Factors Affecting Foreign Direct Investment in APEC Member Countries

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A Thesis Defense Submitted in Partial Fulfillment of the Requirements

For the Degree of Master of Business Administration

Department of International Business

International College

University of the Thai Chamber of Commerce

2016

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2016

THESIS APPROVAL
INTERNATIONAL COLLEGE

Master of Business Administration
Degree

Finance
Major Field

Title: **Factors Affecting Foreign Direct Investment in APEC Member Countries**

Donghui Li   **2016**

  Name   Graduation Year

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ACKNOWLEDGEMENTS

I would like to take this opportunity to express my gratitude to all the people who have ever helped me in this study.

My sincere and hearty thanks and appreciations go firstly to my supervisor, assistant professor Li Li, whose suggestions and encouragement have given me much insight into these empirical studies. It has been a great privilege and joy to study under her guidance and supervision. Furthermore, it is my honor to benefit from her personality and diligence, which I will treasure my whole life. My gratitude to she knows no bounds.

I am also extremely grateful to all my friends and classmates who have kindly provided me assistance and companionship in the course of preparing this study.

In addition, many thanks go to Charley for his guidance that help me to improve my thesis format.

Finally, I am really grateful to all professors who devote much time to reading this thesis and give me much advice, which will benefit me in my later study.

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member countries

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Degree: Master of Business Administration

Major Field: International Finance

Thesis Adviser: Assistant Professor Li Li, Ph.D.

Graduate Year: 2016-2017

ABSTRACT

After a long term development, APEC has grown to a dynamic engine of economic growth and one of the most important regional forums in the Asia-Pacific. APEC member countries have made important contributions to economic development and political stability in the region and even the whole world. At the same time, foreign direct investment (FDI) has become an important factor in promoting the APEC member countries economic development. Therefore, how to attract FDI becoming more and more important for APEC member countries to develop their economies and promote regional stability. Compared with previous data, distribution of FDI in APEC member countries is unbalanced, the stocks and flows of FDI in APEC member countries are significantly different. Therefore, this research aim at study what factors affecting FDI in APEC member countries and measure how these factors affect FDI inflow.

Based on empirical literature, seven factors were selected in this research, namely, market size, natural resource endowment, foreign trade level, science and technology, infrastructure, financial environment and political environment. Seven

proxy variables were choose to study FDI in this research, there are gross domestic product (GDP), fuel, metal, ore exports (percentage of merchandise export) (NER), imports of goods (percentage of GDP) (IPG), patent applications, nonresidents (PAN), fixed telephone subscriptions (per 100 people) (FTS), exchange rate (ER), government stability (GS).

In order to find out what factors that affect FDI in each sample country, multiple liner regression was used to analyze empirical data in this study. Panel data regression was used to identify factors that affect APEC member countries attract FDI in different periods. Study results shown that GDP positively affecting FDI in Chile, GDP, NER and ER positively affecting FDI in Japan, IPG negatively affecting FDI in Korea, NER negatively affecting FDI in New Zealand, but ER positively affecting FDI in New Zealand, FTS negatively affecting FDI in Philippines, FTS and PAN negatively affecting FDI in Thailand. It can be conclude that GDP positively affects FDI, IPG and FTS negatively affects FDI, NER, PAN, ER and GS has no effects on FDI. In addition, this paper also studies the influence of the variables on the FDI during special period, intercepted 1996-2000 and 2006--2013 years data, the empirical results are GDP and GS positively affects FDI, NER and IPG negatively affects FDI, PAN, FTS and ER has no effects on FDI. There are some limitation and short-comes of this study due to the number of research sample and proxy variables.

Keywords: FDI, APEC member countries, economic crisis, GDP

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CHAPTER 1

INTRODUCTION

This chapter mainly introduce the study background, research problem, research objective, research significance, research question, expected benefit and operational definition. Financial environment and political environment are different as different countries have different levels of economy, foreign direct investment meet the problem of uneven distribution. Therefore, he main purpose of this study is to find out factors that have impact on foreign direct investment.

1.1 Research background

APEC stands for the Asia-Pacific Economic Cooperation Forum. Today, APEC has 21 members, including all the major economies of the region and some of the most dynamic, fastest growing economies in the world. Over the past decade, APEC has become the primary vehicle in the region to promote open trade and economic cooperation. APEC's role has grown in recent years in both depth and scope and now encompasses trade liberalization, business facilitation, economic and technical cooperation, youth and women.

APEC has grown to become a dynamic engine of economic growth and one of the most important regional forums in the Asia-Pacific. Its 21 member economies are home to around 2.8 billion people and represent approximately 59 per

cent of world GDP and 49 per cent of world trade in 2015.

As a result of APEC's work, growth has soared in the region, with real GDP increasing from USD 16 trillion in 1989 to USD 20 trillion in 2015. Meanwhile, residents of the Asia-Pacific saw their per capital income rise by 74 per cent, lifting millions out of poverty and creating a growing middle class in just over two decades. This organization plays an important role in global economic activity as it makes great contribution had made in the past 20 years.

Foreign direct investment is indispensable to APEC member countries development. foreign direct investment is an investment directly into production in a country by a company located in another country, either by buying a company in the target country or by expanding operations of an existing business in that country. Not only can FDI add to investible resources and capital formation, but, perhaps more important, it is also a means of transferring production technology, skills, innovative capacity, and organizational and managerial practices between locations, as well as of accessing international marketing networks.

APEC is the world's largest economic forum, with participation from most major countries and regions within the Asia-Pacific. Now, the world economic situation is not optimistic, APEC member countries played an important role in the world economy recovery and development when global economic crisis happened. As mentioned earlier, foreign direct investment is important for the country economic development. Therefore, study on factors affecting foreign direct

investment has a certain significance for the APEC member countries economic

development and thus promote the development of the world economy.

