.

The factors that significantly influence the relationship between imports of China and inward FDI into China include technology distance, immigration of Chinese in OECD countries, the income differences between China and OECD countries, the natural resource endowment of China, and the GDP of China. The technology distance is significantly positive at the 10% level under the fixed effects specification for the period of 1988-2006, which is consistent with the hypothesis. The technology distance is one of the main driving factors that influence the trade and FDI cycle. A large technology distance means that the MNCs in OECD countries own comparative advantages over the firms in China and therefore are comparatively more productive than the firms in China (Dunning, 1993; Cassiman and Golovko, 2011). Consequently, MNCs from OECD countries choose to enter a foreign market either by exporting or investing directly to gain economies of scale, thereby to spread their cost of R&D investments (Hirsch and Bijaoui, 1985; Harris and Ravenscraft, 1991; Hitt *et al.*, 1997). In a word, large technology distance promotes both imports and inward FDI of China, therefore support a complementary relationship between imports and inward FDI.

The immigration of Chinese in OECD countries denotes the culture proximity between OECD countries and China, and the coefficient for this variable is expected to show a positive sign. This is because countries with similar cultures tends to trade and invest more with each other due to that culture proximity could reduce the operation costs (Hofstede, 1991; Wei, 2000; Rauch, 1999; Yeniyurt and Townsend, 2003; Dow and Karunaratna, 2006). However, our results indicate a negative influence of immigration of Chinese on China’s inward FDI. Countries with distant culture proximity with China tend to invest more in China. This result is consistent with the studies of Johanson and Vahlne (1977) and Vahlne and Johanson (2002), and further supports the complementary relationship between imports and inward

FDI. The fact that a large cultural distance between participating countries increases the communication costs in operations is discussed by many studies (Kogut and Singh, 1988; Buckley *et al.*, 2007b; Flores and Aguilera, 2007; Ramasamy *et al.*, 2012). Therefore, MNCs usually choose exports to enter the unknown market. FDI is undertaken when sufficient knowledge is accumulated. Consequently, with smaller numbers of Chinese immigrants in OECD countries, the imports of China tend to cause more inward FDI from OECD countries.

The coefficient for income differences between China and OECD countries is significantly positive at the 10% level under the fixed effects specification in both time ranges, and it is significantly positive at the 1% level under the random effects specifications during the period of 1988-2006. These results are what we have expected. The income differences indicate the capital resource differences between China and OECD countries. As what the traditional international trade theory argues (Wakasugi, 1997), as OECD countries are abundant in capital resources, they specialise in the production that is intensive with capital resources. Trade takes place and the benefits of international trade are realised for both China and OECD countries. In addition, capital resource tends to flow into the countries that are scarce of it; therefore, FDI flows into China from OECD countries. In summary, the larger the differences between the capital resource endowment, the more inward FDI and imports China receives from OECD countries.

The natural resource endowment of China is another factor that influences the relationship between China's imports and inward FDI. Our results indicate that at the first stage of the cycle, the abundant natural resource endowment of China is the main factor that attracts inward FDI. According to Dunning's (1993) theory, acquiring natural resource is one of the major motives for resource-seeking FDI. Therefore, FDI are attracted to countries with abundant natural resource endowments (Deng, 2004; Buckley, *et al.*, 2007; Ramasamy *et al.*, 2012; Kang and Jiang, 2012). The coefficient of natural resource endowment of China is positive significantly at the 1% level under the fixed effects specification for the period of 1988-2006; and it is positive significantly at the 5% level under the random effects specification for the same period. Therefore, FDI flows from OECD countries to China are mainly undertaken by resource seekers, especially for the period before 2006. In brief, with abundant natural resource endowment, China has attracted more inward FDI from OECD countries.

The great increase of China's GDP also makes China more attractive to MNCs from OECD countries. The GDP of China positively significantly influences its inward FDI at the 1% level under the fixed effects specification and the 5% level under the random effects specification during the period of 1988-2006. As proposed in the hypothesis, a country with larger market size means it has a larger demand for products as an importing country (Chi and Kilduff, 2010), and a country with larger market size makes it more attractive to MNCs as a destination (Scaperlanda and Mauer, 1969; Cuyvers *et al.*, 2011). Therefore, the large market size of China makes it more favoured by MNCs from OECD countries, either as exports partner or investing destination. Moreover, the significantly positive coefficient also proves that, apart from resource seekers, the inward FDI of China is also undertaken by market seekers.

In summary, at the first stage of a trade-FDI cycle, imports of China lead to the increase in inward FDI into China. Technology distance, income differences, natural resource endowment of China and the GDP of China all significantly positively influence the inward FDI into China from OECD countries, while the immigration of Chinese in OECD countries negatively influences the inward FDI from OECD countries. Moreover, all those factors support the complementary relationship between inward FDI and imports into China. Therefore, at the first stage, imports complement inward FDI.

Table 6.3 Regression Results of First Stage (Equation 1): 1988-2012

Dependent variable: inward FDI	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	-8.686*	4.661	-1.864	0.064	-0.889	3.485	-0.255	0.799
Imports	0.569	0.925	0.615	0.539	0.148	0.845	0.176	0.861
Imports(-1)	1.340	1.206	1.111	0.268	1.603	1.197	1.339	0.182
Imports (-2)	0.360	1.107	0.325	0.746	0.282	1.077	0.262	0.793
Imports (-3)	-0.968	0.943	-1.026	0.306	-1.614*	0.918	-1.758	0.080
Imports (-4)	0.013	0.665	0.019	0.985	0.960*	0.561	1.711	0.089
Technology Distance	$-5.623e^{-5}$	$3.735\ e^{-5}$	-1.506	0.134	$-1.102e^{-5}$	$1.326\ e^{-5}$	-0.831	0.407
Immigration of Chinese	0.071	0.058	1.218	0.225	-0.064*	0.038	-1.679	0.095
Income Difference	78.259*	45.241	1.730	0.085	3.777	12.442	0.304	0.762
Natural Resource Endowment of China	1.290	0.845	1.526	0.129	-0.732	0.511	-1.432	0.154
Labour Costs Difference	6.610	10.088	0.655	0.513	9.453	7.933	1.192	0.235
GDP of China	2.484	1.808	1.374	0.171	-0.282	0.565	-0.500	0.618
Population of China	14.253	8.131	1.753	0.081	1.589	6.439	0.247	0.805
R-squared	0.628				0.570			
Adjusted R-squared	0.571				0.545			
F-statistic	10.909***				22.533***			
Prob. (*F*-statistic)	0.000				0.000			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.4 Regression Results of First Stage （Equation 1）: 1988-2006

Dependent Variable: Inward FDI	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	-4.650	4.015	-1.158	0.249	-0.479	3.711	-0.129	0.898
Imports	2.464***	0.772	3.191	0.002	1.323**	0.657	2.015	0.046
Imports(-1)	0.156	0.910	0.172	0.864	0.232	0.895	0.259	0.796
Imports (-2)	1.175	0.830	1.416	0.159	0.624	0.804	0.776	0.439
Imports (-3)	0.158	0.698	0.227	0.821	-0.780	0.674	-1.158	0.249
Imports (-4)	-0.544	0.539	-1.010	0.315	-0.388	0.441	-0.880	0.380
Technology Distance	8.566 e^{-5}*	4.560 e^{-5}	1.878	0.063	2.501 e^{-5}	2.198 e^{-5}	1.138	0.257
Immigration of Chinese	0.018	0.058	0.308	0.758	-0.070	0.050	-1.399	0.164
Income Difference	98.739*	53.387	1.850	0.067	50.597***	18.142	2.789	0.006
Natural Resource Endowment of China	2.034***	0.748	2.718	0.008	1.368**	0.533	2.568	0.011
Labour Cost Difference	-4.083	9.804	-0.417	0.678	-0.077	8.645	-0.009	0.993
GDP of China	5.699**	2.385	2.389	0.018	2.828***	0.879	3.218	0.002
Population of China	5.373	7.309	0.735	0.464	-0.652	6.867	-0.096	0.924
R-squared	0.826				0.419			
Adjusted R-squared	0.789				0.370			
F-statistic	22.296***				8.527***			
Prob. (*F*-statistic)	0.000				0.000			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.5 Breutsh-Pagan and Hausman Test of First Stage (Equation 1)

Breutsh-Pagan Test Summary	1988-2012				1988-2006			
	Chi-Sq. Statistic		Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.
	0.009		1	0.923	3.258*		1	0.084
Hausman Test Summary	1988-2012				1988-2006			
Dependent Variable: Inward FDI	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.
Cross-section Random	22.287**		11	0.022	38.748***		11	0.000
Variable	Fixed	Random	Var (Diff.)	Prob.	Fixed	Random	Var (Diff.)	Prob.
Imports	0.569	0.148	0.141	0.263	2.464	1.323	0.165***	0.005
Imports (-1)	1.340	1.603	0.021*	0.071	0.156	0.232	0.028	0.653
Imports (-2)	0.360	0.282	0.066	0.765	1.175	0.624	0.043***	0.008
Imports (-3)	-0.968	-1.614	0.047***	0.003	0.158	-0.780	0.033***	0.000
Imports (-4)	0.013	0.960	0.128***	0.008	-0.544	-0.388	0.096	0.614
Technology Distance	-0.000	-0.000	0.000	0.195	0.000	0.000	0.000	0.129
Immigration of Chinese	0.071	-0.064	0.002***	0.002	0.018	-0.070	0.001***	0.002
Income Differences	78.259	3.777	1891.897*	0.087	98.739	50.597	1.046	0.338
Natural Resource Endowment of China	1.290	-0.732	0.453***	0.003	2.033	1.368	0.276	0.205
Labour Cost Difference	6.609	9.453	38.834	0.648	-4.083	-0.077	21.376	0.386
GDP of China	2.484	-0.282	2.949	0.107	5.700	2.828	4.917	0.195
Population of China	14.253	1.589	24.646**	0.011	5.373	-0.652	6.270	0.016

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

6.2 The second stage of the cycle (Hypothesis 1b and Hypothesis 2b)

At the second stage, the motivations of FDI from OECD countries to China are crucial in determining the relationship between trade and FDI. The regression results for the first stage in a trade-FDI cycle support the hypothesis developed in Chapter 5 and prove that FDI from OECD countries to China is mainly driven by natural resource and market seekers. According to Lemi (2003) and Lu *et al.* (2010), FDI motivated by resource seeking tends to increase the exports of China but substitute the imports of China. This is because MNCs from OECD countries would like to import China's resources to their countries, or move their production lines to China in order to utilise the resource locally and produce the products. Thus the imports into China are reduced and the exports from China are promoted. On the other hand, FDI motivated by market seeking tends to be substitutions for the exports of the FDI home country. In other words, the inward FDI of China is a substitution for its imports (Kimino *et al.*, 2007). Therefore, at the second stage of a trade-FDI cycle, the inward FDI of China is expected to complement its exports, but substitute its imports. However, the regression results for the second stage in a trade-FDI cycle not only prove the complementary relationship between inward FDI and exports, but also indicate a strong complementary relationship between inward FDI and imports.

Both Table 6.6 and Table 6.7 indicate a very strong positive relationship between imports and inward FDI, which is opposed to our hypothesis. Such a strong positive relationship between imports and inward FDI could be caused by the following reasons. First, China is a very large market that has the largest population in the world; hence MNCs from OECD countries may choose both exports and FDI to serve this enormous market. Therefore, inward FDI into China does not necessarily substitutes the imports of China. In addition, China is abundant in natural resources and cheap labour. Subsequently, MNCs from OECD countries export the intermediates to China to produce the final products. Thus the intermediates imports into China from OECD countries have increased. However, we further examined the impacts posed on net imports by inward FDI of China, a negative relationship is confirmed as shown in Table 6.12 and Table 6.13. Most of the coefficients of inward FDI to China and net imports of China are negative in lagged years, and the coefficient becomes significantly negative in lagged four years. This significantly negative relationship between inward FDI and imports is consistent in both time periods with either effects specification. Therefore, the increase of inward FDI leads to the increase of imports; meanwhile the increase of inward FDI also causes the decrease of net imports. In conclusion, the relationship between inward FDI and imports of China is complementary due to the large market of China; moreover, there also exist certain levels of substitution as what we conjectured.

The F-statistic is significant at the 1% level for all the regression results in this stage for examining the relationship between inward FDI and imports or net imports. This means that the conjecture of our model explains the relationship well. As shown in Table 6.8 and Table 6.14, the Breutsh-Pagan test statistic is significant at the 1% level for both time periods and for both imports and net imports, proving the random effects model is better fitted than OLS regression in explaining the relationship between inward FDI and imports or net imports. In addition, the Hausman test results support the regression specified with fixed effects with its Hausman test value being significant at the 1% level. Therefore the effects exerted on imports by inward FDI are positive while inward FDI substitutes net imports.

Table 6.9 and Table 6.10 present the regression results of the effects of inward FDI on exports. Overall, our hypothesis that inward FDI promotes exports is accepted with the reported estimation results. In Table 6.9, the regression results of equation 2.2 under the random effects specification during 1988-2012 report positive coefficients for all the contemporary inward FDI and lagged inward FDI variables, all being significant at the 1% level. With the fixed effects model, significantly positive coefficients are observed for contemporary inward FDI and inward FDI lagged between one and three years. While the coefficient for the inward FDI variable at lag 4 is significantly negative, its size is less than one fifth of the coefficient for the inward FDI variable at lag 3 that is positive and significant at a higher level of 1%. Table 6.10 shows the regression results of equation 2.2 for the period of 1988-2006. Closer to the above reported results, an overall complementary relationship between inward FDI and exports is maintained for China. The coefficients for contemporary inward FDI and inward FDI at lag 3 are significantly positive at the 1% level with the random effects specification, and the coefficient for inward FDI at lag 3 is significantly positive at the 1% level with the fixed effects specification. Similarly, although the coefficient for the inward FDI variable at lag 4 is significantly negative, its size is less than one fifth of the coefficient for the inward

FDI variable at lag 3 that is positive and significant at a higher level of 1%, for both fixed effects and random effects models. That is, any probable negative effects of inward FDI on exports will be outweighed by the manifested positive effects of inward FDI on exports, which are substantially greater. The results portray a broad picture for a complementary relationship between inward FDI and exports. Exports are not only positively related to contemporary inward FDI in the same year, which define a narrow complementary relationship, but also promote lagged inward FDI. Therefore, inward FDI complements exports, and it leads to increases in exports as well.

The F-statistic shown in Table 6.9 and Table 6.10 is both significant at the 1% for the analysis of equation 2.2 at the second stage. The model we suggested is able to explain the relationship between inward FDI and exports. Breutsh-Pagan statistic reported in Table 6.11 is significant at the 1% level as well, indicating the random effect model is more appropriate than the OLS model in estimating the relationship between inward FDI and imports. Table 6.11 also shows the Hausman test results for both 1988-2012 and 1988-2006 periods, which support the regression results with fixed effects. Therefore, the fixed effects model is the most suitable model. Due to the similarity of regression results with random effects and fixed effects, the relationship between inward FDI and exports is not influenced. Inward FDI of China is believed positively influence China's exports strongly.

In addition, the population of China is significantly negatively related with the imports, which supports hypothesis 2b. The coefficient of the variable for population of China is significantly negative at the 1% level in the regression of equation 2.1 during the period of 1988-2012, and significantly negative at the 5% level in the regression of equation 2.1 during the period of 1988-2006. The results for the first stage in the trade-FDI cycle indicate that FDI from OECD countries to China is motivated by market seeking, and the regression results of equation 2.1 for the second stage further demonstrate that FDI motivated by exploring markets is negatively related with trade (Kimino *et al.*, 2007). Due to a large population of China, an increasing number of MNCs from OECD countries choose to explore the market of China by FDI, in order to maintain and expand their market shares and gain benefits. Thereby, the market size of China negatively influences the imports of China, which supports a substitute relationship between imports and inward FDI.

Moreover, the regression results of equation 2.2 indicate that FDI from OECD countries to China is motivated by natural resource exploitation. The coefficient of natural resource endowment of China is significantly positive at the 1% level, which further supports hypothesis 2b. As discussed previously in Chapter 4 and Chapter 5, FDI driven by resource exploitation complements exports. The abundant natural resource endowment of China attracts MNCs from OECD countries to undertake direct investment in China. MNCs produce the products using the relative abundant natural resource in China to reduce the production costs, and then export those intermediates or final products to OECD countries or other countries. Therefore, the exports of China are promoted. In a word, the abundant natural resource of China leads to a complementary relationship between inward FDI and exports.

However, labour cost differences between OECD countries and China are found to significantly negatively influence the exports of China at the 5% level, which is different from hypothesis 2b. As discussed before, large differences in labour costs between OECD countries and China would make MNCs to be more willing to produce the products in China, by which they could utilise the cheap labour in China to reduce the production costs and then export those products. Therefore, similar with the role of natural resource endowment, a positive coefficient is expected. However, there does not seem to be an association between China's exports to OECD countries and labour cost differences between China and OECD countries. The panel data regression results in Table 6.10, which exclude the impact of the financial crisis, yield a positive but insignificant coefficient for the labour cost differences variable with both fixed and random effects models. The results in Table 6.9, which are likely to be twisted by the financial crisis, exhibit an unconfirmed positive relationship with the fixed effects specification and a significantly negative relationship with the random effects specification. Taking these mixed results and the impact of the financial crisis into consideration, it can be largely ruled that labour cost differences would not boost China's exports to OECD countries. As addressed in Chapter 5, one of the reasons is that higher labour costs in developed countries can be associated with higher capital intensities, labour productivity and total factor productivity. So, labour costs themselves are not a deterrent to export in the case of OECD countries and China.