1.2 Problem statement

Table 1: Foreign direct investment inward stock, in millions

YEAR	1985	1990	1995	2000	2005	2010	2011	2012	2013
AUS	26616	80364	111311	121686	247748	527064	553910	611055	561507
BN	22	33	642	3868	2125	4140	4837	5662	6251
CA	64657	112843	123181	212716	341630	591873	591043	636835	650321
CL	11988	16107	24437	45753	78599	152645	158985	191280	198628
CN	6060	20691	101098	193348	272094	587817	711802	832882	956793
HK	183220	201653	227532	435417	493895	1067520	1078749	1244646	1352022
TW	2930	9735	15736	19502	43158	62977	54979	59633	65797
ID	5739	8732	20626	25060	41187	160735	184804	211635	230818
JP	4743	9850	33531	50322	100901	214880	225787	205752	170710
KP	1803	5186	18220	43738	104879	135500	135178	157876	180860
MY	7388	10318	28731	52747	44460	101620	115064	132656	136028
MX	8700	22424	41130	121691	234149	363769	338975	366564	391879
NZ	2043	7938	25728	24957	44094	61139	65608	72742	76174
PG	683	1582	1667	935	1069	3748	4567	4656	4176
PE	1130	1330	5510	11062	15889	42976	50641	62559	71857
PH	2601	3268	6730	13762	14978	25896	30995	36459	47276
RU	_	_	5601	32204	180228	490560	454949	514926	565654
SG	10620	30468	65644	110570	237009	632766	688774	820991	869858
TH	1999	8242	17684	30944	61413	139286	155036	172471	178259
US	219996	539601	1005726	2783235	2817970	3422293	3498726	3929073	4985926
VN	41	243	5743	14730	22444	57004	64523	72891	81791

Data sources: UNCTAD stat

Table 2: Foreign direct investment stock percentage of total world

YEAR	1985	1990	1995	2000	2005	2010	2011	2012	2013
AUS	2.70 %	3.66 %	3.12 %	1.69 %	2.25 %	2.69 %	2.71 %	2.77 %	2.29 %
BN	0.00 %	0.00 %	0.02 %	0.05 %	0.02 %	0.02 %	0.02 %	0.03 %	0.03 %
CA	6.55 %	5.13 %	3.45 %	2.95 %	3.11 %	3.02 %	2.89 %	2.89 %	2.66 %
CL	1.21 %	0.73 %	0.69 %	0.64 %	0.72 %	0.78 %	0.78 %	0.87 %	0.81 %
CN	0.61 %	0.94 %	2.83 %	2.68 %	2.48 %	3.00 %	3.48 %	3.77 %	3.91 %
HK	18.57 %	9.18 %	6.38 %	6.04 %	4.49 %	5.44 %	5.28 %	5.64 %	5.52 %
TW	0.30 %	0.44 %	0.44 %	0.27 %	0.39 %	0.32 %	0.27 %	0.27 %	0.27 %
ID	0.58 %	0.40 %	0.58 %	0.35 %	0.37 %	0.82 %	0.90 %	0.96 %	0.94 %
JP	0.48 %	0.45 %	0.94 %	0.70 %	0.92 %	1.10 %	1.10 %	0.93 %	0.70 %
KP	0.18 %	0.24 %	0.51 %	0.61 %	0.95 %	0.69 %	0.66 %	0.72 %	0.74 %
MY	0.75 %	0.47 %	0.81 %	0.73 %	0.40 %	0.52 %	0.56 %	0.60 %	0.56 %
MX	0.88 %	1.02 %	1.15 %	1.69 %	2.13 %	1.86 %	1.66 %	1.66 %	1.60 %
NZ	0.21 %	0.36 %	0.72 %	0.35 %	0.40 %	0.31 %	0.32 %	0.33 %	0.31 %
PG	0.07 %	0.07 %	0.05 %	0.01 %	0.01 %	0.02 %	0.02 %	0.02 %	0.02 %
PE	0.11 %	0.06 %	0.15 %	0.15 %	0.14 %	0.22 %	0.25 %	0.28 %	0.29 %
PH	0.26 %	0.15 %	0.19 %	0.19 %	0.14 %	0.13 %	0.15 %	0.17 %	0.19 %
RU	_	_	0.16 %	0.45 %	1.64 %	2.50 %	2.23 %	2.33 %	2.31 %
SG	1.08 %	1.39 %	1.84 %	1.53 %	2.16 %	3.23 %	3.37 %	3.72 %	3.55 %
TH	0.20 %	0.38 %	0.50 %	0.43 %	0.56 %	0.71 %	0.76 %	0.78 %	0.73 %
US	22.30 %	24.55 %	28.20 %	38.64 %	25.64 %	17.45 %	17.12 %	17.80 %	20.36 %
VN	0.00 %	0.01 %	0.16 %	0.20 %	0.20 %	0.29 %	0.32 %	0.33 %	0.33 %
SUM	57.05 %	49.62 %	52.89 %	60.36 %	49.14 %	45.12 %	44.85 %	46.86 %	48.12 %

Data sources: UNCTAD stat

AS it shows in Table 1 and Table 2, many empirical studies indicated that foreign direct investment drive APEC member countries economic growth, after nearly 30 years development, stock of foreign direct investment in APEC member countries growed rapidly. In 1985, foreign direct investment stock in APEC members was 562,978 millions dollars. But in 2013, the volume increased to 11,782,584 millions dollars, that account almost 20 times than 1985. In Brunei

Darussalam, foreign direct investment stock increased almost 300 times during 30 years, but in Papua New Guinea, foreign direct investment stock only increased less than 7 times. There were great differences of foreign direct investment stock among APEC members. In 2012, the Unites States foreign direct investment stock reached nearly 220,000 million dollars.

There is a big difference between foreign direct investment in APEC member countries. As it shows in the Table 1 and Table 2, foreign direct investment stock in the United States was much higher than other countries with foreign direct investment stock in the U.S. reached $ 4,985,926 million in 2013. In addition, in some countries, foreign direct investment has grown by more than 100 times within 30 years.

APEC member countries have a big difference in economic development, financial environment, political environment, science and technology level, infrastructure, foreign trade level, natural resource endowment, etc. These factors made foreign direct investment in APEC member countries different, and the gap became more bigger.

Foreign investment in APEC member countries became negative as global economic crisis happened. Therefore, how to attract investment and make it easier, study factors attracting investment has a certain practical significance. Each APEC member countries have their own strengths and weaknesses, make full use of advantages and avoid disadvantages of each APEC member countries is good for

investing in different industries. Because different scales can make the investment more efficient, and the resources can be fully used.

1.3 Research objectives

There are three objectives of this study:

Objective 1. To study what factors affecting foreign direct investment in each APEC member countries and measure how these factors affect inflow foreign direct investment by using multiple linear regression base on APEC member countries relevant aggregated data .

Objective 2. To study what factors affecting foreign direct investment in APEC member countries and measure how these factors to affect inflow foreign direct investment by using regression analysis of APEC member countries panel data t.

Objective 3. To study what factors affecting foreign direct investment in APEC member countries and measure how these factors affect inflow foreign direct investment in economic crisis by using regression analysis of APEC member countries panel data during two economic crisis periods which including the Asian economic crisis and the 2008 global economic crisis .

1.4 Research significance

Investment environment of each APEC member countries are different. And investors may not have enough understanding of the investment environment. Therefore, foreign direct investor should pay attention to the investing environment based on different countries conditions. The situation in each APEC member countries is different, a careful analysis of the investment environment in APEC member countries, with knowing the main factors that affect foreign direct investment in APEC member countries and affect foreign direct investment, targeting and selecting development of related industries can effectively attract foreign direct investment, promoting economic and trade cooperation, and economic development of both sides.

In today's rapid integration of the world's economy, foreign direct investment inflows and outflows are embedded in a country with an important way to the economy globalization. For some countries, attract foreign investments can solve the problem of insufficient funding in the economic development. On the other hand some countries can implementing foreign direct investment to gain scarce resources and technology. So study factors affect foreign direct investment in foreign economic development has great significance.

1.4.1 Theoretical significance

Few study indicated foreign direct investment that have been arousing sufficient knowledge. Hymer (1960) was considered to be the first scholar presented monopolistic advantage theory. He argued that foreign direct investment and foreign financial assets invested in the traditional economic has difference. Foreign direct investment attracted the attention of economists, and it is hot topic in recent years. Many economists and scholars developed their theories to explain the foreign investment, such as Venon's (1966) product life cycle theory, Buckley and Casson's (1976) internalization theory, Duning's (1977) eclectic theory of international production and Kojjima's (1978) theory of marginal production expansion, and the like. They clarified that the motivation of foreign direct investment. By using large multinational corporations in developed countries as the study object, and found that the main determinants of foreign direct investment is an excellent business management technology. After 1980, scholars focused on gathering information from developing countries, Duning (1980), Wells (1983) and Rao (1983) put forward the investment development cycle theory, small scale technology theory and technology localization theory. At the same time, economic development level is a fundamental factor on foreign direct investment decision making.

Previous studies on the foreign direct investment in the APEC were mainly focus on the description of the current situation and provide investment strategy. In this paper will build dynamic panel data model based on the dynamic

level, by using the Ordinary Least Squares method to inspects the APEC member countries market scale, natural resource endowment, infrastructure, foreign trade, financial environment, scientific and technology and political environment. It's imperative to determine whether these factors affecting foreign direct investment in APEC member countries.

Previous research on foreign direct investment were mainly focus on some specific countries or regions, and there were few literature study foreign direct investment in the APEC member countries. APEC established to provide more convenience for foreign direct investment in APEC member countries. As the study object, study APEC member countries are important by giving suggestions for enterprises investing specific in APEC member countries.

1.4.2 Practical significance

It's not easy to survive in the domestic enterprise with rapid development of the world's economy, expanding of the transnational corporations, lead to fierce market competition. According to the world investment bulletin (2001) data, from the last century, transnational corporations increasing rapidly but world trade was expanding. It's grow rapidly in assets of overseas subsidiaries, sales, trade, and employment, the world GDP, domestic investment, license payment, trade. Many countries were moving to a period of economic restriction within some started foreign direct investment late and in small scale. But these countries have a lot of

surplus labor in many industries. It is urgent for these countries to develop foreign direct investment as they are facing the foreign government's trade protection policy and various barriers. This will not only improve their international economic status, but also able to make full use of their domestic foreign exchange reserves and other financial resources.

In this case, study the factors impact on foreign direct investment, find out foreign direct investment problems have very important significance. By using empirical analysis to explain the effects of different factors on foreign direct investment, revealing the law of the development of foreign direct investment also have great significance. Countries and enterprises can better achieve the goal of economic development, strengthen the management of foreign direct investment, achieve future development goals, so that they can better serve foreign direct investment by providing appropriate policy recommendations. In order to better attract foreign direct investment, APEC member countries can also implement the relevant policies for their own situation.

1.5 Research questions

This paper focus on constructing the evaluation index system of the influencing factors of foreign direct investment in APEC member countries. By using the Ordinary Least Squares method to analysis market scale, scientific

research ability, political environment and other factors have important influences on related industry.

By using the Ordinary least squares method, comprehensively and thoroughly investigate the dynamic changes of foreign direct investment in APEC member countries, to determine what factors affecting foreign direct investment and how to affecting these factors affecting FDI.

Research questions of this study are show as follows:

Question 1. What factor affect foreign direct investment in each APEC member country?

Question 2. How these factors affect foreign direct investment in each APEC member country?

Question 3. What factors affect foreign direct investment in APEC member countries?

Question 4. How these factors affect foreign direct investment in APEC member countries?

Question 5. During economic crisis what factor affect foreign direct investment in APEC member countries?

Question 6. During economic crisis how these factors affect foreign direct investment in each sample APEC member countries?

1.6 Expected benefits

First of all, few study had show evidence of foreign direct investment in the Asia Pacific region according. This paper used empirical research,   statistics and a large number of related data may help to offer some theoretical reference to the foreign direct investment study and APEC areas economy research, so that to improve the foreign direct investment research system.

Secondly, by clarifying what factors affect the foreign direct investment, the APEC members can attract foreign direct investment more efficiently and implement the relevant policies more purposively, thereby promoting the economy development. For example, if the political environment is the most important factor, APEC members should improving the legal system, completing law and order, maintaining political and social stability. If scientific and technological factors are very important, APEC members should taking measures to encourage innovation. If the infrastructure is the most important factor, the APEC members should considering increasing the expenditure on infrastructure.

Finally foreign investors to make investment decisions can based on the relevant APEC member countries specific strengths and weaknesses. For example, a country's has a rich natural resources endowment, resource-seeking investors should consider investing in this country. Some countries have advanced technology, technical-seeking investors should consider invest in these countries, so that the investment decision-making will be more accurate and efficient.

1.7 Operational Definitions

1. Asia-Pacific Economic Cooperation (APEC) is a forum for 21 Pacific Ri-m member economies that promotes free trade throughout the Asia-Pacific region. The APEC member include Australia, Brunei Darussalam, Canada, Chile, Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Peru, Papua New Guinea, Philippines, Russia, Singapore, Thailand, U.S.A and Vietnam.