In conclusion, at the second stage of a trade-FDI cycle, inward FDI complements both imports and exports of China. The enormous market size of China causes MNCs from OECD countries to choose both trade and FDI to serve the Chinese market. As pointed by Li *et al.* (2001), Liu *et al.* (2001), Buckley *et al.* (2002), Liu (2002) and Buck *et al.* (2007) , a positive spillover effect of inward FDI is posed on Chinese domestic firms and promote the exports of China. Additionally, the large market size and abundant natural resource are the main factors that influence the relationship between trade and FDI at this stage. The market size of China is negatively related with China's imports, which supports the substitute relationship between inward FDI and imports. Whereas the natural resource endowment of China is positively related with China's exports, which supports the complementary relationship between inward FDI and exports.

Table 6.6 Regression of Second Stage (Equation 2.1): 1988-2012

Dependent Variable: Imports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	1.897***	0.371	5.119	0.000	1.872***	0.370	5.055	0.000
Inward FDI	0.016*	0.009	1.780	0.076	0.025***	0.009	2.735	0.006
Inward FDI (-1)	0.017*	0.009	1.820	0.070	0.026***	0.009	2.866	0.005
Inward FDI (-2)	0.021	0.014	1.519	0.130	0.031**	0.014	2.307	0.022
Inward FDI (-3)	0.021	0.015	1.412	0.160	0.027*	0.015	1.830	0.068
Inward FDI (-4)	0.015	0.014	1.075	0.284	0.029**	0.014	2.105	0.036
Market Openness of China	-0.116	0.278	-0.418	0.677	-0.175	0.278	-0.630	0.530
GDP of China	-0.064	0.041	-1.570	0.118	-0.066	0.041	-1.610	0.109
Population of China	-3.467***	0.700	-4.954	0.000	-3.439***	0.699	-4.917	0.000
R-squared	0.985				0.276			
Adjusted R-squared	0.983				0.252			
F-statistic	562.373***				11.743***			
Prob. (*F*-statistic)	0.000				0.000			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.7 Regression of Second Stage (Equation 2.1): 1988-2006

Dependent Variable: Imports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	2.965**	1.141	2.600	0.010	2.331**	1.135	2.055	0.041
Inward FDI	0.031*	0.016	1.934	0.055	0.057***	0.016	3.619	0.004
Inward FDI (-1)	0.002	0.016	0.153	0.876	0.016	0.016	0.979	0.329
Inward FDI (-2)	0.012	0.016	0.742	0.459	0.014	0.016	0.919	0.360
Inward FDI (-3)	0.005	0.016	0.287	0.775	0.006	0.016	0.398	0.691
Inward FDI (-4)	0.018	0.014	1.249	0.214	0.040***	0.014	2.772	0.006
Market Openness of China	-1.317	1.110	-1.186	0.237	-0.844	1.107	-0.762	0.447
GDP of China	0.233	0.272	0.856	0.393	0.077	0.271	0.282	0.778
Population of China	-5.498**	2.178	-2.525	0.013	-4.313**	2.167	-1.991	0.048
R-squared	0.988				0.262			
Adjusted R-squared	0.986				0.228			
F-statistic	484.595***				7.736***			
Prob. (*F*-statistic)	0.000				0.000			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.8 Breutsh-Pagan and Hausman Test of Second Stage (Equation 2.1)

Breutsh-Pagan Test Summary	1988-2012			1988-2006		
	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
	238.899***	1	0.000	129.791***	1	0.000

Hausman Test Summary	1988-2012				1988-2006			
Dependent Variable: Imports	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.
Cross-section Random	203.340***		8	0.000	219.396***		8	0.000
Variable	Fixed	Random	Var (Diff.)	Prob.	Fixed	Random	Var (Diff.)	Prob.
Inward FDI	0.016	0.025	0.000***	0.000	0.031	0.057	0.000***	0.000
Inward FDI (-1)	0.017	0.026	0.000***	0.000	0.002	0.016	0.000***	0.000
Inward FDI (-2)	0.021	0.031	0.000***	0.000	0.012	0.014	0.000***	0.000
Inward FDI (-3)	0.021	0.027	0.000***	0.000	0.005	0.006	0.000***	0.000
Inward FDI (-4)	0.015	0.029	0.000***	0.000	0.018	0.040	0.000***	0.000
Market Openness of China	-0.116	-0.175	0.000***	0.000	-1.317	-0.844	0.006***	0.000
GDP of China	-0.064	-0.066	0.000	0.128	0.233	0.077	0.001***	0.000
Population of China	-3.467	-3.439	0.001	0.309	-5.498	-4.313	0.048***	0.000

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.9 Regression of Second Stage (Equation 2.2): 1988-2012

Dependent Variable: Exports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	5.399***	0.627	8.609	0.000	5.447***	0.677	8.049	0.000
Inward FDI	0.028**	0.013	2.227	0.027	0.051***	0.013	4.093	0.000
Inward FDI (-1)	0.021*	0.012	1.724	0.086	0.051***	0.012	4.239	0.000
Inward FDI (-2)	0.034***	0.012	2.735	0.007	0.061***	0.012	4.943	0.000
Inward FDI (-3)	0.112***	0.012	9.047	0.000	0.148***	0.012	12.235	0.000
Inward FDI (-4)	-0.021**	0.009	-2.236	0.026	-0.011	0.009	-1.199	0.232
Labour Cost Difference	0.333	0.935	0.356	0.722	-2.267**	0.900	-2.519	0.012
Natural Resource Endowment of China	0.166***	0.056	2.947	0.004	-0.070	0.050	-1.415	0.158
R-squared	0.980				0.427			
Adjusted R-squared	0.978				0.411			
F-statistic	457.264***				26.106***			
Prob. (*F*-statistic)	0.000				0.000			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.10 Regression of Second Stage (Equation 2.2): 1988-2006

Dependent Variable: Exports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	5.939***	0.936	6.347	0.000	4.357***	0.677	8.049	0.000
Inward FDI	0.017	0.021	0.810	0.419	0.058***	0.013	4.093	0.006
Inward FDI (-1)	-0.005	0.021	-0.243	0.809	0.024	0.012	4.239	0.270
Inward FDI (-2)	-0.009	0.021	-0.421	0.674	0.022	0.012	4.943	0.306
Inward FDI (-3)	0.127***	0.015	8.603	0.000	0.134***	0.012	12.235	0.000
Inward FDI (-4)	-0.020**	0.010	-2.010	0.046	-0.017*	0.009	-1.199	0.084
Labour Cost Difference	1.393	1.578	0.883	0.379	0.572	0.900	-2.519	0.711
Natural Resource Endowment of China	0.216***	0.067	3.217	0.002	0.013	0.050	-1.415	0.833
R-squared	0.984				0.423			
Adjusted R-squared	0.981				0.399			
F-statistic	416.408***				17.480***			
Prob. (*F*-statistic)	0.000				0.000			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.11 Breutsh-Pagan and Hausman Test of Second Stage (Equation 2.2)

Breutsh-Pagan Test Summary	1988-2012			1988-2006		
	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.
	2133.480***	1	0.000	1219.464***	1	0.000

Hausman Test Summary	1988-2012				1988-2006			
Dependent Variable: Exports	Chi-Sq. Statistic		Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq.d.f.	Prob.
Cross-section Random	682.636***		7	0.000	343.368***		7	0.000
Variable	Fixed	Random	Var (Diff.)	Prob.	Fixed	Random	Var (Diff.)	Prob.
Inward FDI	0.028	0.051	0.000***	0.000	0.017	0.058	0.000***	0.000
Inward FDI (-1)	0.021	0.051	0.000***	0.000	-0.005	0.024	0.000***	0.000
Inward FDI (-2)	0.034	0.061	0.000***	0.000	-0.009	0.022	0.000***	0.000
Inward FDI (-3)	0.112	0.148	0.000***	0.000	0.127	0.134	0.000***	0.000
Inward FDI (-4)	-0.021	-0.011	0.000***	0.000	-0.020	-0.017	0.000***	0.005
Labour Cost Difference	0.333	-2.267	0.063***	0.000	1.393	0.572	0.117**	0.016
Nature Resource Endowment of China	0.166	-0.070	0.001***	0.000	0.216	0.013	0.001***	0.000

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.12 Regression of Second Stage (Equation 2.1) with Net Imports: 1988-2012

Dependent Variable: Net Imports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	80.420*	42.201	1.906	0.058	76.906*	42.153	1.824	0.069
Inward FDI	-0.014	0.010	-1.367	0.173	-0.011	0.010	-1.100	0.272
Inward FDI (-1)	-0.020*	0.010	-1.945	0.053	-0.016	0.010	-1.524	0.129
Inward FDI (-2)	0.002	0.016	0.108	0.915	0.002	0.016	0.146	0.884
Inward FDI (-3)	0.003	0.017	0.195	0.845	0.008	0.017	0.442	0.659
Inward FDI (-4)	-0.043***	0.016	-2.781	0.006	-0.037**	0.016	-2.395	0.017
Market Openness of China	0.009	0.317	0.292	0.771	0.039	0.316	0.124	0.902
GDP of China	0.013	0.047	0.278	0.781	0.016	0.047	0.352	0.725
Population of China	-1.523*	0.797	-1.911	0.057	-1.453*	0.796	-1.825	0.069
R-squared	0.967				0.048			
Adjusted R-squared	0.964				0.017			
F-statistic	260.914***				1.554			
Prob. (*F*-statistic)	0.000				0.139			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.13 Regression of Second Stage (Equation 2.1) with Net Imports: 1988-2006

Dependent Variable: Net Imports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	2.361	1.433	1.648	0.101	2.193	1.426	1.537	0.126
Inward FDI	-0.002	0.020	-0.080	0.936	-0.001	0.020	-0.059	0.953
Inward FDI (-1)	-0.017	0.020	-0.840	0.402	-0.015	0.020	-0.753	0.453
Inward FDI (-2)	-0.006	0.020	-0.309	0.758	-0.005	0.016	-0.243	0.808
Inward FDI (-3)	0.008	0.020	0.389	0.698	0.011	0.020	0.539	0.590
Inward FDI (-4)	-0.043**	0.018	-2.393	0.018	-0.040**	0.018	-2.193	0.030
Market Openness of China	-1.330	1.395	-0.954	0.342	-1.250	1.392	-0.898	0.370
GDP of China	0.358	0.342	1.047	0.297	0.326	0.341	0.958	0.340
Population of China	-4.494	2.736	-1.643	0.103	-4.168	2.723	-1.531	0.128
R-squared	0.969				0.053			
Adjusted R-squared	0.964				0.009			
F-statistic	186.750***				1.207			
Prob. (*F*-statistic)	0.000				0.297			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.14 Breutsh-Pagan and Hausman Test of Second Stage (Equation 2.1)

Breutsh-Pagan Test Summary	1988-2012			1988-2012		
	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.
	2760.275***	1	0.000	1637.430***	1	0.000

Hausmann Test Summary	1988-2012				1988-2006			
Dependent Variable: Net Imports	Chi-Sq. Statistic		Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq.d.f.	Prob.
Cross-section random	186.378***		8	0.000	89.795***		8	0.000
Variable	Fixed	Random	Var (Diff.)	Prob.	Fixed	Random	Var (Diff.)	Prob.
Inward FDI	-0.014	-0.011	0.000***	0.002	-0.002	-0.001	0.000	0.853
Inward FDI (-1)	-0.020	-0.016	0.000***	0.000	-0.017	-0.015	0.000	0.111
Inward FDI (-2)	0.002	0.002	0.000	0.574	-0.006	-0.005	0.000***	0.001
Inward FDI (-3)	0.003	0.008	0.000***	0.000	0.008	0.011	0.000***	0.000
Inward FDI (-4)	-0.043	-0.037	0.000***	0.000	-0.043	-0.040	0.000**	0.045
Market Openness of China	0.092	0.016	0.000**	0.016	-1.330	-1.250	0.009	0.389
GDP of China	0.013	0.039	0.000***	0.000	0.358	0.326	0.001	0.303
Population of China	-1.523	-1.453	0.001*	0.064	-4.494	-4.168	0.069	0.214

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

6.3 The third stage of the cycle (Hypothesis 1c and Hypothesis 2c)

At the third stage of the trade-FDI cycle, after years of receiving inward FDI from OECD countries, the local firms' productivity has been improved through technology spillovers of inward FDI (Buckley *et al.*, 2002; Buck *et al.*, 2007; Sasidharan and Kathuria, 2011). Therefore, in order to gain overseas market shares, the sharply increased exports of China lead to outward FDI. Moreover, as what Signh (2007) and Driffield and Love (2007) have pointed out, the subsidiaries of foreign companies not only are the source of technology for the domestic country, but also could serve as a channel to gain the technology from developed countries. In order to acquire further technology, some technology sourcing outward FDI from China to OECD countries also takes place. Consequently, a positive relationship between outward FDI and exports are expected, where technology is expected to significantly positively influence outward FDI. In addition, similar with the second stage, lower market openness of OECD countries could also lead to tariff-jumping FDI. Natural resource endowment of OECD countries, similarly in network links with China, and market size of OECD countries are also expected to be the crucial factors that influence the outward FDI originated from China.

Table 6.15 and Table 6.16 present the regression results of equation 3. It is observed that the exports of China lead to an increase in its outward FDI three years later significantly but cause a dramatically decrease of outward FDI four years later. Moreover, all of the four regression results show the same phenomenon. Nevertheless, the F-statistic is not significant in three of the regression models, which indicates that the model we proposed is not that well matched. This is possibly due to that most of the outward FDI of China is government led, in which the government and political reasons are the major concerns. However, government and political issues are not included in our model since they are not normally important factors to other countries, especially for analysing the relationship between trade and FDI from economic perspectives. Nevertheless, for the period of 1988-2012 with random effects, the F-statistic is significant at the 10% level. The Breutsh-Pagan test supports that the random effects model is better fitted than OLS at the 1% significance level. Moreover, as reported in Table 6.17, the Hausman test results also indicate that the random effects model is better for explaining the relationship at this stage. Consequently, the random effects specification is the most appropriate one for the third stage regression analysis from 1988 to 2012.

This study brings forward two explanations for the dramatically swinging from significantly positive to significantly negative effects of China's exports on its outward FDI. On the one hand, exports leads to the increase of outward FDI three years later, which is in accordance with hypothesis 1c. Then the outward FDI of China causes the substitution of exports; therefore, four years later, China's exports decrease sharply. Thus the exports and outward FDI relationship become substitution in the fourth year. This demonstration can be validated by the regression results for the next stage. If the outward FDI of China leads to a decrease in exports in the current year or one year later in the next stage, this conjecture and the cycle are both proved. On the other hand, the outward FDI flows of China are not stable. From the original data, it is easy to find that some of the data are quite big negative numbers in certain years, which influence other countries share. Therefore, the unsteady numbers cause the swinging results. In a word, which explanation is the better demonstration of the results could be defined with the regression results for the fourth stage.

Moreover, none of the factors influence the outward FDI of China significantly. All of the four sets of regression results for the third stage show that all the coefficients for technology distance, market size of OECD countries, market openness of OECD countries, and the immigration of Chinese are statistically insignificant. This is generally because, different from OECD countries' outward FDI, China's outward FDI is mainly conducted by the government. Therefore, many factors are not taken into consideration when the firms in China decide to make direct investment overseas; and the determinants of Chinese outward FDI are more related with political reasons rather than other factors. Many studies have reached the similar conclusions, such as Buckley *et al.*, (2007b), Voss *et al.*, (2009) and Kang and Jiang (2012). In addition, as demonstrated in Table 2.13 of Chapter 2, more than half of the China's outward FDI flows to Hong Kong, and around fifteen per cent of China's outward FDI flows to British Virgin Island and Cayman Island, relatively a small amount of China's outward FDI flows to other countries, such as European countries. Therefore, China's outward FDI has increased, but the increased outward FDI mainly flows to other regions rather than OECD countries. Because these regions provide better tax policy than OECD countries, such as Cayman Island, or they owns closer network links with China, such as Hong Kong and Singapore, they become the principal destination for China's outward FDI. Consequently, the market size, network links are not the main driving force of China's outward FDI to OECD countries.

In summary, at the third stage of a trade-FDI cycle, the dramatically increased exports lead to an increase in outward FDI. Moreover, none of the contributing factors, including the market size of OECD countries, the market openness of OECD countries, natural resource endowment of OECD countries, network links with China, and even the technology distance between OECD countries and China, pose significant influence on the outward FDI from China to OECD countries. Because a large amount of China's outward FDI is led by the government, therefore it is more related with the politics. Moreover, the relatively smaller amount of China's FDI to OECD countries also contributes to the insignificant results of the determinants.