2. Foreign direct investment (FDI) is a controlling ownership in a business enterprise in one country by an entity based in another country. Broadly, foreign direct investment includes "mergers and acquisitions, building new facilities, reinvesting profits earned from overseas operations and intra company loans". In a narrow sense, foreign direct investment refers just to building new facility in a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. FDI is the sum of equity capital, other long-term capital, and short-term capital as shown in the balance of payments. FDI usually involves participation in management, joint-venture, transfer of technology and   expertise. Stock of FDI is the net (i.e., inward FDI minus outward FDI) cumulative FDI for any given period. Direct investment excludes investment by purchasing of shares. Political stability is the durability and integrity of a current government regime.

3. Gross domestic product (GDP)is a monetary measure of the value of all final goods and services produced in a period (quarterly or yearly). Nominal GDP

estimates are commonly used to determine the economic performance of a whole country or region, and to make international comparisons. Nominal GDP, however, does not reflect differences in the cost of living and the inflation rates of the countries. Therefore, using a GDP purchasing power parity per capita basis is arguably more useful when comparing differences in living standards between nations.

4. Natural resources of total export ratio (NER) reflect export and resource's proportion. This ratio can reflect the natural resource endowment of a country to a certain extent.

5. Imports of goods percent of GDP (IPG). An import is a good brought into a jurisdiction, especially across a national border, from an external source. The party bringing in the good is called an importer while an import in the receiving country is the exporter from the sending country. Importation is the defining financial transactions of international trade. Data on international trade in goods are mostly obtained through declarations to custom services. If a country applies the general trade system, all goods entering the country are recorded as imports. If the special trade system (e.g. extra-EU trade statistics) is applied goods which are received into customs warehouses are not recorded in external trade statistics unless they subsequently go into free circulation of the importing country.

6. Patent applications, non-residents(PAN). Patent application documentation submitted by an inventor as a request to be the sole owner of an idea

or invention's patent. The application include elements of a patent which may also be modified during the application process approval. Application for a US patent is submitted to the US Patent and Trademark office. Utility patents can be obtained for the discovery of a new process, machine, manufacturing mechanism, or an improvement on existing idea. Design patents may be granted to those investing a new design or an improvement on a design for manufacturing devices. A non-resident is an individual who mainly resides in one region or jurisdiction but has interests in another region. In the region where he or she does not mainly reside, he or she will be classified by government authorities as a non-resident. The classification itself will be determined in each region based on set circumstances such as the amount of time spent within the region during the calendar year. This classification is focused on where the person resides and does not focus on citizenship.

7. Fixed telephone subscriptions (per 100 people) abbreviated FTS. A fixed phone line (a line that is not a mobile phone line) can be hard-wired or cordless and typically refers to the operation of wireless devices or systems in fixed locations such as homes. Fixed wireless devices usually derive their electrical power from the utility mains electricity, unlike mobile wireless or portable wireless, which tend to be battery-powered. Although mobile and portable systems can be used in fixed locations, efficiency and bandwidth are compromised compared with fixed systems. Mobile or portable, battery-powered wireless systems can be

used as emergency backups for fixed systems in case of a power blackout or natural disaster.

8. Exchange rate (ER) in finance is a rate between two currencies that the rate at one currency will be exchanged for it's counterpart. It is also regarded as the value of one country's currency in terms of another currency.

9. Government stability (GS) is the durability and integrity of a current government regime. This is determined by the amount of violence and terrorism expressed in the nation and by citizens associated with the state. A stable society can be defined as satisfied with the ruling party and system of operations and is not interested in revolutionary or despotic ideas.

10. Organization for Economic Co-operation and Development (OECD) is an intergovernmental economic organization of 34 countries, founded in 1961 to stimulate economic progress and the world trade. It is a forum of countries describing themselves as committed to democracy and the market economy, providing a platform to compare policy experiences, seeking answers to common problems, identifying good practices and coordinating domestic and international policies of its members.

11. Ordinary least squares (OLS) is a method for estimating the unknown parameters in a linear regression model with the goal of minimizing the differences between the observed responses in some arbitrary dataset and the responses predicted by the linear approximation of the data (visually this is seen as

the sum of the vertical distances between each data point in the set and the corresponding point on the regression line - the smaller the differences, more better the model fits the data). The resulting estimator can be expressed by a simple formula, especially in the case of a single regressor on the right-hand side.

CHAPTER 2

LITERATURE REVIEW

Past research studies relating to the determinants of FDI inflows in this research paper are summarized in this chapter. This provides a better understanding of the nature of FDI and factors which influencing FDI inflow. Other than that, the relationships between the dependent variable and independent variables are studied as well. With the help of the previous studied models, researchers are able to formulate a new proposed framework for this study.

2.1 Related literature

Western scholars' perspective of study factors affecting FDI shifted from the home country to the host country. Therefore, this paper will summarize the theory from the perspective of the home country and the host country.

At first introduce the research from the perspective of the home country. Hymer (1960) established that there was a distinction between financial investments and these kinds of investments, which he named Foreign Direct Investment: the latter gives the firm control over the business activities in other countries whereas portfolio investment does not. In addition, he points out foreign direct investment can only succeed as long as there are market imperfections that can create advantages and conflicts: companies could reduce their competition by

implementing foreign direct investment.

In order to gain a better understanding of developing countries FDI, Wells proposed the small-scale technology theory, which proposes that the enterprises in small-scale markets liked developing countries are featured with higher flexibility and lower technology costs, which enable them to capture the market with a faster speed and a lower price. In comparison to SMEs, the multinationals respond slower since the scale effect usually acquires longer time. Some scholar put forward technology localization theory. This theory indicates that developing country firms can digest, improve, and innovate foreign technologies and make the products better suited to local economic conditions and demands. Such innovation is not simply a passive imitation of the technology but the regeneration of it. Such innovation activity injects new vitality into the imported technology, creates new competitive advantages for the firm that imports it, and gives the developing country firm competitive advantages in the local market and in neighboring country markets. Lass's (1983) technology localization theory is an important theory for analyzing the internalization motivations of developing country firms. According to the technology localization theory is a unique innovation activity that helps promote developing country firms' international operation and hence creates competitive advantages.

Cantwell and Tolentino (1990) put forward the technology innovation industrial upgrading theory due to accelerated growth of OFDI from developing

countries in the mid-1980s. It argues that industry choice of OFDI from developing countries should follow the order of resource-intensive industry, import-substituted or export-oriented industry, high-tech industry at last.

In addition, Early research on FDI identified the role played by research and development. Large, research-intensive firms, typically resident in the most developed capital markets, were observed to dominate FDI (Vernon, 1966; Gruber, Mehta and Vernon, 1967; and Hirsch, 1967). The decision to undertake FDI was a stage in their growth strategy (Buckley and Casson, 1976). These firms were able to create differentiated products that could be competitive abroad (Vernon, 1966; Caves, 1971; and Hymer, 1976). The ability for a firm to utilize its competitive advantage through FDI was said to depend on discovering product, locational or financial market imperfections that encourage FDI. Dunning (1958), Vernon (1966), Caves (1971), Hymer, (1976), Buckley and Casson (1976), Dunning (1977 and 1988), Rugman (1980) and Hennart (1989) pioneered the research to find a comprehensive framework for explaining FDI. This became known as the OLI paradigm and has been intensively utilized to the present time.

There also have some research from the perspective of the host country. Thunnen (1826) developed the first serious treatment of spatial economics and economic geography , connecting it with the theory of rent. Weber (1909) formulated a least cost theory of industrial location which tries to explain and predict the locational pattern of the industry at a macro-scale. The point for locating

an industry that minimizes costs of transportation and labor requires analysis of three factors: material index, labor, agglomeration and agglomeration.

Aliber (1973) had given the concept of foreign exchange rate in foreign direct investment. He argues that a multinational corporation from hard currency area can borrow at lower rates in a soft currency country than can local firms.

China scholars also paid great attention to how the host country investment environment influence the FDI. Song (2008) believed that the host country's economic scale, market potential, infrastructure, economic stability and the government attitude, and foreign trade conditions can affect the foreign direct investment. Yang and Ying (2003) proposed foreign direct investment of foreign enterprises affected by non-institutional factors and institutional factors. The non-system factors were divided into economic factors, basic factors and geographical factors, while the institutional factors can be divided into political system, economic system, legal system and enterprise operation. The current FDI should focus on Southeast Asian developing countries rather than developed countries.

According to the latest international research, the economic development of a country depends on a considerable degree of the country's political, governance, legal system. Economic development has an important impact on foreign direct investment outflows, and the investment level of governance is also an important determinant for the outflow of foreign investment. Mody and Srinivasan (1991)

suggested that factors such as education and environment have impact on FDI outflows. They found that clean environment associated with a higher quality of life, and more educated population can promote more outflow of foreign direct investment on the economy. Olibe and Crumbley (1997) found that government capital expenditure and investment are significant positive factors, but population size do not have a significant effect.

2.2 Related factors research

2.2.1 Market size

The location theory mainly research influence factors of the FDI from the perspective of the host country. Some scholars mainly research from the following four aspects: the cost school represented by Thunen (1826) and Weber (1909) believed that the most important factor affect enterprises perform FDI layout is minimize the cost of producing, transportation, labor and agglomeration. Caves (1971) further introduced the transaction cost and information cost, expand the scope of the cost. In the 1930-40's, the market school represented by Christaller and Lorch believed that the enterprise should take the market and the profit maximum as the principle in foreign investment, looking for potential markets with convenient traffic, favorable human resources and lower costs. So foreign direct investment should consider the host country's economy, nature, human resources, politics. The new economic geography represented by Krugman put forward the importance of

agglomeration economies, through the external economies of produced scale increasing economies of scale. Representatives of the North's institutional economics thought the system provides an economic incentive structure which will determine the economic change and affect FDI in the host country. A good system is beneficial to increase the enterprise resources and ability, it also can attract more FDI, but weak institutional framework will increase transaction costs for the FDI.

The local market size is one of the factors that foreign direct investors have to consider, by generally using local GDP level as substitution variables, as the empirical analysis factors lead to different conclusions. Xiang (2009) used GMM estimation method gained the result that the host country market size has an impact on FDI. Cheng and Ma (2007) study the empirical results, they suggested that the larger of the host country market scale, the higher the degree to attract FDI. Kolstad and Wiig (2010) also believed that the larger market in the host country will more successful in attracting FDI.

2.2.2 Natural resource endowments

From the perspective of natural resource endowments, Suvakunta (2010) deemed that Chinese FDI has significant in grown rate after China became a member of the WTO in 2001. China has the largest international reserves in the world with continuous economic growth. Moreover, it has many potential corporations, among capital, technology and experience as well as FDI policy.

Motivations of Chinese invest in others countries are looking for markets, resources and materials such as rubber, oil and natural gas, and cereals. Some APEC member countries location have advantages in terms of Go-Out strategy in the region.

The local natural resources is also a main factor in attracting FDI. Pradhan (2011) found that multinational enterprises prefer to choose specific location to invest where close to abundant of resources endowment.

2.2.3 Foreign trade

According to empirical study, there is a close connection between bilateral trade and investment, Zhang(2007) believed that the more host country exports, the more FDI, as bilateral trade and foreign investment complementary relationships.

Relationship between trading and FDI have been interpreted as a complement or alternative to each other, as it is a continuous process of internationalization of the company. Lall and Siddharthan (1982) found that in the 1970's protectionist trade policies of the United States is significant determinant of FDI. Meredith and Maki's (1992) study also found that American companies are investing more in Canada with closer economic ties between the Canada and the United States. Caves's (1996) study found that trade and FDI are positively correlated.

Wilamoski and Tinkler (1999) study found that by using the OLS model with the implementation of the North American free trade agreement, FDI led to

United States and Mexico's trade increased dramatically, and gained rapidly increase in trade which led to the United States perform Mexico additional FDI. They also suggested that trade has an impact on foreign direct investment. And this relationship in trade and FDI of transnational corporations often engaged in investment goods and value-added processing trade between companies. On the contrary, Duning (1993) found that when the fixed costs of production in a foreign country can be transaction costs once it makes up, foreign direct investment will have an effect on export.

2.2.4 Science and technology

Research on impact factors, Huang, Ruangkanjanases, and Chen (2014) thought that the factors affect the FDI of multinational enterprises in other counties are politic factors, government factors, location factors, market factors, social and cultural factors, financial factors. Their study found that only location factors, social and cultural factors have positive and significant correlation with FDI in other countries. In order to study the problems existing on multinational enterprises FDI, Keorite, Intaraphan, Pan (2015), deemed Chinese companies have to understand the Labor Law and Regulations in host country. Multinational enterprises also have to accelerate the learning and following of Oversea Local Laws and Regulations. Eventually, regulators should create regulations clearly. Regulators also have to evaluate and check update of those regulations.