Table 6.15 Regression of Third Stage (Equation 3): 1988-2012

Dependent Variable: Outward FDI	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	-3.039	4.140	-0.734	0.464	-3.884	27.482	-0.141	0.888
Exports	-6.510	16.703	-0.390	0.697	-5.494	15.884	-0.346	0.730
Exports (-1)	4.086	24.364	0.168	0.867	3.102	24.229	0.128	0.898
Exports (-2)	-4.715	18.236	-0.259	0.796	-2.154	17.189	-0.125	0.900
Exports (-3)	19.297***	7.378	2.615	0.010	19.232***	7.361	2.613	0.010
Exports (-4)	-18.329***	5.625	-3.259	0.001	-17.009***	5.018	-3.390	0.001
Technology Distance	-7.643 e^{-5}	2.497 e^{-4}	-0.306	0.760	-4.485 e^{-6}	1.896 e^{-4}	-0.024	0.981
GDP of OECD	-0.054	34.209	-0.002	0.999	-3.068	11.200	-0.274	0.785
Population of OECD	142.682	168.692	0.846	0.399	14.235	26.271	0.542	0.589
Market Openness of OECD	1.022	9.445	0.108	0.914	-0.656	2.863	-0.229	0.819
Natural Resource Endowment of OECD	-0.619	1.216	-0.509	0.612	0.669	0.634	1.056	0.293
Immigration of Chinese	0.147	0.625	0.236	0.814	0.008	0.333	0.023	0.982
R-squared	0.114				0.100			
Adjusted R-squared	-0.054				0.039			
F-statistic	0.679				1.652*			
Prob. (*F*-statistic)	0.885				0.089			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.16 Regression of Third Stage (Equation 3): 1988-2006

Dependent Variable: Outward FDI	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	-95.426	888.707	-0.107	0.915	24.072	49.754	0.484	0.630
Exports	-6.183	26.371	-0.234	0.815	-4.151	23.251	-0.179	0.859
Exports (-1)	1.482	36.442	0.041	0.968	0.578	36.226	0.016	0.987
Exports (-2)	0.043	28.002	0.002	0.999	-1.012	24.821	-0.041	0.968
Exports (-3)	19.058**	9.204	2.071	0.041	19.273**	9.165	2.103	0.038
Exports (-4)	-18.618**	7.526	-2.474	0.015	-17.197***	6.298	-2.731	0.007
Technology Distance	4.473 e^{-4}	9.168 e^{-4}	0.488	0.627	3.900 e^{-4}	6.363 e^{-4}	0.613	0.541
GDP of OECD	22.224	86.845	0.256	0.799	-4.986	17.977	-0.277	0.782
Population of OECD	3.013	433.129	0.007	0.995	8.499	44.678	0.190	0.850
Market Openness of OECD	-0.062	21.891	-0.003	0.998	-1.920	5.200	-0.369	0.713
Natural Resource Endowment of OECD	-1.024	2.523	-0.406	0.686	0.385	1.124	0.343	0.732
Immigration of Chinese	0.552	1.167	0.448	0.655	0.066	0.637	0.103	0.918
R-squared	0.117				0.103			
Adjusted R-squared	-0.127				0.012			
F-statistic	0.478				1.136			
Prob. (*F*-statistic)	0.983				0.341			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.17 Breutsh-Pagan and Hausman Test of Third Stage (Equation 3)

Breutsh-Pagan Test Summary	1988-2012			1988-2006		
	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.
	9.068***	1	0.003	7.623***	1	0.006

Hausmann Test Summary	1988-2012				1988-2006			
Dependent Variable: Outward FDI	Chi-Sq. Statistic		Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq.d.f.	Prob.
Cross-section random	2.045		11	0.998	1.144		11	1.000
Variable	Fixed	Random	Var (Diff.)	Prob.	Fixed	Random	Var (Diff.)	Prob.
Exports	-6.510	-5.494	26.709	0.844	-6.183	-4.151	154.837	0.870
Exports (-1)	4.086	3.102	6.572	0.701	1.482	0.577	15.728	0.820
Exports (-2)	-4.715	-2.154	37.115	0.674	0.043	-1.012	168.001	0.935
Exports (-3)	19.297	19.232	0.247	0.896	19.058	19.273	0.707	0.797
Exports (-4)	-18.329	-17.009	6.458	0.603	-18.618	-17.197	16.973	0.730
Technology Distance	-0.000	-0.000	0.000	0.658	0.000	0.000	0.000	0.931
GDP of OECD	-0.054	-3.068	1044.808	0.926	22.224	-4.986	7224.041	0.749
Population of OECD	142.681	14.235	27766.824	0.441	3.013	8.799	185604.857	0.990
Market Openness of OECD	1.022	-0.656	81.008	0.852	-0.062	-1.920	452.173	0.930
Natural Resource Endowment of OECD	-0.619	0.669	1.077	0.215	-1.024	0.385	5.105	0.533
Immigration of Chinese	0.147	0.008	0.280	0.792	0.522	0.066	0.955	0.640

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

6.4 The fourth stage of the cycle (Hypothesis 1d and Hypothesis 2d)

At the fourth stage of the trade-FDI cycle, the labour cost in China has increased with the fast development of China. Therefore, the increase in production costs causes a decrease in exports. In addition, there are increasingly trade disputes between China and OECD developed countries, especially those countries from the EU and the US. The exports of China have encountered with even greater difficulties, and thereby decrease. Moreover, similar with the situation at the second stage, the outward FDI motivated by market seeking tends to be a substitution for exports, and the outward FDI motivated by resource exploitation are more likely to be complementary for imports. Furthermore, the OECD countries own technology advantages over China. Thus the newly invented technology stimulates the exports of OECD countries, which is the import of China. The regression results for the fourth stage of trade-FDI cycles support a substitute relationship between exports and outward FDI, but indicate no significant relationship between imports and outward FDI.

Table 6.18 and Table 6.19 report the regression results of equation 4.1 and Table 6.20 shows the Breutsh-Pagan and Hausman test results of equation 4.1. It is found that the F-statistic is significant at the 1% level for both periods with fixed effects, while the F-statistic is insignificant for both periods with random effects. This indicates that the fixed effects model better explains the sample than the random effects model. The Breutsh-Pagan statistic reported in Table 6.20 is significant at the 1% level for both time periods, showing that random effects models are preferred to OLS. Moreover, the Hausman statistic is also significant at the 1% for both time periods, supporting that the fixed effects model is better fitted than the random effects model in analysing the relationship between outward FDI and imports. As a result, the regression with fixed effects is much preferred.

However, the coefficients of outward FDI and lagged outward FDI are all insignificant in either effects or either period. Therefore, the imports of China are not influenced by the outward FDI. This is because China's outward FDI just starts booming in recent years. Compared to China's imports, its outward FDI flows are relatively small, especially the outward FDI to OECD countries that is motivated by natural resource exploitation. Consequently, the effects of outward FDI to OECD countries motivated by natural resource exploitation on imports are too small to be observed.

Moreover, the technology distance and natural resource endowment of OECD countries are both found to negatively influence the imports of China, which are opposed to hypothesis 2d. According to Filippini and Molini (2003), a country tends to trade more with countries with similar technology levels, due to that they have similar productivity and demand and it is easy for one country to fit into the demand pattern or mode of production of the other one. This explains why the technology distance factor negatively influences the imports of China at the 1% level. The major reason for a significantly negative coefficient of the variable of natural resource endowment of OECD is that China is abundant in natural resource itself; therefore the abundant natural resource of OECD countries is not attractive to China's outward FDI. As seen from Chart 2.9 of Chapter 2, China's imports are mainly distributed in these sectors: machinery and transport equipment, miscellaneous and manufacture articles, and manufactured goods. The primary products only account for approximately 5 per cent of total China's imports. The countries with abundant natural resources receives less attention from China's outward FDI, and China will import less products from those natural resource abundant countries.

Table 6.21 and Table 6.22 show the regression results of equation 4.2. They indicate a significant negative relationship between exports and outward FDI as hypothesis 1d has stated. Table 6.23 reports the Breutsh-Pagan test and Hausman test results for model specifications. The regression with random effects is preferred to an OLS model, while the fixed effects specification better explains the relationship between outward FDI and exports at this stage than the random effects specification. Therefore, the regression results of equation 4.2 with a fixed effects specification demonstrate the relationship between outward FDI and exports most appropriately.

Althought the coefficients of equation 4.2 with fixed effect specification are not as significant as the one with random effect specification, the coefficiants are negative. Therefore, China's outward FDI is a substitution for China's exports. More accurately, the outward FDI of China leads to a decrease in exports in the following years. This reminds us that the effects exerted on outward FDI by exports in the third stage of the trade-FDI cycle swing dramatically from being significantly positive to negative. Combined with the results in the fourth stage, the explanations for the third stage become explicit. The increased exports complement the outward FDI three years later while the outward FDI start to substitute the exports significantly one year later. Therefore, look at the last stage of the cycle together, the exports and outward FDI are complementary with each other at the beginning, and four years later, with the dramatic increase in outward FDI, the relationship between FDI and exports become substitute.

Furthermore, the results are also in accordance with hypothesis 2d. With the narrowing in the labour cost differences between OECD countries and China, the exports to OECD countries are getting reduced. This is mainly because the labour costs of China are rising, which makes the production costs become higher and reduces the benefit of cheap labour for firms in China. The market openness of OECD countries also significantly positively influences the exports from China to OECD countries. In recent years, with the surge of China’s exports worldwide, incresingly trade disputes are generated against China. Such as, the US imposes a 31% anti-dumping tariff on the imports of Chinese PV products in 2012, and the EU impose anti-dumping tariffs on Chinese solar panels in 2013.With the increasing number of trade disputes arising, the exports to OECD countries are getting harder, therefore, outward FDI that aims at avoiding trade barriers increases. Thus, the lower the market openness of an OECD countries, the lower the exports from China to that OECD country are; the higher the outward FDI from China to that OECD country, which supports the substitute relationship between outward FDI and exports.

As proposed in hypothesis 2d, GDP is supposed to be significantly negatively related with exports. The outward FDI stimulated by market seeking tends to substitute exports. However, the results show the opposite coefficient of GDP as suggested by the hypothesis. The opposite coefficient indicates that China enters large OECD countries by both exports and outward FDI, while enters the smaller OECD countries only by outward FDI. Therefore, the substitution relationship between outward FDI and exports are more obviously for countries with smaller GDP. In addition, the coefficient of population of OECD countries is positive when the regression is under the fixed effects specification in both periods, while the coefficient of population of OECD countries becomes negative adopting the random effects specification. This is consistent with what Papazoglou (2007) has pointed out, that population size can be trade enhancing as well as trade inhibiting. On the one hand, a large population means large demands for a wider variety of goods and can better absorb imports (Krugman, 1981; Venables, 1987; Chi and Kilduff, 2010). So if this kind of situation is dominant, the relationship between trade and population is expected to be positive. On the other hand, a large population may indicate a large resource endowment, self-sufficiency, and less reliance on imports (Papazoglou, 2007). Moreover, if the population is too large in rural areas, the distribution and advertising costs will be much more expensive, which will inhibit trade (Mullen and Sheng, 2007; Sheng and Mullen, 2011). Therefore, the relationship between population of OECD countries and China's exports is twofold. Combined with another indicator of market size (GDP) and the Hausman test results, this study supports the argument that a larger market size leads to the substitute relationship between outward FDI and exports.

In summary, at the fourth stage, the outward FDI of China is a substitution for its exports. Market size of OECD countries, market openness of OECD countries and labour costs differences between OECD countries and China all positively influence the exports of China, and the latter two factors both provide supports to the substitute relationship between China's outward FDI and exports. Moreover, the results for the third stage of the cycle have been further validated. Exports lead to an increase in outward FDI. With the surge of outward FDI, outward FDI substitutes exports later on. Therefore, time goes by, the relationship between outward FDI and exports changes from being complementary to substitute.

Table 6.18 Regression of Fourth Stage (Equation 4.1): 1988-2012

Dependent Variable: Imports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	9.185***	0.368	24.928	0.000	5.258***	1.366	3.848	0.000
Outward FDI	-5.156 e^{-4}	8.977 e^{-4}	-0.574	0.567	-4.466 e^{-4}	8.950 e^{-4}	-0.499	0.619
Outward FDI (-1)	-7.939 e^{-4}	0.001	-0.786	0.433	-8.046 e^{-4}	0.001	-0.799	0.425
Outward FDI (-2)	-0.001	0.001	-1.110	0.269	-0.001	0.001	-1.036	0.302
Outward FDI (-3)	-7.293 e^{-4}	0.001	-0.676	0.500	-5.975 e^{-4}	0.001	-0.561	0.576
Outward FDI (-4)	-6.462 e^{-4}	8.599 e^{-4}	-0.752	0.454	-6.523 e^{-4}	8.547 e^{-4}	-0.763	0.447
Technology Distance	-3.312 e^{-6}	3.077 e^{-6}	-1.076	0.284	-4.182 e^{-7}	2.990 e^{-6}	-0.140	0.890
Natural Resource Endowment of OECD	-0.137*	0.076	-1.810	0.073	-0.104	0.069	-1.504	0.135
R-squared	0.974				0.019			
Adjusted R-squared	0.969				-0.026			
F-statistic	188.338***				0.425			
Prob. (*F*-statistic)	0.000				0.886			

Notes: * indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.19 Regression of Fourth Stage (Equation 4.1): 1988-2006

Dependent Variable: Imports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	11.676***	0.591	19.760	0.000	6.908***	1.301	5.309	0.000
Outward FDI	-6.442 e^{-4}	8.447 e^{-4}	-0.763	0.448	6.527 e^{-4}	8.370 e^{-4}	-0.780	0.438
Outward FDI (-1)	2.672 e^{-4}	9.510 e^{-4}	0.281	0.780	1.713 e^{-4}	9.446 e^{-4}	0.181	0.857
Outward FDI (-2)	-0.001	0.001	-1.036	0.304	-0.001	0.001	-1.001	0.320
Outward FDI (-3)	-0.001	0.001	-1.058	0.294	-8.564 e^{-4}	0.001	-0.768	0.445
Outward FDI (-4)	-0.001	0.001	-1.326	0.189	-0.001	0.001	-1.266	0.209
Technology Distance	-2.806 e^{-5}***	8.900 e^{-6}	-3.152	0.002	-5.211 e^{-6}	8.136 e^{-6}	-0.641	0.524
Natural Resource Endowment of OECD	-0.215**	0.090	-2.384	0.020	-0.158**	0.076	-2.083	0.040
R-squared	0.982				0.041			
Adjusted R-squared	0.977				-0.038			
F-statistic	178.235***				0.516			
Prob. (*F*-statistic)	0.000				0.820			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.20 Breutsh-Pagan and Hausman Test of Fourth Stage (Equation 4.1)

Breutsh-Pagan Test Summary	1988-2012			1988-2006		
	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.
	2006.021***	1	0.000	768.259***	1	0.000

Hausmann Test Summary	1988-2012				1988-2006			
Dependent Variable: Imports	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.
Cross-section Random	21.196***		7	0.004	55.636***		7	0.000
Variable	Fixed	Random	Var (Diff.)	Prob.	Fixed	Random	Var (Diff.)	Prob.
Outward FDI	-5.156 e^{-4}	-4.466 e^{-4}	0.000	0.326	-6.442 e^{-4}	-6.527 e^{-4}	0.000	0.941
Outward FDI (-1)	-7.939 e^{-4}	-8.046 e^{-4}	0.000	0.885	2.672 e^{-4}	1.713 e^{-4}	0.000	0.384
Outward FDI (-2)	-0.001	-0.001	0.000	0.585	-0.001	-0.001	0.000	0.786
Outward FDI (-3)	-7.293 e^{-4}	-5.975 e^{-4}	0.000	0.419	-0.001	-8.564 e^{-4}	0.000	0.234
Outward FDI (-4)	-6.462 e^{-4}	-6.523 e^{-4}	0.000	0.948	-0.001	-0.001	0.000	0.686
Technology Distance	-3.312 e^{-6}	-4.182 e^{-7}	0.000***	0.000	-2.806 e^{-5}	5.211 e^{-5}	0.000***	0.000
Natural Resource Endowment of OECD	-0.137	-0.104	0.001	0.287	-0.215	-0.158	0.002	0.243

*** indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.**

Table 6.21 Regression of Fourth Stage (Equation 4.2): 1988-2012

Dependent Variable: Exports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	-13.091***	1.891	-6.921	0.000	-2.050***	0.528	-3.882	0.000
Outward FDI	1.870 e^{-4}	4.460 e^{-4}	0.419	0.676	2.621 e^{-5}	4.436 e^{-4}	0.059	0.953
Outward FDI (-1)	-7.534 e^{-4}	5.120 e^{-4}	-1.471	0.143	-0.001**	5.055 e^{-4}	-2.259	0.025
Outward FDI (-2)	-7.838 e^{-4}	5.529 e^{-4}	-1.418	0.158	-0.002***	5.371 e^{-4}	-2.792	0.006
Outward FDI (-3)	-5.274 e^{-4}	5.327 e^{-4}	-0.990	0.324	-0.001**	5.201 e^{-4}	-2.279	0.024
Outward FDI (-4)	-3.809 e^{-4}	4.490 e^{-4}	-0.848	0.398	-6.870 e^{-4}	4.350 e^{-4}	-1.579	0.116
Labour Cost Difference	3.165***	0.744	4.257	0.000	3.717***	0.678	5.484	0.000
GDP of OECD	2.141***	0.126	16.965	0.000	1.662***	0.108	15.399	0.000
Population of OECD	2.673***	0.750	3.565	0.001	-1.059***	0.282	-3.761	0.002
Market Openness of OECD	0.214**	0.105	2.048	0.042	-0.013	0.064	-0.203	0.839
R-squared	0.991				0.830			
Adjusted R-squared	0.989				0.822			
F-statistic	624.439***				100.716***			
Prob. (*F*-statistic)	0.000				0.000			

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 6.22 Regression of Fourth Stage (Equation 4.2): 1988-2006

Dependent Variable: Exports	Fixed Effects				Random Effects			
Variable	Coefficient	S.E.	*t*-statistic	*p*-value	Coefficient	S.E.	*t*-statistic	*p*-value
Constant	-17.570***	3.146	-5.586	0.000	-2.138***	0.791	-2.702	0.008
Outward FDI	2.809 e^{-4}	4.077 e^{-4}	0.689	0.492	1.105 e^{-4}	4.060 e^{-4}	0.272	0.786
Outward FDI (-1)	-5.803 e^{-4}	4.773 e^{-4}	-1.216	0.227	-0.001**	4.643 e^{-4}	-2.416	0.017
Outward FDI (-2)	2.237 e^{-6}	5.855 e^{-4}	0.004	0.997	-9.002 e^{-4}	5.630 e^{-4}	-1.599	0.112
Outward FDI (-3)	2.917 e^{-5}	5.532 e^{-4}	0.053	0.958	-8.684 e^{-4}	5.316 e^{-4}	-1.633	0.105
Outward FDI (-4)	6.561 e^{-4}	5.375 e^{-4}	1.221	0.225	8.635 e^{-5}	5.238 e^{-4}	0.165	0.869
Labour Cost Difference	1.628	1.466	1.110	0.269	5.158***	1.034	4.986	0.000
GDP of OECD	2.354***	0.230	10.232	0.000	1.823***	0.190	9.580	0.000
Population of OECD	4.035***	1.376	2.933	0.004	-1.511***	0.522	-2.893	0.005
Market Openness of OECD	0.452*	0.237	1.904	0.060	-0.101	0.109	-0.924	0.357
R-squared	0.993				0.801			
Adjusted R-squared	0.992				0.787			
F-statistic	569.488***				54.275***			
Prob. (*F*-statistic)	0.000				0.000			

*** indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.**

Table 6.23 Breutsch-Pagan and Hausman Test of Fourth Stage (Equation 4.2)

Breutsch-Pagan Test Summary	1988-2012			1988-2006		
	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.	Chi-Sq. Statistic	Chi-Sq.d.f.	Prob.
	1716.382***	1	0.000	1017.985***	1	0.000

Hausmann Test Summary	1988-2012				1988-2006			
Dependent Variable: Exports	Chi-Sq. Statistic		Chi-Sq. d.f.	Prob.	Chi-Sq. Statistic		Chi-Sq. d.f	Prob.
Cross-section random	80.559***		9	0.000	51.269***		9	0.000
Variable	Fixed	Random	Var (Diff.)	Prob.	Fixed	Random	Var (Diff.)	Prob.
Outward FDI	$1.870\ e^{-4}$	$2.621\ e^{-5}$	0.000***	0.001	$2.809\ e^{-4}$	$1.105\ e^{-4}$	0.000***	0.000
Outward FDI (-1)	$-7.534\ e^{-4}$	$-0.001\ e^{-4}$	0.000***	0.000	$-5.803\ e^{-4}$	-0.001	0.000***	0.000
Outward FDI (-2)	-7.838	-0.002	0.000***	0.000	$2.237\ e^{-6}$	$-9.002\ e^{-4}$	0.000***	0.000
Outward FDI (-3)	$-5.274e^{-4}$	-0.001	0.000***	0.000	$2.917\ e^{-5}$	$-8.684\ e^{-4}$	0.000***	0.000
Outward FDI (-4)	$-3.809\ e^{-4}$	$-6.870\ e^{-4}$	0.000***	0.006	$6.561\ e^{-4}$	$-8.635\ e^{-5}$	0.000***	0.000
Labour Cost Difference	3.165	3.717	0.093*	0.071	1.628	5.158	1.079***	0.001
GDP of OECD	2.141	1.662	0.004***	0.000	2.354	1.823	0.017***	0.000
Population of OECD	2.673	-1.059	0.483***	0.000	4.035	-1.511	1.620***	0.000
Market Openness of OECD	0.214	-0.013	0.007***	0.006	0.452	-0.101	0.044***	0.009

* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

6.5 Summary of major findings

This chapter provides the panel data regression results of the trade-FDI cycle model and explains the factors that influence the relationship between trade and FDI at each stage of the cycle. The results confirm that there exists a trade-FDI cycle between developing and developed countries based on the example of China and OECD developed countries. At the first stage of the trade-FDI cycle, the imports of China lead to an increase in inward FDI, imports and inward FDI are complementary to each other. The technology distance between China and OECD countries, income differences between OECD countries, natural resource endowment of China and the GDP of China all significantly positively influence the inward FDI from OECD countries. Therefore, the inward FDI flows from OECD countries to China are driven by resource seekers and market seekers. Moreover, the immigration of Chinese in OECD countries negatively influences the inward FDI of China, which indicates that FDI is favoured by the MNCs from OECD countries to serve foreign markets with large cultural differences. Therefore, all of those factors support the complementary relationship between inward FDI and imports in China at the first stage.

At the second stage of a trade-FDI cycle, due to the dramatic increase in inward FDI from OECD countries, the productivity of local firms in China has been improved through various spillovers from inward FDI. Therefore, the exports of China has increased greatly accordingly. The abundant natural resources of China further strengthen the complementary relationship between inward FDI and exports. Moreover, although there is certain level of substitution between market seeking FDI and imports, which is verified by the decreasing net imports, the giant market size of China stimulates the MNCs from OECD countries to serve such a big market by both trade and FDI, thus inward FDI and imports are complementary overall. Consequently, the rise of inward FDI of China accompanies an increase in imports and exports and a decrease in net imports in the subsequent years.

At the third stage of the trade-FDI cycle, with the development of China’s local firms, the local firms no longer satisfy with China’s market, they start to go global to compete with other MNCs. Therefore, great a significant increase in exports leads to increases in outward FDI in the next few years. Nevertheless, since most of China’s outward FDI is government-led, the political issues are more important in the determination of the destination of China's outward FDI. Therefore, the market openness of OECD countries, natural resource endowment of OECD countries, network links between OECD countries and China and the technology distance between OECD countries and China are all found to exert no significant influences on the complementary relationship between China's exports and outward FDI.

At the last stage of the trade-FDI cycles, after further development of outward FDI, the relationship between China's outward FDI and subsequent years' exports becomes substitute. Moreover, the market openness of OECD countries, market size of OECD and labour cost differences between OECD countries and China all positively influence the exports of China, which support this substitute relationship.

In summary, the trade-FDI cycle is presented as below based on the example of China and OECD developed countries (from China's perspective):

$$I_t \uparrow \rightarrow IFDI_t \rightarrow\ I_t \uparrow, NET\ I_t \downarrow;\ X_t \uparrow \rightarrow\ OFDI_{t+3} \uparrow \rightarrow\ X_{t+4} \downarrow$$

where inward FDI leads to the increase in imports and exports while cause the decrease of net imports from the current year, and these upward trends of imports and exports last for several years until outward FDI starts to substitutes exports. At the first stage and second stage, market size and factor endowment of China are the major driving forces of the inward FDI from OECD countries, which support the complementary relationship between inward FDI and imports, and between inward FDI and exports. At the fourth stage, the estimated effects exerted by market size of OECD countries, labour cost differences and market openness of OECD countries all supports the substitute relationship between outward FDI and exports.

7 CHAPTER 7: CONCLUSIONS

This thesis has made inquiries into the dynamic relationship between trade and FDI by examining the engagements and interactions between China and OECD developed countries in their trade and FDI undertakings. In doing so, some of the gaps in the existing literature are addressed and filled in to a certain extent. This work has transcended the on-going debate on the relationship between trade and FDI, which is largely vindicated in the existing literature as being either substitute or complementary in a static manner. Rather, this work has provided an examination of the relationship between trade and FDI on a dynamic basis, evolving in cycles and progressing through stages. It has demonstrated how trade and FDI interact with each other stage by stage. Moreover, apart from export and outward FDI, the analysis also includes imports and inward FDI in the trade and FDI relationship. In addition, an examination of the factors that drive such cyclical relationship between trade and FDI is undertaken, with justifications as to why these factors are chosen and why they are crucial in the examination. To conclude this study, Section 7.1 summarises the major finding. Moreover, it highlights the contributions made by this thesis. Then, the limitations of the thesis are addressed and reflected upon in Section 7.2, together with suggestions and recommendations for further research and research focuses in this field.

7.1 Major contributions and implications

The results of this study indicate that overall, there is a trade-FDI cycle existing between developing countries and developed countries, such as China and OECD developed countries. An augmented gravity model is employed to test the hypotheses developed in the study. The strong economic foundation as well as the model's superb ability to examine trade and FDI flows and their relationship makes it a good analytical tool for this research. Furthermore, the augmented gravity model also provides better support and explanation for the factors that influence the relationship between trade and FDI.

At the first stage of the trade-FDI cycle, the imports of China lead to, and accompany, the increase of inward FDI into China. Moreover, factors such as technology distance between China and OECD countries, income differences between China and OECD countries, natural resource endowment of China, the relative GDP size of China, and the immigration of Chinese in OECD countries all contribute to this complementary relationship between imports and inward FDI. The MNCs from OECD countries own comparative technology advantage to China. In order to achieve economies of scale, obtain natural resources, and spread R&D expenditures, MNCs form OECD countries choose to enter the market of China. With the accumulation of knowledge about China through exports, FDI is undertaken to serve China to overcome the large differential in network links. The analysis suggests that the inward FDI from OECD countries to China is driven by market seeking and abundant natural resources. The motivations for making direct inward in China by OECD countries, which is FDI into China from OECD countries, are associated with the relationship between inward FDI into China and exports and imports of China at the second stage.

At the second stage of the trade-FDI cycle, productivity gets imporoved in local firms in China, due to the technology spillover effect from the inward FDI from OECD countries. Therefore, the Chinese firms are able to produce similar products at the same or even lower costs and then export those products. Thus, they are better positioned to engage in international economic activities. With the abundant natural resources of China, the complementary relationship between inward FDI and exports are further strengthened. China could export the natural resources or the primary products to OECD countries, and MNCs could reduce production costs subsequently by utilising those products. Moreover, the inward FDI and imports also show a complementary relationship due to the giant market size of China, which forces the MNCs from OECD countries enter the market of China by both trade and FDI. Nevertheless, there exists a substitute relationship between inward FDI and imports, for the inward FDI leads to deceasing in net imports. Therefore, the rise of inward FDI into China causes the increase of imports and exports concurrently and in subsequent years, meanwhile the inward FDI also leads to the decrease of net imports.

At the third stage of the trade-FDI cycle, exports are found to have a three year lead over outward FDI; therefore, exports promote outward FDI and complementary to outward FDI in the case of China. However, most factors, such as the market openness of OECD countries, natural resource endowment of OECD countries, network links between OECD countries and China and the technology distance between OECD countries and China, are found to exert no significant effects on this relationship. The explanation for this lies in the executor of China's outward FDI. As indicated in many studies (Buckley *et al.*, 2007b; Voss *et al.*, 2009; Kang and Jiang, 2012), most of China's outward FDI is led by the Chinese government. Therefore, the outward FDI of China is less responsive to the typical factors that influence outward FDI.

Moreover, at the fourth stage of trade-FDI cycles, the relationship between China's outward FDI and subsequent years' exports becomes substitute. The market openness of OECD countries and labour cost difference between OECD countries and China both positively influence the exports of China, lending support to this substitute relationship. The substitute relationship between outward FDI and exports is enhanced by the lower market openness of OECD countries. Furthermore, with the narrowing down of the labour cost differences between OECD countries and China, the exports to OECD countries are getting reduced. Moreover, China's local firms tend to serve large OECD countries with both exports and FDI, and serve small OECD countries only by outward FDI. In addition, although outward FDI shows no significant influence on imports due to relative small FDI flows, the analytical results confirm the findings in previous studies that a country tends to trade more with countries with similar technology levels (Filippini and Molini, 2003). The results further indicate that China's outward FDI shows no interest in countries with abundant natural resource. In conclusion, the trade-FDI cycle between China and OECD developed countries can be demonstrated as below:

$$I_t \uparrow \rightarrow IFDI_t \rightarrow \ I_t \uparrow, NET\ I_t \downarrow;\ X_t \uparrow \rightarrow \ OFDI_{t+3} \uparrow \rightarrow \ X_{t+4} \downarrow$$

This research contributes to the existing literature by not only examining the trade-FDI relationship but also by providing a detailed analysis of the dynamic trade-FDI cycle. Moreover, it has provided a clear path showing how a country achieves its development by attracting inward FDI and utilising trade and outward FDI. Other worthy extensions of the literature in this study are a systematical review of the determinants of trade and FDI individually and jointly, and an analytical identification of the factors that drive the cycle of trade and FDI relationship. This gives a more comprehensive insight into the nature of and patterns in the trade-FDI relationship, and how they interact with each other.

While there is a fairly large body of literature addressing the relationship between trade and FDI based on the cases of Japan and the US, there is very limited research on the FDI-trade relationship of China vis-à-vis OECD developed countries. Likewise, economic benefits from utilising FDI and engaging in trade have been demonstrated with the examples of Japan, and then the countries like Singapore and Korea; with a time lag, what is lacked in the literature is more scrutiny of China's experience. Evidence from China and OECD developed countries helps derive a clearer pattern in the trade-FDI cycle in which the trade and FDI relationship evolves between the largest developing countries and major developed economies in the world. It further makes this dynamic cyclical relationship an interesting case to demonstrate the internationalisation process.

Additionally, this trade-FDI cycle also has useful policy implications for both developing and developed countries. Policy makers in both developed and developing countries would better understand the current state of, and trends in the trade, FDI and economy of their countries, given specific knowledge in trade-FDI cycles and their stages. This helps them to set the pertinent policy accordingly to encourage and support further development of their countries.

7.2 Limitations of the study and suggestions for future research

There are however some limitations in this study, especially those arising from shortcomings in data. While the research compares the trade and FDI dynamic relationship between China and OECD developed countries, Canada has not been included due to the difficulty in obtaining FDI data between China and Canada. Further, some of previous empirical studies have conducted analysis at industry level or firm level. Studying the relationship between trade and FDI at firm level or industry level definitely provides greater and more accurate insights into the interaction of trade and FDI. However, FDI data between China and OECD countries at industry level is not practically available. Hopefully, in the future, we could obtain the industry level data to further validate the cyclical relationship between trade and FDI.

This research chooses China as the typical developing country to analyse the dynamic cyclical relationship between trade and FDI and attempts to provide a better understanding of how internationalisation helps developing countries to achieve their fast development. However, as the largest developing country, China is different from other developing countries in many aspects, including culture, political environment and country size. In particular, China's outward FDI is government-led, which makes the analysis of outward FDI of China more complex. Therefore, analysis of other typical developing countries, such as Brazil and South Africa, would provide more convincible evidence of the cyclical relationship between trade and FDI.

Additionally, the relationship between China's outward FDI and its exports is found to be complementary at the very beginning and becomes substitute a few years later in this thesis. In future research, it is superior to set up a VAR with a system of two equations to verify this relationship, where both the current outward FDI and exports appear on the left hand side of the equations. That is, both outward FDI and exports are treated as endogenous variables. The proposed VAR for deal with trade-FDI interactions will be a VAR with panel data structure.

In summary, this thesis has endeavoured to theorise the relationship between trade and FDI between developed countries and developing countries, which is verified by hypothesis tests in a panel data analytical framework. A cyclical relationship between trade and FDI is identified based on China and OECD developed countries. The factors that drive this relationship have also been clarified. Nevertheless, there are still more works to be done in future research.

BIBLIOGRAPHY

Aberg, P. (2001) Japanese exports and foreign direct investment. In Poon J. P. H. & Thompson, E. (Ed.), *Asia Pacific Transitions*. London: Macmillan, 355-378.

Adler, M. & Stevens, G. (1974) The trade effects of direct investment. *Journal of Finance*, 29(2), 655-676.

Aitken, B. J. & Harrison, A. E. (1999) Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. *American Economic Review*, 89(3), 605-618.

Aitken, B. J., Hanson, G. H. & Harrison, A. E. (1997) Spillovers, foreign investment, and export behaviour. *Journal of International Economics*, 43(1), 103-132.