In order to analyze developing countries foreign direct investment more precisely, Wells (1983) put forward the theory of small-scale technology, he thought that developing countries enterprises with small scale production in technology, low cost marketing and national products in overseas production has comparative advantages. Lall (1983) technology localization theory believed that domestic enterprises can create new technology actively to expand the FDI according to different local conditions. This shows that the technical level is also the key factor affecting FDI.

Based on the empirical research on the host country technical level, Guan, Wang (2007) argued that the factors related to technical ability have not been constituted the determinants of Chinese FDI, Chinese FDI is not technology leading due to.

2.2.5 Infrastructure

To study the influence of the host country's infrastructure on FDI, Zhang , Yang (2010) used "per capita electricity consumption" reflects the host country's infrastructure situation, they drew conclusions based on empirical research that infrastructure positively affect Foreign Direct Investment inflows. It means more FDI is likely to occur in countries with good physical infrastructure. Duan (2010) used "mixed-telephone subscriptions", "mobile cellular subscriptions" and "length of railway lines" reflects the host country's infrastructure situation, the

empirical research showed that the host country infrastructure construction have a positive impact on attract Chinese enterprise FDI .

2.2.6 Financial environment

Froot and Stein (1991) found that the exchange rate is a major determinant of foreign direct investment outflows, they proposed a "relative wealth" theory which implied that the home country currency appreciation or host country currency devaluation will increase the relative wealth of investors. Thus contributing to invest foreign direct outflows, which exchange rate movements or investment flows to developing economies and developing economies, became important determinants of foreign direct investment flows. While changes in exchange rates is an important determinant that investment flows to developing economies.

Gross (2002) study the relationship between other countries foreign direct investment in the United States and exchange rate, he found that the country's direct investment in the United States increased when the country's currency appreciation, which indicates that the exchange rate for foreign direct investment is a positive determinant. For example, after "Plaza Agreement" in July, 1985, the Japanese yen against the US dollar rose, with 100~120 Yen / $ became to 220~240 Yen / $, On the contrary, Japan attracted more investment from the United States.

However, there were some scholars put forward the opposite view, in which Campa (1993) study 1981-1987 investment between the United States and

Japan found that Japan's direct investment in the United States and the exchange rate have a negative relationship. In other words, when the Japanese yen devaluation, Japan's foreign investment in the United States has increased. Hasnat (1993) found that exchange rate misalignment has asymmetric effects. Specifically, overvaluation significantly hurts growth while undervaluation has the opposite effect (though statistically insignificant). Misalignment affects developed and developing countries differently in that developing countries are more sensitive to the growth effects of misalignment.

2.2.7 Political environment

In recent years, the political factors on the international direct investment have attracted more and more attention with scholars began to analyze the influence of political factors on FDI. Buckley et al. (2007) argued that international investors tend to invest in countries with poor investment and higher political risk. Generally speaking, international investors prefer to invest in developing countries He and Guo (2009) measured of political factors from the political belief, political friction, international position and orientation of the political relations, the results showed that political factors has significant influence on Chinese FDI, as it prefers the country where they have the same political beliefs with Chinese, less political friction, similar international status and good political relationship orientation.

Kraay and Lobaton (1999), based on previous research conclusions and develop a basis of six indices to measure governance, and use these indicators to analyze the impact of political fundamentals on attracting direct investment. These six index includes all aspects of the systems and policies are the degree of political stability, the rule of law, corruption, regulatory burdens, political freedom, the Government's efficiency. The government has an important impact on foreign direct investment. Antony, David, Aidan and Weimer (2001) from the viewpoint of costs--benefits, study human capital and physical infrastructure, they found that infrastructure has an impact on investment, as it conducive to the growth of investment, and subjects to market failure.

Globerman and Shapiro (2002) argued that investments can be created based on the conditions of environment of governance domestic growth of transnational corporations and foreign investment within which governance is the basis impact factors of FDI. They thought that good governance should be based on the effective, fair and transparent rules while protecting intellectual property and private property rights legal system, government policies conducive should be free and open to the society. This study used the index of human development, government infrastructure index, environmental sustainability, management responsibility as variables of the basis of governance. Alderson (2002) analysis of 16 OECD countries, and came to the conclusion that both of the Government's social-democratic control system, striking strength and Union density of a country

nave impact on FDI flows.

2.3 Conceptual framework

According to the relevant literature, there are four main motivations for international investors to invest in FDI:

1.Expanding overseas markets. Expanding overseas markets' motivation mainly based on Monopolistic advantage theory (Hymer, 1960), marginal industry theory (Kojima), small-scale technology theory (Wells, 1983). These theory emphasize expand the overseas market as the motivation more concerned about trade relations factors, economic environmental factors, infrastructure factors, political and legal environment.

2. Seeking natural resources. The motivation of seeking natural resources is mainly based on the internalization theory, which proposed enterprises in order to reduce transaction costs to established subsidiaries in the host countries. This theory provides an investment path for companies which want to get resources, and concerned about the natural resources of APEC member countries. Enterprise that have this motivation are most concerned about natural resource endowments.

3. Acquiring advanced technology. The motivation of acquiring advanced technology is mainly based on the technology localization theory and the industrial upgrading of technological innovation theory in which technology seeks enterprises pay more attention to scientific and cultural factors.

4. Optimizing industrial structure. The investment motivation that optimizing industrial structure is relatively macro, according to the product life cycle theory and the international production compromise theory. In product growth stage and mature stage, the production technology is the main factor influence FDI. But during the recession period, overseas market scale is important influence factors, and the production cost is the key factor to influence the foreign direct investment. With the change of the product life cycle, host country's international production compromise theory covers most of the factors that affecting international direct investment. Enterprises perform FDI based on this motivation and focus on the host country's Economic environment factors, natural environmental factors, infrastructure factors, technological and cultural factors, political and legal factors.

Therefore, based on these four investment drivers and previous references, this study will focus on the relationship between seven factors and FDI inflows: market size, natural resource endowment, infrastructure, science and technology level, foreign trade level, financial environment, political environment to establish the conceptual framework as figure 1 shows. And the table 3 shows the ratios definition.

Table 3: Ratios definition

Ratios	Formulas description
FDI	Foreign direct investment
GDP	Gross domestic product
NER	Fuel, metal, ore exports (percentage of merchandise export)
IPG	Imports of goods (percentage of GDP)
FTS	Fixed telephone subscriptions (per 100 people)
PAN	Patent applications, non-residents
ER	Exchange rate
GS	Government stability

Market size Proxy variable: GDP (+)	Infrastructure Proxy variable: FTS (+)	Science and technology Proxy variable: PAN (-)
Natural resource endowments Proxy variable: NRE (+)	Foreign direct investment Proxy variable: FDI	Financial environment Proxy variable: ER (-)
Foreign trade Proxy variable: IPG (+)		Political environment proxy variable: GS (+)
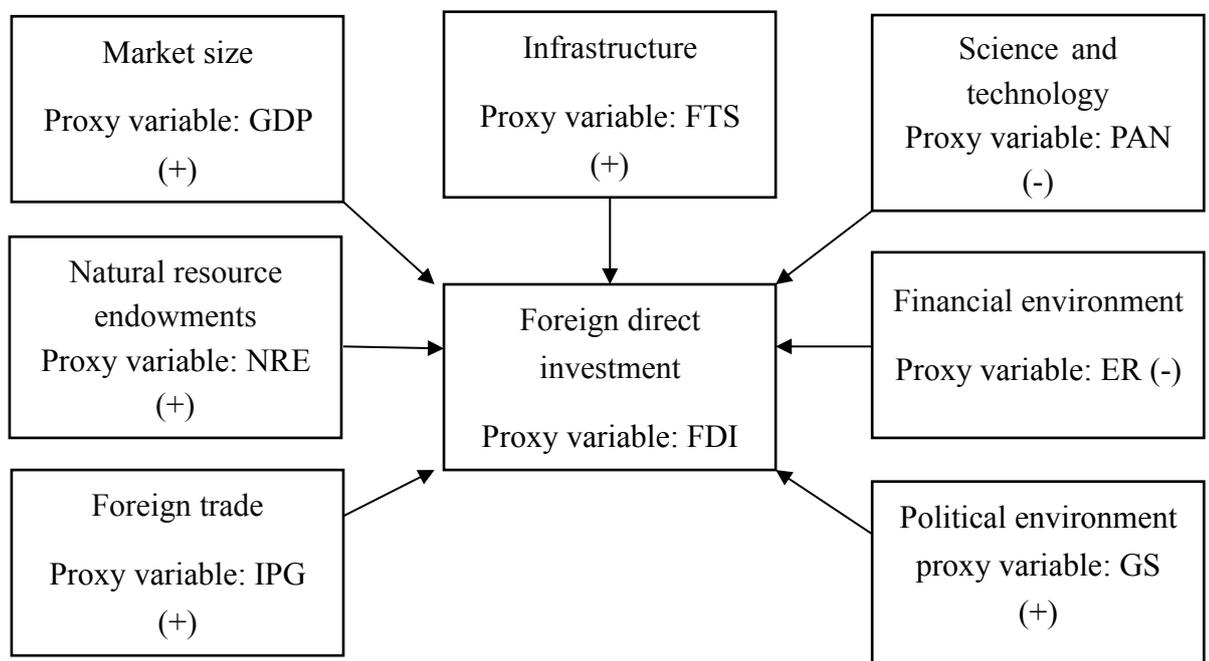
Figure 1: Conceptual framework

2.4 Hypothesis

Dependent variable: FDI

FDI flow and FDI stock also can be used to represent FDI situation. Because the stock index mainly reflects a long-term accumulation of FDI, which is not suitable to reflect the change of the investment environment. Therefore, the FDI inflow of the APEC member countries was selected as the dependent variable.

H1: According to previous scholars' study, the market size is very important for attracting foreign direct investment. For example, the market school's representative Christaller and Lorch believed that foreign investment should consider the market size, because the larger market size means there are rich human resources, and market searches cost reduction. so this study would like to based on empirical research to make clear how market size market size affects foreign direct investment in APEC members.

The host country's market size is an important factor that affecting FDI. GDP is a core indicator of system of national accounts, which reflects a country's (or regional) economic strength and market size. The United Nations System of National Accounts (often abbreviated as SNA or UNSNA) is an international standard system of national accounts, it can fully reflect the situation of a country's economic development. Therefore, this study used of GDP as a proxy variable for market size. Xiang (2009) believed that GDP negatively affects FDI, but Cheng and Ma (2007), Kolstad and Wiig (2010) believed that the GDP positively affects FDI.

Therefore, this study's hypothesis 1 is the APEC member countries' market size positively affects FDI.

H2: John (2002) believed that resources are the core in the international competition especially among the Multi-National Corporation. He suggested that investment countries could make up their resources through obtain host countries resources. With the rapid economic growth of searching and developing resources are become increasingly urgent, as the main purpose of foreign direct investment is to obtain the natural resources. On the one hand, it can ensure the stability of raw material source and meet the domestic demand, on the other hand, it can realize resources and energy supply security.

Natural resource endowment. With economy rapidly development, the seeking and developing resources have become increasingly urgent, obtain natural resources is the main motivation of international investor. On the one hand, it can ensure the stability of raw material source, on the other hand, it can meet the demand of domestic scarce resources, and achieve the foreign security resources and energy supply. Hu and Li (2008) believed that fuel, metal, ore exports (percentage of merchandise export) positively affects FDI. So using fuel, metal, ore exports (percentage of merchandise export) (NER) as a proxy variable of natural resource endowment for this study.

Therefore, the hypothesis 2 is the natural resources of the APEC member countries positively affects FDI.

H3: Foreign trade level. FDI and foreign trade are the complementary strategies, from which the enterprise can takes advantage of the trade to get information, then again carries on the direct investment. It can reduce the cost of direct investment (Johanson, 1997). Lall and Siddharthan (1982) and Caves (1996) believed that imports of goods positively affects FDI. So this study select imports of goods (percentage of GDP) (IPG) to reflect the foreign Trade level.

Therefore, the hypothesis 3 is the APEC member countries' foreign trade level positively affects FDI.

H4: Science and technology. Advanced science and technology means the good labor quality, high production efficiency and advanced management and technology and strong enterprise's profit. FDI can make up its own competitive disadvantage (Child, 2005), and improve its technology through technology spillover effect. So the study select PAN as the proxy variable of the host country's science and technology level.

Li and Yu (2011) believed that science and technology do not affect FDI. However, Guan and Yu (2007) believed that science and technology negatively affects FDI. Considering availability of data, this study using patent applications, nonresidents (PAN) as a proxy variable of science and technology.