Aitken, N. D. (1973) The effect of the EEC and EFTA on European trade: a temporal cross-section analysis. *American Economic Review*, 63(5), 881-892.

Aizenman, J. & Noy, I. (2006) FDI and trade — two-way linkages? *Quarterly Review of Economics and Finance*, 46(3), 317–337.

Alguacil, M. T. & Orts, V. (1999) Temporal causality between exports and FDI: the Spanish case. *International Advances in Economic Research*, 5(4), 512.

Aliber, R.Z. (1970) A theory of foreign direct investment. In Kindleberger, C. P. (Ed.), *The International Corporation: A Symposium*. Cambridge, Massachusetts: MIT Press, 17–34.

Alvarez, R., & Robertson, R. (2004) Exposure to foreign markets and firm-level innovation: Evidence from Chile and Mexico. *Journal of International Trade and Economic Development*, 13(1), 57–87.

Amuedo-Dorantes, C. & Pozo, S. (2001) Foreign exchange rates and foreign direct investment in the United States. *International Trade Journal*, 15(3), 323-343.

Andersen, O. (1993) On the internationalization process of firms: A critical analysis. *Journal of International Business Studies*, 24(2), 209-231.

Anderson, J. & Van Wincoop, E. (2003) Gravity with gravitas: a solution to the border puzzel. *The American Economic Review*, 93(1), 170-192.

Anderson, J. & Van Wincoop, E. (2004) Trade costs. *Journal of Economic Literature*, 42(3), 691-751.

Anderson, J. E. & Marcouiller, D. (2002). Insecurity and the pattern of trade: An empirical investigation. *The Review of Economics and Statistics*, 84(2), 342–352.

Anderson, J. E. (1979) A theoretical foundation for the gravity equation. *The American Economic Review*, 69(1), 106-116.

Aoki, K. & Lennerfors, T. T. (2013) Whither Japanese *keiretsu*? The transformation of vertical *keiretsu* in Toyota, Nissan and Honda 1991-2011. *Asia Pacific Business Review*, 19(1), 70-84.

Aqeel, A. & Nishat, M. (2005) The determinants of foreign direct investment in Pakistan. *The Pakistan Development Review*, 43 (4), 651–664.

Aristotelous, K. (2001) Exchange rate volatility, exchange rate regime, and trade volume: Evidence from the UK-US export function. *Economics Letters*, 72(1), 87-94,

Arize, A. C., Osang, T. & Slottje, D. J. (2000) Exchange rate volatility and foreign trade: evidence from thirteen LDCs. *Journal of Business and Economic Statistics*, 18(1), 10-17.

Asiedu, E. (2002) On the determinants of foreign direct investment to developing countries: is Africa different? *World Development*, 30(1), 107–119.

Ayele, B. T. (2003) Essays on the relationships between foreign direct investment, international trade, and exchange rate volatility. PhD dissertation. United States, Western Michigan University.

Baek, H. Y. & Kwok, C. C. Y. (2002) Foreign exchange rates and the corporate choice of foreign entry mode. *International Review of Economics and Finance*, 11(2), 207–227.

Bahmani-Oskooee, M. & Payesteh, S. (1993) Does exchange rate volatility deter trade volume of LDCs? *Journal of Economic Development*, 18(2), 189-205.

Bahmani-Oskooee, M. (1984) On the effects of effective exchange rates on trade flows. *The Indian Journal of Economics*, 65(3), 57-67.

Bahmani-Oskooee, M. (1986) Determinants of international trade flows: The case of developing countries. *Journal of Development Economics*, 20(1), 107-123.

Baier, S. L. & Bergstrand, J. H. (2007) Do free trade agreements actually increase members' international trade? *Journal of International Economics*, 71(1), 72-95.

Balassa, B. & Bauwens, L. (1988) The determinants of intra-European trade in manufactured goods. *European Economic Review*, 32(7), 1421-1437.

Balassa, B. (1965) Trade liberalisation and "revealed" comparative advantage. *The Manchester School*, 33(2), 99-123.

Balassa, B. (1978) Exports and economic growth. *Journal of Development Economics*, 5(2), 181-189.

Balasubramanyam, V. N., Sapsford, D. & Griffiths, D. (2002) Regional integration agreements and foreign direct investment: Theory and preliminary evidence. *The Manchester School*, 70(3), 460–482.

Baldwin, R. E. & Ottaviano, G. L. P. (2001) Multiproduct multinationals and reciprocal FDI dumping. *Journal of International Economics*, 54(2), 429-448.

Baldwin, R. E. (1971) Determinants of the commodity structure of U.S. trade. *American Economic Review*, 61(1), 126-146.

Barrel, R. & Pain, N. (1996) An econometric analysis of U.S. foreign direct investment. *Review of Economics and Statistics*, 78(2), 200-207.

Barrel, R. & Pain, N. (1998) Real exchange rates, agglomerations, and irreversibilities: macroeconomic policy and FDI in EMU. *Oxford Review of Economic Policy*, 14(3), 152-167.

Barrel, R. & Pain, N. (1999a) Trade restraints and Japanese direct investment flows. *European Economic Review*, 43(1), 29-45.

Barrel, R. & Pain, N. (1999b) Domestic institutions, agglomerations and foreign direct investment in Europe. *European Economic Review*, 43(4-6), 925-934.

Baumann, H. G. (1973) The industrial composition of U.S. export and subsidiary sales to the Canadian market. *American Economic Review*, 63(5), 1009-1012.

Bedasa, T. A. (2003) Essays on the relationships between foreign direct investment, international trade, and exchange rate volatility. PhD dissertation. United States, Western Michigan University.

Behrman J. N. (1972) *The Role of International Companies in Latin America: Autos and Petrochemicals*. Lexington, MA: Lexington Books.

Belderbos, R. & Sleuwaegen, L. (1998) Tariff jumping FDI and export substitution: Japanese electronics firms in Europe. *Journal of Industrial Organization*, 16(5), 601-638.

Bell, M. & Pavitt, K. (1997) Technological accumulation and industrial growth: contrast between developed and developing countries. In Archibugi and Michie (ed.): *Technology, Globalization and Economic Performance*. Cambridge: Cambridge University Press, 83-137.

Benassy-Quere, A., Fontagne, L. & Lahreche-Revil, A. (2001) Exchange rate strategies in the competitive for attracting foreign direct investment. *Journal of the Japanese and International Economics*, 15(2), 178-198.

Bergstrand, J. H. (1985) The gravity equation in international trade: some microeconomic foundations and empirical evidence. *Review of Economics and Statistics*, 67(3), 474-481.

Bergstrand, J. H. (1989) The generalized gravity equation, monopolistic competition and the factor-portions theory in international trade. *Review of Economics and Statistics*, 71(1), 143-153.

Bernard, A. B. & Jensen, B. (2004) Why some firms export? *The Review of Economics and Statistics*, 86(2), 561-569.

Bernard, A., & Jensen, J. (1999) Exceptional exporter performance: Cause, effect or both? *Journal of International Economics*, 47(1), 1–25.

Bevan, a. A. & Estrin, S. (2004) The determinants of foreign direct investment into European transition economies. *Journal of comparative Economics*, 32(4), 775-787.

Bhardwaj, A., Diets, J. & Beamish, P. (2007) Host country culture influences on foreign direct investment. *Management International Review*, 47(1), 29–50.

Bhaumik, S. K. & Co, C. Y. (2011) China's economic cooperation related investment: an investigation of its direction and some implications for outward investment. *China Economic Review*, 22(1), 75-87.

Bilgili, F., Tülüce, N. S. H. & Doğan, İ. (2012) The determinants of FDI in Turkey: A Markov Regime-Switching approach. *Economic Modelling*, 29(4), 1161-1169.

Biswas, R. (2002) Determinants of foreign direct investment. *Review of Development Economics*, 6(3), 492–504.

Bitzenis, A., Tsitouras, A. & Vlachos, V. (2009) Decisive FDI obstacles as an explanatory reason for limited FDI inflows in an EMU member state: The case of Greece. *The Journal of Socio-Economics*, 38(4), 691-704.

Blomström, M. & Kokko, A. (1997) Regional integration and foreign direct investment: A conceptual framework and three cases. *Policy Research Working Paper*, No. 1750. Washington.

Blomström, M., Konan, D. & Lipsey, R. E. (2000) FDI in the restructuring of the Japanese economy. *NBER Working Paper*, No.7693, Cambridge, MA.

Blomström, M., Lipsey, R. E. & Kulchycky, K. (1988) U.S. and Swedish direct investment and exports. In R. E. Baldwin (Ed.), *Trade Policy Issues and Empirical Analysis*. Chicago: University of Chicago Press, 259-297.

Blonigen, B. A. & Feenstra, R. C. (1996) Effects of U.S. trade protection and promotion policies. *NBER Working Paper*, No. 5285. Cambridge, MA.

Blonigen, B. A. & Piger, J. (2011) Determinants of foreign direct investment, *NBER Working Paper*, No. 16704. Cambridge, MA.

Blonigen, B. A. (1997) Firm-specific assets and the link between exchange rates and foreign direct investment. *American Economic Review*, 87(3), 447-465.

Blonigen, B. A. (2001) In search of substitution between foreign production and exports. *Journal of International Economics*, 53(1), 81-104.

Blonigen, B. A. (2002) Tariff-jumping antidumping duties. *Journal of International Economics*, 57(1), 31-50.

Blonigen, B. A., Ellis, C. J. & Fausten, D. (2005) Industrial Groupings and Foreign Direct Investment. *Journal of International Economics*, 65(1), 75-91.

Borenstein, E., De Gregorio, J. & Lee, J. W. (1998) How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1), 115-135.

Bougheas, S., Demetriades, P. O. & Morgenroth, E. (1999) Infrastructure, transport costs and trade. *Journal of International Economics*, 47(1), 169-189.

Brainard, S. L. (1993) A simple theory of multinational corporations and trade with a trade-off between proximity and concentration. *NBER Working Paper*, No. 4269, Cambridge, MA.

Brainard, S. L. (1997) An empirical assessment of the proximity-concentration trade-off between multinational sales and trade. *American Economic Review*, 87(4), 520-544.

Branstetter, L. G. (2001) Are knowledge spillovers international or intransnational in scope? *Journal of International Economics*, 53(1), 53-79.

Breinlich, H. & Criscuolo, C. (2011) International trade in service: A portrait of importers and exporters. *Journal of International Economics*, 84(2), 188-206

Brenton, P., Mauro, F. D. & Lucke, M. (1999) Economic integration and FDI: an empirical analysis of foreign investment in EU and in Central and Eastern Europe. *Empirica*, 26(2), 95-121.

Breuss, F. & Egger, P. (1999) How reliable are estimations of east-west trade potentials based on cross-section gravity analyses? *Empirica*, 26(2), 81-94.

Brouthers, K. & Brouthers, E. (2001) Explaining the National Cultural Distance Paradox. *Journal of International Business Studies*, 32(1), 177–189.

Brülhart, M. (1998) Trading places: Industrial specialization in the European Union. *Journal of Common Market Studies*, 36(3), 319-346.

Brülhart, M. (2001) Evolving geographical concentration of European manufacturing industries. *Review of World Economics*, 137(2), 215-243.

Buck, T., Liu, X. & Wei, Y. (2007) The trade development path and export spillovers in China: A missing link? *Management International Review*, 47(5), 683-706.

Buckley, P. J. & Casson, M. (1976) *The Future of the Multinational Enterprise*, London: Macmillan.

Buckley, P. J. & Casson, M. (1981) The optimal timing of a foreign direct investment. *Economic Journal*, 91(361), 75-87.

Buckley, P. J. & Casson, M. (1999) A theory of international operations, in P. J. Buckley & P. N. Ghauri (Ed.) *The Internationalization Process of the Firm: a Reader*, 2nd ed., London: International Business Thomson, pp:55-60.

Buckley, P. J. & Pearce, R. D. (1979) Overseas production and exporting by the world's largest enterprises: a study in sourcing policy. *Journal of International Business Studies*, 10(1), 9-20.

Buckley, P. J., Clegg, J. & Wang, C. (2002) The impact of inward FDI on the performance of Chinese manufacturing firms. *Journal of International Business Studies*, 33(4), 637-655.

Buckley, P. J., Clegg, J. & Wang, C. (2007a) Is the relationship between inward FDI and spillover effects linear? An empirical examination of the case of China. *Journal of International Business Studies*, 38(3), 447-459.

Buckley, P. J., Clegg, J., Cross, A. R., Liu, X., Voss, H. & Zheng, P. (2007b) The determinants of Chinese outward foreign direct investment. *Journal of International Business Studies*, 38(4), 499-518.

Buckley, P. J., Cross, A. R., Tan, H., Liu, X. & Voss, H. (2008) Historic and emergent trends in Chinese outward direct investment. *Management International Review*, 48(6), 715–748.

Buckley, P. J., Devinney, T. M. & Louviere J. J. (2007c) Do managers behave the way theory suggests? A choice-theoretic examination of foreign direct investment location decision-making. *Journal of International Business Studies*, 38(7), 1069-1094.

Burmeister, A. (2000) Accessibility versus proximity in production networks. In Green, M. B. & McNaughton, R. B. (Ed.) *Industrial Networks and Proximity*. Ashgate: Aldershot, 47-68.

CalÌ, M. & Velde, D. W. (2011) Does aid for trade really improve trade performance? *World Development*, 39(5), 725-740.

Campa, J. M. (1993) Entry by foreign firms in the United States: Under exchange rate uncertainty. *Review of Economics and Statistics*, 75(4), 614-622.

Cantwell, J. (1994) The relationship between international trade and international production. In D. Greenaway & A. L. Winters (Ed.), *Surveys in International Trade*. Oxford: Blackwell, 303-328.

Carstensen, K. & Toubal, F. (2004) Foreign Direct Investment in Central and Eastern European Countries: A Dynamic Panel Analysis. *Journal of Comparative Economics*, 32(1), 3–22.

Cassiman, B. & Golovko, E. (2011) Innovation and internationalization through exports. *Journal of International Business Studies*, 42(1), 56-75.

Cavallari, L. & D' Addona, S. (2013) Nominal and real volatility as determinants of FDI. *Applied Economics*, 45(18), 2603-2610

Caves, R. E. (1974) Multinational firms, competition, and productivity in host-country markets. *Economica*, 41(162), 176-193.

Caves, R. E. (1981) Intra-industry trade and market structure in the industrial countries. *Oxford Economic Papers*, 33(2), 203-223.

Cavusgil, S. T. (1997) Measuring the potential of emerging markets: an indexing approach. *Business Horizons*, 40(1), 87-91.

Cavusgil, S. T., Kiyak, T. & Yeniyurt, S. (2004) Complementary approaches to preliminary foreign market assessment: country clustering and country ranking. *Industrial Marketing Management*, 33(7), 607-617.

Ceglowski, J. (2006) Does gravity matter in a service economy? *Review of World Economics*, 142(2), 307-329.

Černoša, S. (2009) Intra-industry trade and industry-specific determinants in Slovenia: manual labor as comparative advantage. *Eastern European Economics*, 47(3), 84-99.

Chakrabarti, A. (2001) The determinants of foreign direct investments: sensitivity analyses of cross-country regressions. *Kyklos*, 54(1), 89-114.

Chang, S. J. (1995) International expansion strategy of Japanese firms: Capability building through sequential entry. *Academy of Management Journal*, 38(2), 383–407.

Chang, S. J., & Xu, D. (2008) Spillovers and competition among foreign and local firms in China. *Strategic Management Journal*, 29(5), 495–518.

Chen, H. & Chen, T. J. (1998) Network linkages and location choice in foreign direct investment. *Journal of International Business Studies*, 29(3), 445-467.

Chen, H. (2006) Trade and multinational firms: Evidence from China. PhD Dissertation.United States ,California: University of California.

Cheng, L. K. & Kwan, Y. K. (2000) What are the determinants of the location of foreign direct investment? The Chinese experience. *Journal of International Economics*, 51(2), 379-400.

Chi, T. & Kilduff, P. P. D. (2010) An empirical investigation of the determinants and shifting patterns of US apparel imports using a gravity model framework. *Journal of Fashion Marketing and Management*, 14(3), 501-520.

Child, J. & Rodrigues, S. B. (2005) The internationalization of Chinese firms: a case for theoretical extension. *Management and Organization Review*, 1(3), 381-410.

Cho, K. R. & Padmanabhan, P. (1995) Acquision versus new venture: the choice of foreign establishment mode by Japanese firms. *Journal of International Management*, 1(3), 255-285.

Cho, K. R. & Padmanabhan, P. (2005) Revisiting the role of cultural distance in MNC's foreign ownership mode choice: the moderating effect of experience attributes. *International Business Review*, 14(3), 307–324.

Chowdhurry, A. (1993) Does exchange volatility depress trade flows? Evidence from error-correction models. *Review of Economics and Statistics*, 75(4), 700-706.

Chowdhury, A. R. & Wheeler, M. (2008) Does real exchange rate volatility affect foreign direct investment? Evidence from four developed economies. *The International Trade Journal*, 22(2), 218-245.

Chung, W., Mitchell, W. & Yeung, B. (2003) Foreign direct investment and host country productivity: the American automotive component industry in the 1980s'. *Journal of International Business Studies*, 34(2), 199-218.

Clegg, J., & Scott-Green, S. (1999) The determinants of new FDI capital flows into the EC: a statistical comparison of the USA and Japan. *Journal of Common Market Studies*, 37(4), 597-615.

Clougherty, J. & Garajek, M. (2008) The impact of ISO 9000 diffusion on trade and FDI: a new institutional analysis. *Journal of International Business Studies*, 39(4), 613-633.

Crowley, P. & Lee, J. (2003) Exchange rate volatility and foreign investment: international evidence. *International Trade Journal*, 17(3), 227-252.

Cuervo-Cazurra, A. (2008) The effectiveness of law against bribery abroad. *Journal of International Business Studies*, 39(4), 634-651.

Culem, C. G. (1988) The locational determinants of direct investments among industrialized countries. *European Economic Review*, 32(4), 885-904.

Cushman, D. O. (1985) Real exchange rate risk, expectations, and the level of direct investment. *Review of Economics and Statistics*, 67(2), 297-308.

Cuyvers, L., Soeng, R., Plasmans, J. & Van Den Bulcke, D. (2011) Determinants of foreign direct investment in Cambodia. *Journal of Asian Economics*, 22(3), 222-234.

Dascal, D., Mattas, K. & Tzouvelekas, V. (2002) An analysis of EU wine trade: a gravity model approach. *International Advances in Economic Research*, 8(2), 135-148.

De Grauwe, P. (1988) Exchange rate variability and the slowdown in growth of international trade. *IMF Staff Papers*, 35(1), 63-84.

De Groot, H., Linders, G. J., Rietveld, P., & Subramanian, U. (2004). The institutional determinants of bilateral trade patterns. *Kyklos*, 57(1), 103–124.

De Jesus Noguera, J. & Pecchenino, R. A. (2011) FDI versus exports in a general equilibrium Ricardian model. *The Economic Record*, 87(278), 438-448

De Mooij, R. A. & Ederveen, S. (2003) Taxation and foreign direct investment: a synthesis of empirical research. *International Tax and Public Finance*, 10(6), 673-693.

Delios, A. & Beamish, P. W. (1999) Ownership strategy of Japanese firms: transnational, institutional, and experience influences. *Strategic Management Journal*, 20(10), 915-933.

Dell'Ariccia, G. (1999) Exchange rate fluctuations and trade flows: evidence from the European Union. *IMF Staff Papers*, 46(3), 315-334.

Deng, P. (2004) Outward investment by Chinese MNCs: motivations and implications. *Business Horizons*, 47(3), 8-16.

Deng, P. (2007) Investing for strategic resources and its rational: The case of outward FDI from Chinese companies. *Business Horizons*, 50(1), 71–81.

Deng, P. (2009) Why do Chinese firms tend to acquire strategic assets in international expansion? *Journal of World Business*, 44(1), 74-84.

Dikova, D. & Witteloostuijn, A. V. (2007) Foreign direct investment mode choice: entry and establishment modes in transition economies. *Journal of International Business Studies*, 38(6), 1013-1033.

Doh, J. P., & Teegen, H. (2002). Nongovernmental organizations as institutional actors in international business: Theory and implications. *International Business Review*, 11(6), 665–684.

Donnenfeld, S. (2003) Regional blocs and foreign direct investment. *Review of International Economics*, 11(5), 770–788.

Dow, D. & Karunaratna, A. (2006) Developing a multi-dimensional instrument to measure psychic distance stimuli. *Journal of International Business Studies*, 37(5), 578-602.

Dow, D. (2000) A note on psychological distance and export market selection. *Journal of International Marketing*, 8 (1), 51-64.

Doytch, N. & Eren, M. (2012) Institutional determinants of sectoral FDI in Eastern European and Central Asian Countries: The role of investment climate and democracy. *Emerging Markets Finance and Trade*, 48(4), 14-32.

Driffield, N. & Love, J. H. (2007) Linking FDI motivation and host economy productivity effects: conceptual and empirical analysis. *Journal of International Business Studies*, 38(3), 460-473.

Driffield, N. L. (2001) The impact on domestic productivity of inward investment in the UK. *The Manchester School*, 69(1), 103-119.

Duanmu, J. (2012) Firm heterogeneity and location choice of Chinese multinational enterprises. *Journal of World Business*, 47(1), 64-72.

Dunning, J. H. & Lundan, S. M. (2008) *Multinational Enterprises and the Global Economy*. Cheltenham: Edward Elgar.

Dunning, J. H. (1980) Toward an eclectic theory of international production: some empirical tests. *Journal of International Business Studies*, 11(1), 9-31.

Dunning, J. H. (1988) *Explaining International Production*. London: Unwin Hyman.

Dunning, J. H. (1988b) The eclectic aradigm of international production: a restatement and some possible extensions. *Journal of International Business Studies*, 19(1), 1-31.

Dunning, J. H. (1993) *Multinational Enterprises and the Global Economy*. Workingham: Addison-Wesley.

Dunning, J. H. (1994) Re-evaluating the benefits of foreign direct investment. *Transnational Corporations*, 3(1), 23-51.

Dunning, J. H. (1996) *Multinational Enterprises and The Global Economy*. Harlow: Addison-Wesley Publishers Ltd.

Eaton, J. & Tamura, A. (1994) Bilateralism and regionalism in Japanese and US trade and direct foreign investment patterns. *Journal of the Japanese and International Economies*, 8(4), 478-510.

Eaton, J. & Tamura, A. (1996) Japanese and U.S. exports and investments as conduits of growth. *NBER Working Paper*, No. 5457, Cambridge, MA.

Edwards, S. (1990) Capital flows, foreign direct investment, and debt-equity swaps in developing countries. *NBER Working Paper*, No. 3497, Cambridge, MA.

Egger, P. & Pfaffermayr, M. (2005) The determinants of intrafirm trade: in search for export-import magnification effects. *Review of World Economics*, 141(4), 648-669.

Egger, P. (2000) A note on the proper econometric specification of the gravity equation. *Economics Letters*, 66(1), 25-31.

Egger, P. (2002) An econometric view on the estimation of gravity models and the calculation of trade potentials. *The World Economy*, 25(2), 297-312.

Ekanayake, E. M., Mukherjee, A. & Veeramacheneni, B. (2010) Trade bocks and the gravity model: A study of economic integration among Asian developing countries. *Journal of Economic Integration*, 25(4), 627-643.

Elliott, R. J. R. & Ikemoto, K. (2004) AFTA and the Asian crisis: Help or hindrance to ASEAN intra-regional trade? *Asian Economic Journal*, 18(1), 1-23.

Encarnation, D. J. (1998) The Asian crisis and foreign direct investment. *The Brookings Review*, 16(3), 26-30.

Ethier, W. J. (1986) The multinational firm. *Quarterly Journal of Economics*, 101(4), 805-834.

Evenett, S. J. & Keller, W. (1998) On theories explaining the success of the gravity models. *NBER Working paper*, No. 6529, Cambridge, MA.

Evenett, S. J. & Keller, W. (2002) On the theories explaining the success of the gravity equation. *Journal of Political Economy*, 110(2), 281-316.

Farrell, R., Gaston, N. & Sturm, J. E. (2004) Determinants of Japan's foreign direct investment: an industry and country panel study, 1984–1998. *Journal of the Japanese and International Economics*, 18(2), 161–182.

Feenstra, R.C., Markusen, J. A. & Rose, A. K. (1998) Understanding the home market effect and the gravity equation: The role of differentiating goods. *NBER Working Paper*, No. 6804, Cambridge, MA.

Felbermayr, G. J. & Toubal, F. (2010) Cultural proximity and trade. *European Economic Review*, 54(2), 279-293.

Feng, Y., Sun, Y. & Walton, J. (2009) Foreign Direct Investment in Russia and Lessons for China. *The Chinese Economy*, 42(3), 78-93.

Filippini, C. & Molini, V. (2003) The determinants of East Asian trade flows: a gravity equation approach. *Journal of Asian Economics*, 14(5), 695-711.

Flores, R. G. & Aguilera, R. V. (2007) Globalization and location choice: an analysis of US multinational firms in 1980 and 2000. *Journal of International Business Studies*, 38(7), 1187-1210.

Frankel, G. (1991) Exchange rate volatility and international trading strategy. *Journal of International Money and Finance*, 10(2), 292-307.

Frankel, J. A. & Rose, A. (2002) An estimate of the effect of common currencies on trade and income. *Quarterly Journal of Economics*, 117(2), 437-466.

Frankel, J., Stein, E., Wei, S. (1995) Trading blocs and the Americas: the natural, the unnatural, and the super-natural. *Journal of Development Economics*, 47(1), 61-95.

Fratianni, M. & Oh, C. H. (2009) Expanding RTAs, trade flows, and the multinational enterprise. *Journal of International Business Studies*, 40(7), 1206-1227.

Frenkel, J. A. (1997) *Regional Trading Blocs in the World Economic System*. Washington, D.C.: Institute for International Economics.

Frenkel, M., Funke, K. & Stadtmann, G. (2004) A panel analysis of bilateral FDI flows to emerging economies. *Economic Systems*, 28(3), 281–300.

Froot, K. A. & Stein, J. C. (1989) Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach. *NBER Working Paper*, No. 2914, Cambridge, MA.

Froot, K. A. & Stein, J. C. (1991) Exchange rates and foreign direct investment: An imperfect capital markets approach. *Quarterly Journal of Economics*, 106(4), 1191-1217.

Gao, T. (2005) Foreign direct investment from developing Asia: Some distinctive features. *Economics Letters*, 86(1), 29–35.

Ge, G. & Ding, D. (2009) The effects of institutional environment on the internationalisation of Chinese firm. In Alon, I., Chang, J., Fetscherin, M., Lattemann, C. & McIntyre, J. R. (Ed.), *China Rules: Globalisation and Political Transformation*. New York: Palgrave Macmillan, 46–68

Georgopoulos, G. J. (2008) Cross-border mergers and acquisitions: does the exchange rate matter? Some evidence for Canada. *Canadian Journal of Economics*, 41(2), 450–474.

Geraci, V. J. & Prewo, W. (1977) Bilateral trade flows and transport costs. *Review of Economics and Statistics*, 59(1), 67-74.

Ghosh, I. (2007) The relations between trade and FDI in developing countries — a panel data approach. *Global Economy Journal*, 7(3), 1–30.

Glick, R. & Rose, A. K. (2002) Does a currency union affect trade? The time-series evidence. *European Economic Review*, 46(6), 1125-1151.

Globerman, S. & Shapiro, D. (2003) Governance infrastructure and US foreign direct investment. *Journal of International Business Studies*, 34(1), 19-39.

Globerman, S. (1979) Foreign direct investment and 'Spillover' efficiency benefits in Canadian manufacturing industries. *Canadian Journal of Economics*, 12(1), 42-56.

Goerzen, A. & Beamish, P. (2003) Geographic scope and multinational enterprise performance. *Strategic Management Journal*, 24(13), 1289-1306.

Goldberg, S. & Klein, W. (1998) Foreign direct investment, trade, and real exchange rate linkages in developing countries. In R. Glick (Ed.), *Managing Capital Flows and Exchange Rates: Lessons from the Pacific Basin*. Cambridge: Cambridge University Press, 73-100.

Goldberg, S. & Klein, W. (1999) International trade and factor mobility. *NBER Working Paper*, No. 7196, Cambridge, MA.

Goldsbrough, D. J. (1979) The role of foreign direct investment in the external adjustment process. *IMF Staff Papers*, 26(4), 725–754.

Gopinath, M., Pick, D. & Vasavada, U. (1999) The economics of foreign direct investment and trade with an application to the U.S. food processing industry. *American Journal of Agricultural Economics*, 81(2), 442-452.

Gorg, H. & Strobl, E. (2001) Multinational companies and productivity spillovers: a meta-analysis. *The Economic Journal*, 111(November), 723-739.

Gorg, H. & Wakelin, K. (2002) The impact of exchange rate volatility on US investment. *The Manchester School*, 70(3), 380-397.

Graham, E. M. (1999) Foreign direct investment outflows and manufacturing trade: a comparison of Japan and the United States. In Encarnation D. J. (Ed.), *Japanese Multinationals in Asia-Regional Operations in Comparative Perspective*. Oxford: Oxford University Press, 87-99.

Greene, W. H. (1990) *Econometric Analysis*. New York: Macmillan Publishing Company.

Grosse, R. & Trevino, L. J. (1996) Foreign direct investment in the United States: An analysis by country of origin. *Journal of International Business Studies,* 27(1), 139–155.

Grosse, R. & Trevino, L. J. (2005) New institutional economics and FDI location in Central and Eastern Europe. *Management International Review*, 45(2), 123–145.

Grossman, G. M. & Helpman, E. (1989) Product development and international trade. *The Journal of Political Economy*, 97(6), 1261-1283.

Grossman, G. M., Helpman, E. & Szeidl, A. (2006) Optimal integration stragegies for the multinational firm. *Journal of International Economics,* 70(1), 216-238.

Grubel, H. G. & Lloyd, P. J. (1975) *Intra-Industry Trade*, Macmillan: London.

Grubel, H. G. (1968) Internationally diversified portfolios: welfare gains and capitcal flows. *American Economic Review*, 58(5), 1299-1314.

Gruber, W., Mehta, D. & Vernon, R. (1967) The R&D factor in international trade an investment of United States. *The Journal of Political Economy,* 75(1), 20-37.

Guerin, S. S. (2006) The role of geography in financial and economic integration: a comparative analysis of foreign direct investment, trade and portfolio investment flows. *The World Economy,* 29(2), 189–209.

Gujrati, D. N. & Porter, D. C. (2003) *Basic Econometric* (4th Ed.). New York: McGraw-Hill.

Gul, N & Yasin, H. M. (2011) The trade potential of Pakistan: an application of the gravity model. *The Lahore Journal of Economics*, 16(1), 23-62.

Gupta, V. K. (1983) A simultaneous determination of structure, conduct and performance in Canadian manufacturing. *Oxford Economic Papers*, 35(2), 281–301.

Habib, M. & Zurawicki, L. (2002) Corruption and foreign direct investment. *Journal of International Business Studies*, 33(2), 291-307.

Hacker, S. & Johasson, B. (2001) Sweden and the Baltic Sea region: transaction costs and trade intensities. In: Bröcker, J. & Herrmann, H. (Ed.) *Spatial Change and Interregional Flows in the Integrating Europe: Essays in Honour of Karin Peschel*. New York: Physica, Heidelberg.

Hanson, G. & Xiang, C. (2011) Trade barriers and trade flows with product heterogeneity: An application to US motion picture exports. *Journal of International Economics*, 83(1), 14-26.

Harris, R. S. & Ravenscraft, D. (1991) The role of acquisitions in foreign direct investment: evidence from the US stock market. *Journal of Finance*, 46(3), 826-844.

Hartman, D. G. (1984) Tax policy and foreign direct investment in the United States. *National Tax Journal*, 37(4), 475-487.

Hartman, D. G. (1985) Tax policy and foreign direct investment. *Journal of Public Economics*, 26(1), 107-121.

Hatab, A. A., Romstad, E. & Huo, X. (2010) Determinants of Egyptian agricultural exports: a gravity model approach. *Modern Economy*, 2010(1), 134-143.

Hatzius, J. (2000) Foreign direct investment and factor demand elasticities. *European Economic Review*, 44(1), 117-143.

Head, K. & Ries, J. (2001) Overseas investment and firm exports. *Review of International Economics*, 9(1), 108-122.

Hedlund, G. & Kverneland, A. (1983) Are Entry Strategies for Foreign Markets Changing? The Case of Swedish Investment in Japan. In P. J. Buckley & P. Ghauri (Ed.), *The Internationalization of the Firm: A Reader*, London: Academic Press, 106-123.

Heiduk, G. & Hodges, U. W. (1992) German multinationals in Europe: patterns and perspectives. In M. W. Klein & P. J. J. Welfens (Ed.), *Multinationals in the New Europe and Global Trade*. Berlin: Springer-Verlag, 237-268.

Helpman, E. & Krugman, P. (1985) *Market Structure and Foreign Trade: Increasing Return, Imperfect Competition and the International Economy*. Cambridge, MA.: MIT Press.

Helpman, E. (1981) International trade in the presence of product differentiation, economies of scale and monopolistic competition: A Chamberlin-Heckscher-Ohlin approach. *Journal of International Economics*, 11(3), 305-340.

Helpman, E. (1984) A simple theory of international trade with multinational corporations. *The Journal of Political Economy*, 92(3), 451-471.

Helpman, E. (1985) Multinational corporations and trade structure. *The Review of Economics Studies*, 52(3), 443-457.

Helpman, E., Melitz, M. & Rubinstein, Y. (2008) Estimating trade flows: trading partners and trading volumes. *Quarterly Journal of Economics*, 123(2), 441-487.

Helpman, E., Melitz, M. & Yeaple, S. (2004) Export versus FDI with heterogeneous firms. *The American Economic Review*, 94(1)**,** 300-316.

Hennart, J. F. & Park, Y. R. (1993) Greenfield vs. acquisition: the strategy of Japanese investors in the United States. *Management Science*, 39(9), 1054-1070.

Henry, M., Kneller, R. & Milner, C. (2009) Trade, technology transfer and national efficiency in developing countries. *European Economic Review*, 53(2), 237-254.

Hirsch, S. (1976) An international trade and investment theory of the firm. *Oxford Economic Papers*, 28, 258-270.

Hirsch, S., & Bijaoui, I. (1985) R&D intensity and export performance: A micro view. *Review of World Economics*, 121(2), 238–251.

Hitt, M. A., Hoskisson, R. E., & Kim, H. (1997) International diversification: Effects on innovation and firm performance in product-diversified firms. *Academy of Management Journal*, 40(4), 767–798.

Hofstede, G. (1980) *Culture's Consequences: Intentional Differences in Work Related Values*. Beverly Hills, CA: Sage Publications.

Hofstede, G. (1991) *Cultures and Organizations*. New York: McGraw Hill,.

Hofstede, G. (2001) *Culture's Consequences, Comparing Values, Behaviors, Institutions, and Organizations across Nations* (2^{nd} Ed), London: Sage Publications.

Horst, T. (1972a) The industrial composition of U.S. exports and subsidiary sales to the Canadian market. *The American Economic Review*, 62(1), 37-45.

Horst, T. (1972b) Firm and industry determinants of the decision to invest abroad: An empirical study. *Review of Economics and Statistics*, 54(3), 258-266.

Horst, T. (1977) American taxation of multinational firms. *The American Economic Review*, 67(3)**,** 376-389.

Horstmann, I. J. & Markusen, J. R. (1987) Strategic investments and the development of multinationals. *International Economic Review*, 28(1), 109-121.

Hummels, D. (2001) *Time as a Trade Barrier*, Mimeo: Purdue University.

Hummels, D., Ishii, J. & Yi, K. M. (2001) The nature and growth of vertical specialization in world trade. *Journal of International Economics*, 54(1), 75-96.

Huot, N. & Kakinaka, M. (2007) Trade structure and trade flows in Cambodia: A gravity model. *ASEAN Economic Bulletin*, 24(3), 305-319.

Hutchinson, W. K. (2005) Linguistic distance' as a determinant of bilateral trade. *Southern Economic Journal*, 72(1), 1-15.

Hymer, S. (1976) *The International Operations of National Firms: A Study of Direct Foreign Investment*. Cambridge, MA: MIT Press.

Isard, W. (1954) Location theory and international and interregional trade theory. *Quarterly Journal of Economics*, 68(1), 97-114.

Jacquemin, A. (1989) International and multinational strategic behavior. *Kyklos*, 42(4), 495-513.

Janicki, H. P. & Wunnava, P. V. (2004) Determinants of foreign direct investment: Empirical evidence from EU accession candidates. *Applied Economics*, 36(5), 505–509.

Johanson, J. & Vahlne, J. E. (1977) The internationalization process of the firm: a model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 8(1), 23-32.

Johanson, J., & Vahlne, J. E. (1990) The mechanism of internationalization. *International Marketing Review*, 7(4), 11–24.

Johansson, B. & Karlsson, C. (2001) Geographic transaction costs and specialization opportunities of small and medium-sized regions: scale economies and market extension. In Johansson, B., Karlsson, C. & Stough, R. R. (Ed.) *Theoreis of Endogenous Regional Growth*. Berlin: Springer-Verlag, 150-180.

Johansson, B. & Westin, L. (1994) Affinities and friction of trade networks. *The Annuals of Regional Science*, 28, 243-261.

Johansson, J. & Mattsson, L. G. (1987) Interorganizational relations in industrial systems: a network approach compared with the transaction-cost concept. *International Studies of Management and Organization*, 17(1), 34-48.

Johansson, J. & Wiedersheim-Paul, F. (1975) The internationalization of the firm: four Swedish cases. *Journal of Management Studies*, 305-322.

Jun, K. W. & Singh, H. (1996) The determinants of foreign direct investment in developing countries. *Transnational Corporations*, 5(2), 64–104.

Kabir, M. & Salim, R. (2010) Can gravity model explain BIMSTEC's trade? *Journal of Economic Integration*, 25(1), 144-156.

Kandogan, Y. (2003) Intra-industry trade of transition countries: trends and determinants. *Emerging Markets Review*, 4(3), 273-286.

Kang, J. W. (2002) Three essays on international trade. PhD disseration, United States, Washington, University of Washington.

Kang, Y. & Jiang, F. (2012) FDI location choice of Chinese multinationals in East and Southeast Asia: traditional economic factors and institutional perspective. *Journal of World Business*, 47(1), 45-53.

Kaufmann, D., Kraay, A. & Mastruzzi, M. (2005) Governance matters IV: Governance indicators for 1996-2004. *World Bank Policy Research Paper*, No. 3630, Washington, DC.

Keller, W. (1998) Absorptive capacity: On the creation and acquisition of technology in development. *Journal of Development Economics*, 49(1), 199–227.

Keller, W. (2002) Geographic localization of international technology diffusion. *American Economic Review*, 92(1), 102-142.

Kemsley, D. (1998) The effect of taxes on production location. *Journal of Accounting Research*, 36(2), 321–341.

Khanna, T., & Palepu, K. G. (2006) Emerging giants- Building world- class companies in developing countries. *Harvard Business Review*, 84(10), 60-69.

Kien, N. T. (2009) Gravity Model by panel data approach: An empirical application with implications for the ASEAN free trade area. *ASEAN Economic Bulletin*, 26(3), 266-277.

Kimino, S., Saal, D. S. & Driffield, N. (2007) Macro determinants of FDI inflows to Japan: An analysis of source country characteristics. *The World Economy*, 30(3), 446-469.

Kimura, F. & Kiyota. K (2006) Exports, FDI, and productivity: Dynamic evidence from Japanese firms. *Reiview of World Economics*, 142 (4), 695-719.

Kindleberger, C. P. (1969) *American Business Abroad: Six Letures on Direct Investment.* New Heaven, CT: Yale University Press.

Kiyota, K. & Urata S. (2004) Exchange rate, exchange rate volatility and foreign direct investment. *The World Economy*, 27(10), 1501–1536.

Kogut, B. & Chang, S. J. (1996) Platform investments and volatile exchange rates: direct investment in the U.S. by Japanese electronic companies. *Review of Economics and Statistics*, 78(2), 221-231.

Kogut, B. & Singh, H. (1988) The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 19(3), 411-432.

Kojima, K. (1977) *Japan and a New World Economic Order*, Tokyo: Tuttle Company, Inc.

Kojima, K. (1978a) Direct foreign investment: Japanese model versus American model. In K. Kojima (Ed.), *Direct Foreign Investment: A Japanese model of multinational business operations*. New York: Praeger Publishers.

Kojima, K. (1978b) International trade and foreign direct investment: substitutes or complements. In K. Kojima (Ed.), *Direct Foreign Investment: A Japanese model of multinational business operations*. New York: Praeger Publishers.

Kokko, A. (1994) Technology, market characteristics, and spillovers. *Journal of Development Economics*, 43(2), 279-293.

Kokko, A. (1996) Productivity spillovers from competition between local firms and foreign affiliates. *Journal of International Development*, 8(4), 517-530.

Kolstad, I. & Wiig, A. (2012) What determines Chinese outward FDI? *Journal of World Business*, 47(1), 26-34.

Konan, D. E. (2000) The vertical multinational enterprise and international trade. *Review of International Economics*, 8(1), 113-125.

Koo, W. W. & Karemera, D. (1991) Determinants of world wheat trade flows and policy analysis. *Canadian Journal of Agricultural Economics*, 39(3), 439-445.

Koo, W. W., Karemera, D. & Taylor, R. (1994) A gravity model analysis of meat trade policies. *Agricultural Economics*, 10(1), 81-88.

Kravis, I. B., Lipsey, R. E. (1982) The location of overseas production and production for export by U.S. multinational firms. *Journal of International Economics*, 12(3-4), 201–223.

Kreinin, M. E. & Plummer, M. G. (2008) Effects of regional integration on FDI: An empirical approach. *Journal of Asian Economics*, 19(5-6), 447–454.

Krugman, P. (1981) Intra-industry specialization and the gains from trade. *Journal of Political Economy*, 89(5), 959-973.

Krugman, P. R. (1979) Scale economies, product differentiation, and the pattern of trade. *American Economic Review*, 70(5), 950-959.

Kumar, N. (1994) Determinants of export orientation of foreign production by US multinationals: an inter-country analysis. *Journal of International Business Studies*, 25(1), 141-156.

Kyrkilis, D. & Pantelidis, P. (2003) Macroeconomic determinants of outward foreign direct investment. *International Journal of Social Economics*, 30(7), 827–836.

Lai, E. L. C. (2001) Competition for foreign direct investment in the product cycle. *Japan and the World Economy*, 13(1), 61-81.

Lardy, N. R. (2002) *Integrating China into the Global Economy*. The Brookings Institution, Washington, D.C.

Lawless, M. (2010) Destinations of Irish exports: a gravity model approach. *Journal of the Statistical and Social Inquiry Society of Ireland*, 39(2009/2010), 1-22.

Lecraw, D. J. (1977) Direct investment by firms from less developed countries. *Oxford Economic Papers*, 29(3), 442-457.

Lemi, A. (2003) Foreign direct investment in developing countries: Uncertainty, trade and welfare. PhD Dissertation. United States, Michigan, Western Michigan University.

Lerner, A. P. (1952) Factor prices and international trade. *Economica*, 19(73), 1-15.

Li, J. & Guisinger, S. E. (1992) The globalization of service multinationals in the 'Triad' regions: Japan, Western Europe and North America. *Journal of International Business Studies*, 23(4), 675-696.

Li, Q. & Resnick, A. (2003) Reversal of fortunes: Democratic institutions and foreign direct investment inflows to developing countries. *International Organization*, 57(1), 175–211.

Li, S., & Samsell, D. (2009) Why some countries trade more than others: The effect of the governance environment on trade flows. *Corporate Governance: An International Review*, 17(1), 47–61.

Li, X., Liu, X. & Parker, D. (2001) Foreign direct investment and productivity spillovers in the Chinese manufacturing sector. *Economic Systems*, 25(4), 305-321.

Lin, A. (1995) Trade effects of foreign direct investment: evidence for Taiwan with four ASEAN countries. *Review of World Economics*, 131(4), 737-747.

Lin, S. A. Y. (1996) Causes of Japanese firms' direct investments in US Manufacturing Industries. *Applied Economics*, 28(9), 1143–1151.

Linder, B. S. (1961) *An Essay on Trade and Transportation*. New York: Wiley.

Linnemann, H. (1966) *An Econometric Study of International Trade Flows*. Amsterdam: North-Holland Publishing Co.

Lipsey, R. E. & Weiss, M. Y. (1981) Foreign production and exports in manufacturing industries. *Review of Economics and Statistics*, 63(4), 488-494.

Lipsey, R. E. & Weiss, M. Y. (1984) Foreign production and exports of individual firms. *Review of Economics and Statistics*, 66(2), 304-308.

Lipsey, R. E. (2001) *Foreign Direct Investors in Three Financial Crises*. *NBER Working Paper*, No.8084, Cambridge, MA.

Lipsey, R. E., Ramstetter, E. D. & Blomström, M. (2000) Outward FDI and parent exports and employment: Japan, the United States, and Sweden. *NBER Working Paper*, No. 7623, Cambridge, MA.

Liu, X., Burridge, P. & Sinclair, P. J. N. (2002) Relationships between economic growth, foreign direct investment and trade: evidence from China. *Applied Economics*, 34(11), 1433-1440.

Liu, X., Parker, D., Vaidya, K. & Wei, Y. (2001) The impact of foreign direct investment on labour productivity in the Chinese electronics industry. *International Business Review*, 10(4), 421-439.

Liu, X. Wang, C. & Wei, Y. (2001) Causal links between foreign direct investment and trade in China. *China Economic Review*, 12(2), 190-202.

Liu, Y. & Cui, R. (2008) Function simulation of FDI, foreign trade and regional GDP in China. *Journal of Chinese Economic and Foreign Trade Studies,* 1(3)**,** 232-243.

Liu, Z. (2002) Foreign direct investment and technology spillover: evidence from China. *Journal of Comparative Economics*, 30(3), 579-602.

Loree, D. W. & Guisinger, S. E. (1995) Policy and non-policy determinants of US equity foreign direct investment. *Journal of International Business Studies*, 26(2), 281-299.

Loungani, P. (2000) Comrades or competitors? Trade links between China and other East Asian economies. *Finance and Development*, 37(2), 34-36.

Love, J. H. & Lage-Hidalgo, F. (2000) Analysing the determinants of US direct investment in Mexico. *Applied Economics*, 32(10), 1259–1267.

Lu, J., & Beamish, P. (2006) SME internationalization and performance: Growth vs. profitability. *Journal of International Entrepreneurship*, 4(1), 27–48.

Lu, J., Lu, Y. & Tao, Z. (2010) Exporting behaviour of foreign affiliates: theory and evidence. *Journal of International Economics*, 81(2), 197-205.

Lucas, R. (1993) On the determinants of direct foreign investment: evidence from East and South Asia. *World Development*, 21(3), 391–406.

MacDougal, G. D. A. (1960) The benefits and costs of private investment from abroad: a theoretical approach. *Economic Record*, 36(73), 13-35.

Markusen, J. R. & Venables, A. J. (1996) The increased importance of investment in North Atlantic economic relationships: a convergence hypothesis. In M. B.

Canzoneri, W. J. Ethier & V. Grilli (Ed.), *The New Transatlantic Economy*. Cambridge MA: Cambridge University Press, 169-189.

Markusen, J. R. & Venables, A. J. (1998) Multinational firms and the new trade theory. *Journal of International Economics*, 46(2), 183-203.

Markusen, J. R. & Venables, A. J. (1999) Foreign direct investment as catalyst for industrial development. *European Economic Review*, 43, 335-356.

Markusen, J. R. (1983) Factor movements and commodity trade as complements. *Journal of International Economics*, 14(3/4), 341-356.

Markusen, J. R. (1984) Multinationals, multi-plant economies, and the gains from trade. *Journal of International Economics*, 16(3/4), 205-226.

Markusen, J. R. (1986) Explaining the volume of trade: an eclectic approach. *The American Economic Review*, 76(5), 1002-1011.

Markusen, J. R. (1995) The boundaries of multinational enterprises and the theory of international trade. *The Journal of Economic Perspectives*, 9(2), 169-189.

Markusen, J. R. (2002) *Multinational Firms and the Theory of International Trade*. Cambridge: MIT Press.

Markusen, J. R., & Venables, A. J. (2000) The theory of endowment, intra-industry and multi-national trade. *Journal of International Economics*, 52(2), 209–234.

Melitz, M. J. (2003) The impact of trade on intra-industry reallocations and agggregate industry productivity. *Econometrica*, 71(6), 1695-1725.

Meredith, L. & Maki, D. (1992) The United States export and foreign direct investment linkage in Canadian manufacturing industries. *Journal of Business Research*, 24(1), 73-88.

Meyer, K. E. (1995) Direct foreign investment in Eastern Europe: The role of labor costs. *Comparative Economic Studies*, 37(4), 69–88.

Meyer, K. E. (2004) Perspectives on multinational enterprises in emerging economies. *Journal of International Business Studies*, 36(6), 600-621.

Miller, R. R. (1993) Determinants of US manufacturing investment abroad. *Finance & Development*, 30(1), 16–18.

Miller, V. V., & Loess, K. (2002). An institutional analysis of the US foreign sales corporation. *International Business Review*, 11(6), 753–763.

Mundell, R. A. (1957) International Trade and Factor Mobility. *The American Economic Review*, 47(3)**,** 321-335.

Nagano, M. (2013) Similarities and differences among cross-border M&A and greenfield FDI determinants: Evidence from Asia and Oceania. *Emerging Markets Review*, 16, 100-118.

Neary, J. P. (2007) Cross-border mergers as instruments of comparative advantage. *Review of Economic Studies*, 74(4), 1229–1257.

Nigh, D. (1985) The effect of political events on United States direct foreign investment: a pooled time-series cross-sectional analysis. *Journal of International Business Studies*, 16(1), 1–17.

Noorbakhsh, F., Paloni, A. & Youssef, A. (2001) Human Capital and FDI Inflows to Developing Countries: New Empirical Evidence. *World Development*, 29(9), 1593–1610.

North, D. C. (1990) *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press.

North, D. C. (2006) *Understanding the Process of Economic Change*. India: Princeton University Press.

OECD (2005) *OECD Factbook 2005: Economic, environmental and social statistics.* http://www.oecd-ilibrary.org/docserver/download/3005041e.pdf?expires=1389881020&id=id&accname=guest&checksum=00CE9AFF903C650BC3C0CED952A14351

Ohlin, B. (1933) *Interregional and International Trade*. Boston: Harvard University.

Ojala, A. & Tyrväinen, P. (2008) Market entry decisions of US small and medium-sized software firms. *Management Decision*, 46 (2), 187-200.

Pain, N. & Wakelin, K. (1998) Export performance and the role of foreign direct investment. *Manchester School of Economic & Social Studies*, 66(98, Supplement 1), 62-89.

Pain, N., & Van Welsum, D. (2003) Untying the Gordian knot: The multiple links between exchange rates and foreign direct investment. *Journal of Common Market Studies*, 41(5), 823–846.

Pajunen, K. (2008) Institutions and inflows of foreign direct investment: A fuzzy-set analysis. *Journal of International Business Studies*, 39(4), 652–669.

Pan, Y. (2003) The inflow of foreign direct investment to China: The impact of country-specific factors. *Journal of Business Research*, 56(10), 829–833.

Panitchpakdi, S. & Clifford, M. L. (2002) *China and the WTO: Changing China, Changing World Trade*.

Pantelidis, P. & Kyrkilis, D. (2005) A cross country analysis of outward foreign direct investment patterns. *International Journal of Social Economics*, 32(6), 510–519.

Pantulu, J. & Poon, P. H. (2003) Foreign direct investment and international trade: evidence from the US and Japan. *Journal of Economic Geography*, 3(3), 241-259.

Papadopoulos, N. & Denis, J. E. (1988) Inventory, taxonomy and assessment of methods for international market selection. *International Marketing Review*, 5(3), 38-51.

Papadopoulos, N., Chen, H. & Thomas, D. R. (2002) Toward a tradeoff model for international market selection. *International Business Review*, 11(1), 165-192.

Papazoglou, C. (2007) Greece's potential trade flows: a gravity model approach. *International Advances in Economic Research*, 13(4), 403-414.

Patel, P. & Pavitt, K (1991) Large firms in the production of the world's technology: an important case of non-globalization. *Journal of International Business Studies*, 22(1), 1-21.

Peng, M. W., Wang, D. Y. L. & Jiang, Y. (2008) An institution-based view of international business strategy: A focus on emerging economies. *Journal of International Business Studies*, 39(5), 920–936.

Pfaffermayr, M. (1994) Foreign direct investment and exports: a time series approach. *Applies Economics*, 26(4), 337-352.

Poon, J. P. H. & Thompson, E. (2001) Effects of the Asian financial crisis on transnational capital. *Geoforum*, 32(1), 121-131.

Porcano, T. M. & Price, C. E. (1996) The effects of government tax and non-tax incentives on foreign direct investment. *Multinational Business Review*, 4(1), 9–20.

Pratten, C. (1988) A survey of the economies of scale. In Commission of the European Communities (CEC), *Research on the "Cost of Non-Europe"*. Luxembourg: Office for Official Publications of the European Communities.

Prime, P. B. (2012) Utilising FDI to stay ahead: the case of Singapore. *Studies in Comparative International Development*, 47(2), 139-160.

Purvis, D. D. (1972) Technology, trade and factor mobility. *The Economic Journal*, 82(327), 991-999.

Qin, J. (2000) Exchange rate risk and two-way foreign direct investment. *International Journal of Finance and Economics*, 5(3), 221–231.

Ramasamy, B., Yeung, M. & Laforet, S. (2012) China's outward foreign direct investment: location choice and firm ownership. *Journal of World Business*, 47(1), 17-25.

Rauch, J. E. (1999) Network versus markets in international trade. *Journal of International Economics*, 48(1), 7-35.

Roberts, M., & Tybout, R. (1997) The decision to export in Colombia: An empirical model of entry with sunk costs. *American Economic Review*, 87(4), 545–564.

Root, F. R. (1994) *Entry Strategies for International Markets*. New York, NY: Lexington Books,.

Rothaermel, F. T., Kotha, S. & Steensma, H. K. (2006) International market entry by US internet firms: an empirical analysis of country risk, national culture, and market size. *Journal of Management*, 32(1), 56-82.

Ruffin, R. J. (1984) International factor movements. In R. W. Jones & P. B. Kenen (Ed.), *Handbook of International Economics, Volume 1*. Amsterdam: Elsevier Science Publishers, 237-288.

Rugman, A. M. & D'Cruz, J. R. (1994) A theory of business networks. In L. Eden (Ed.) *Multinationals in North America, Volume 3*. Calgary: University of Calgary Press, 103-116.

Rui, H. & Yip, G. S. (2008) Foreign acquisitions by Chinese firms: a strategic intent perspective. *Journal of World Business*, 43(2), 213-226.

Russ, K. N. (2007) The endogeneity of the exchange rate as a determinant of FDI: a model of entry and multinational firms. *Journal of International Economics*, 71(2), 344–372.

Russow, L. C. & Okoroafo, S. C. (1996) On the way towards developing a global screening model. *International Marketing Review*, 13(1), 46-64.

Samuelson, P. A. (1949) International factor-price equalization once again. *Economic Journal*, 59(234), 181-197.

Sasidharan, S. & Kathuria, V. (2011) Foreign direct investment and R&D: substitutes or complements — A case of Indian manufacturing after 1991 reforms. *World Development.* Doi:10.1016/j.worlddev.2010.05.012

Scaperlanda, A. (1967) The EEC and US foreign direct investmen: some empirical evidence. *Economic Journal*, 77(305), 22-26.

Scaperlanda, A. E. & Mauer, L. J. (1969) The determinants of U.S. direct investment in the E.E.C. *American Economic Review*, 59(4), 558–568.

Schmitz, A. & Bieri, J. (1972) EEC tariffs and U.S. direct investment. *European Economic Review*, 3(3), 259–270.

Schmitz, A. & Helmberger, P. (1970) Factor mobility and international trade: the case of complementarity. *The American Economic*, 60(4), 761-767.

Scholes, M. S. & Wolfson, M. A. (1990) The effects of changes in tax law on corporate reorganization activity. *Journal of Business*, 63(1), S141-S164.

Scott, W. R. (2002) The Changing world of Chinese enterprises: An institutional perspective. In Tsui, A. S. & Lau, C. M. (Ed.), *Management of Enterprises in the People's Republic of China*. Boston: Kluwer Academic Press, 59–78.

Serlenga, L. & Shin, Y. (2007) Gravity models of intra-EU trade: application of the CCEP-HT estimation in heterogeneous panels with unobserved common time-specific factors. *Journal of Applied Econometrics*, 22(2), 361-381.

Sethi, D., Guisinger, S. E., Phelan, S. E. & Berg, D. M. (2003) Trends in foreign direct investment flows: a theoretical and empirical analysis. *Journal of International Business Studies*, 34(4), 315-326.

Sethi, D., Guisinger, S., Ford, D. L., Jr., & Phelan, S. E. (2002). Seeking greener pastures: A theoretical and empirical investigation into the changing trend of foreign direct investment flows in response to institutional and strategic factors. *International Business Review*, 11(6), 685–705.

Shankarmahesh, M. N., Olsen, H. W. & Honeycutt, E. D. (2005) A dominant product-dominant country framework of industrial export segmentation. *Industrial Marketing Management*, 34 (3), 203-210.

Sheng, S. Y. & Mullen, M. R. (2011) A hybrid model for export market opportunity analysis. *International Marketing Review*, 28(2), 163-182.

Singh, J. (2007) Asymmetry of knowledge spillovers between MNCs and host country firms. *Journal of International Business Studies*, 38(5), 764-786.

Sobel, A. C. (2002) State institutions, risk, and lending in global capital markets. *International Business Review*, 11(6), 725–752.

Sohn, C. H. (2005) Does the Gravity Model explain South Korea's trade flows? *Japanese Economic Review*, 56(4), 417-430.

Stern, R. M. & Maskus, K. E. (1981) Determinants of the structure of U.S. foreign trade, 1958-1976. *Journal of International Economics*, 11(2), 207-224.

Stevens, G. V. G. (1998) Exchange Rates and Foreign Direct Investment: A Note. *Journal of Policy Modeling*, 20(3), 393-401.

Stone, S. F. & Jeon, B. N. (1999) Gravity-model specification for foreign direct investment: A case of the Asia-Pacific economies. *Journal of Business and Economic Studies*, 5(1), 33–42.

Svensson, R. (1996) Effects of overseas production on home country exports: evidence based on Swedish multinational. *Review of World Economics*, 132(2), 304-329.

Swenson, D. L. (1994) The impact of U.S. tax reform on foreign direct investment in the United States. *Journal of Public Economics*, 54(2), 243-266.

Swenson, D. L. (2004) Foreign investment and mediation of trade flows. *Review of International Economics*, 12(4), 609-629.

Tallman, S. B. (1988) Home Country Political Risk and Foreign Direct Investment in the United States. *Journal of International Business Studies*, 19(2), 219–234.

Tansey, M. M. & Touray, A. (2010) The gravity model of trade applied to Africa. *The International Business & Economics Research Journal*, 9(3), 127-130.

Taylor, C. T. (2000) The impact of host country government policy on UK multinational investment decisions. *The World Economy*, 23(5), 635-647.

Taylor, R. (2002) Globalization strategies of Chinese companies current developments and future prospects. *Asian Business and Management*, 1(2), 209-225.

Thomas, D. E. & Grosse, R. (2001) Country-of-origin determinants of foreign direct investment in an emerging market: the case of Mexico. *Journal of International Management*, 7(1), 59–79.

Thrift, N & Olds, K. (1996) Refiguring the economic in economic geography. *Progress in Human Geography*, 20(3), 311-337.

Tian, X. (2007) Accounting for sources of FDI technology spillovers: evidence from China. *Journal of International Business Studies*, 38(1), 147-159.

Tihanyi, A. S. & Roath, A. S. (2002) Technology transfer and institutional development in central and eastern Europe. *Journal of World Business*, 37(3), 188-198.

Tinbergen, J. (1962) *Shaping the World Economy: Suggestions for an International Economic Policy*. New York: The Twentieth Century Fund.

Tolentino, P. E. (2010) Home country macroeconomic factors and outward FDI of China and India. *Journal of International Management*, 16(2), 102-120.

Tuman, J. P. & Emmert, C. F. (1999) Explaining Japanese foreign direct investment in Latin America, 1979–1992. *Social Science Quarterly*, 80(3), 539–555.

UNCTAD (1996) *World Investment Report 1996: Transnational Corporations, Investment, Trade and International Policy Arrangements*. New York and Geneva: United Nations.

UNCTAD (1998) *World Investment Report 1998: Trends and Determinants*. New York and Geneva: United Nations.

UNCTAD (2003) *World Investment Report 2003: FDI Policies for Development, National and International Perspectives*. New York and Geneva: United Nations.

UNCTAD (2011a) *World Investment Prospects Survey 2011-2013*. New York and Geneva: United Nations.

UNCTAD (2011b) *World Investment Report 2011: Non-Equity Modes of International Production and Development*. New York and Geneva: United Nations.

UNCTAD (2012) *World Investment Report 2012: Towards A New Generation of Investment Policies*. New York and Geneva: United Nations.

United Nations (1993) *Foreign Direct Investment and Trade Linkages in Developing Countries*. New York: United Nations.

United Nations (2005) *World Economic Situation and Prospects 2005*. New York: United Nations.

United Nations (2008) *World Economic Situation and Prospects 2008*. New York: United Nations.

Vahlne, J. E. & Johanson, J. (2002) New tchnology, new companies, new business environments and new internationalisation processes? In V. Havila, M. Forsgren & H. Hakansson (Ed.) *Critical Perspectives on Internationalisation*, Amsterdam: Pergamon, 209-227.

Venables, A. J. (1999) Fragmentation and multinational production. *European Economic Review*, 43(6-7), 935–945.

Vernon, R. (1966) International investment and international trade in the product cycle. *The Quarterly Journal of Economics,* 80(2), 190-207.

Vernon, R. (1979) The product cycle hypothesis in a new international environment. *Oxford Bulletin of Economics and Statistics*, 41(4), 255-267.

Veugelers, R. (1991) Locational determinants and ranking of host countries: An empirical assessment. *Kyklos*, 44(3), 363-382.

Vogiatzoglou, K. (2005) Trends and determinants of intra-industry trade between Eastern European countries and Greece. *Economic and Business Review for Central and South-Eastern Europe*, 7(2), 81-99.

Voss, H., Buckley, P. & Cross, A. (2009) An assessment of effects of institutional change on Chinese outward direct investment activity. In Alon, I., Chang, J., Fetscherin, M., Lattemann, C. & McIntyre, J. R. (Ed.), *China Rules: Globalisation and Political Transformation*. New York: Palgrave Macmillan, 135-165.

Wakasugi, R. (1997) Missing factors of intra-industry trade: Some empirical evidence based on Japan. *Japan and the World Economy*, 9(3), 353-362.

Walsh, P. & Yu, J. (2010) Determinants of foreign direct investment: a sectoral and institutional approach. *IMF Working Paper*, 10 (187), 1-27.

Wang, C., & Li, Y. (2007) Do spillover benefits grow with rising foreign direct investment? An empirical examination of the case of China. *Applied Economics*, 39(3), 397-405.

Wang, Y. (2007) On the Relationship Between Overseas Direct Investment and Trade. *The Chinese Economy,* 40(4), 56-69.

Wang, Z. & Swain, N. (1997) Determinants of inflow of foreign direct investment in Hungary and China: time-series approach. *Journal of International Development*, 9(5), 695-726.

Wei, S. (2000a) How taxing is corruption on international investors? *Review of Economics and Statistics*, 82(1), 1-11.

Wei, S. (2000b) Local corruption and global capital flows. *Brookings Papers on Economic Activity*, 0(2), 303-355.

Wei, S. Z. C. & Zhu, Z. (2007) A revisit to the outward FDI determinants: further evidence from count panel data models with fixed effects. *Applied Economics Letters*, 14(11), 809–812.

Wei, Y. & Liu, X. (2001) *Foreign Direct Investment in China: Determinants and Impact*. Cheltenham: Edward Elgar.

Wei, Y. & Liu, X. (2006) Productivity spillovers from R&D, exports and FDI in China's manufacturing sector. *Journal of International Business Studies*, 37(4), 544-557.

Wei, Y. (2004) Foreign direct investment in China. In Y. A. Wei & V. N. Balasubramanyam (Ed.), *Foreign Direct Investment: Six Country Case Studies*, Cheltenham: Edward Elgar, 9-37.

Wei, Y., Liu, X., Parker, D. & Vaidya, K.(1999) The regional distribution of foreign direct investment in China. *Regional Studies*, 33(9), 857-867.

Wheeler, D. & Mody, A. (1992) International investment location decisions: The case of U.S. firms. *Journal of International Economics*, 33(1-2), 57-76.

Wilamoski, P. & Tinkler, S. (1999) The trade balance effects of U.S. foreign direct investment in Mexico. *Atlantic Economic Journal*, 27(1), 24-40.

Williams, C. & Martinez, C. A. (2012) Government effectiveness, the global financial crisis, and multinational enterprise internationalization. *Journal of International Marketing*, 20(3), 65-78.

Wint, A. G. & Williams, D. A. (2002) Attracting FDI to developing countries: A changing role for government? *The International Journal of Public Sector Management*, 15(5), 361-374.

Wong, K. (1986) Are international trade and factor mobility substitutes? *Journal of International Economics*, 21(1/2), 25-44.

Wu, F. & Sia, Y. H. (2002) China's rising investment in Southeast Asia: trends and outlook. *Journal of Asian Business*, 18(2), 41-61.

Wu, J., Li, S. & Selover, D. D. (2012) Foreign investment vs. foreign portfolio investment. *Mangament International Review*, 52(5), 643-670.

Yamawaki, H. (1991) Exports, and foreign distributional activities: evidence on Japanese firms in the United States. *Review of Economics and Statistics*, 73(2), 294-300.

Yeniyurt, S. & Townsend, J. D. (2003) Does culture explain acceptance of new products in a country? An empirical investigation. *International Marketing Review*, 20(4), 377-396.

Yeung, H. W. C. (1994) Critical review of geographical perspectives on business organizations and the organization of production: towards a network approach. *Progress in Human Geography*, 18(4), 460-490.

Yi, K. M. (2003) Can vertical specialization explain the growth of world trade? *Journal of Political Economy*, 111(1), 52-102.

Yiu, D. & Makino, S. (2002) The choice between joint venture and wholly owned subsidiary: An institutional perspective. *Organisation Science*, 13(6), 667–683.

Yu, C. J. & Zietlow, D. S. (1995) The determinants of bilateral trade among Asia-Pacific countries. *ASEAN Economic Bulletin*, 11(3), 298-305.

Yu, J. & Zhao, W. (2008) The impacts of Japanese direct investment in China on the Sino-Japanese bilateral trade. *Journal of Chinese Economic and Foreign Trade Studies*, 1(3) **,** 185-199.

Zhang, J. & Witteloostuijn, A. V. (2004) Economic openness and trade linkages of China: an empirical study of the determinants of Chinese trade intensities from 1993 to 1999. *Review of World Economics*, 140(2), 254-281.

Zwinkels, R. C. J. & Beugelsdijk, S. (2010) Gravity equations: workhorse or Trojan horse in explaining trade and FDI patterns across time and space? *International Business Review*, 19(1), 102-115.