Therefore, this study's hypothesis 4 is the APEC member countries' science and technology negatively affects FDI.

H5: Song (2008) believed that the host country's infrastructure affects foreign direct investment. If the host country has good infrastructure, it can provide the necessary material and technical conditions for business investment.Convenient transportation and communication can reduce costs and improve productivity efficiency. Duan (2010) believed that infrastructure positively affects FDI, the same as Zhang and Yong (2010). They use electricity consumption per capita, the total length of railway lines, fixed telephone and mobile phone users as a proxy for infrastructure, respectively. Considering availability of data, using fixed telephone subscriptions (per 100 people) (FTS) to measure the host country's infrastructure condition.

Therefore, this study's hypothesis 5 is the APEC member countries infrastructure positively affects FDI.

H6: Financial environment. A country's financial environment is very important for attract FDI. Froot and Stein (1991) found that the exchange rate is a major determinant of foreign direct investment outflows, they proposed a "relative wealth" theory, in which they believed exchange rate negatively affects FDI. However, Gross and Trevino (2002) believed that exchange rate positively affects FDI. Therefore, this study use exchange rate (ER) as the proxy variable of the financial environment.

Therefore, this study's hypothesis 6 is the APEC member countries financial environment negatively affects FDI.

H7: Buckley et al. (2007) deem FDI prefer to developing countries that system is poorer and political risk is high. He and Guo (2009) believe political environment positively affects FDI. Select government stability (GS) as the proxy variable of the political stability.

Therefore, this study's hypothesis 7 is the APEC members' political environment positively affects FDI.

CHAPTER 3

METHODOLOGY

This chapter focus on empirical analysis of the influencing factors of FDI in APEC member countries as statement in previous chapters. Selecting the panel data from 1985 to 2013 then using multiple linear regression and panel data regression to estimates APEC member countries GDP, NER, IPG, PAN, FTS, ER and GS as factors affects FDI. Finally, by using the dynamic analysis of the measurement to make clear how these factors impact on direction and intensity of FDI in APEC member countries.

3.1 Research design

There are four parts of the research design that will be describe specifically as follows:

At first, collecting relevant data or required data, include APEC member countries' inward foreign direct investment, gross domestic product, fuel, metal, ore exports percent of merchandise export, imports of goods and services percent of GDP, patent applications, nonresidents, fixed telephone subscriptions (per 100 people), exchange rate and government stability, then select the sample country, etc.

Secondly, using OLS to determine whether the related factors affect the FDI in each APEC member countries, and finally figure out how the related factors

affect the FDI. Next empirical analysis panel data to determine what factors affecting FDI in APEC member countries and how them impact on FDI.

Then analysis finance crises period's relevant data, to determine whether these factors affect the FDI in APEC member countries, and finally figure out how the related factors affect the FDI.

Finally, obtained the study results and analyze them, so that to puts forward the suggestion to APEC members to attract FDI. In addition, put forward the suggestion to foreign investors, to help them make investment decision more accurate.

It is important to note that factors affecting FDI are extensively and complex, so establishment the evaluation index system of influencing factors must follow the following principles:

Scientific principle. Each index should be established on the basis of science. Index should reflect the overall situation of the host country's investment environment systematically and comprehensively.

Independence principle. Each index needs to be independent to avoid repeated evaluation.

Availability principle. The indexes should be easy to quantify and can get the related data by statistics. Only in this way can ensure the entire index system is objective, comprehensive and accurate.

3.2 Population and sample

The population of this study are each APEC member countries annual FDI data, 21 APEC members GDP, NER, IPG, PAN, FTS, ER and GS during 1985-2013. This study will draw conclusions by analyzing these countries market size, natural resource endowment, infrastructure, foreign trade level, science and technology level, financial environment and political environment.

The sample of this study are the 10 sampling APEC member countries annual FDI data, and their GDP, NER, IPG, PAN, FTS, ER and GS during 1985-2013. They are Canada, Chile, China, Japan, Malaysia, Mexico, New Zealand, Philippines, Republic of Korea, Thailand. Because Indonesia, Peru, Australia, Vietnam, the Russian Federation, Singapore's relevant data are un-complete, it will affects the results of empirical tests. So this study removed data from above countries.

In addition, Hongkong and Taiwan are part of China, they can get a lot of investment from China every year. Compared with other APEC member countries, this will affect the results of empirical tests, the data of Hongkong and Taiwan are should be excluded.

In summary, this paper collect 10 countries 29 years data according to 8 variables. They are 290 GDP data, 290 NER data, 290 IPG data, 290 PAN data, 290 FTS data, 290 ER data, 290 GS data and 290 FDI data. In total 2,520 data were used in this study.

3.3 Data collection

This paper has collected Canada, Chile, China, Japan, Malaysia, Mexico, New Zealand, Philippines, Republic of Korea, Thailand in total 10 countries annual related data that during 1985-2013 were used in this study. Related data include foreign direct investment, gross domestic product, fuel, ores and metals exports percent of merchandise exports, imports of goods and services percent of GDP, patent applications, nonresidents, fixed telephone subscriptions (per 100 people), exchange rate and government stability, in total 8 variables were apply to empirical analysis.

Data sources are shown in the following table:

Table 4: Related data source table

variable	Source
Foreign direct investment (FDI)	UNCTAD database
Gross domestic product (GDP)	UNCTAD database
Fuel, metal, ore exports (NER) (percentage of merchandise export)	World Bank
Imports of goods and services (IPG) ((percentage of GDP)	World Bank
Patent applications, nonresidents (PAN)	World Bank
Fixed telephone subscriptions (FTS) (per 100 people)	World Bank
Exchange rate (ER)	World Bank
Government stability (GS)	International Country Risk Guide

3.4 Data Analysis

Analysis of data is a process of inspecting, cleansing, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making.

3.4.1 Model

3.4.1.1 linear regression model

In order to verify the above 7 hypothesis, this paper establishes a linear regression model to identify the determinants of foreign direct investment. Then substituted into the total sample data to calculated and determine what are the main factors affecting FDI in the APEC member countries, to verify the above seven hypotheses. And by comparing the regression coefficients to determine what is the most important factor and what factors are unimportant.

In addition, substituted each sample of APEC member countries related data respectively, to calculated what are the main factors influence the inward FDI, what factors are more active in each country. Finally recommendations were given to each country to better attract FDI. Last but not least, multiple linear regression model was applied to accessing factors affecting FDI in APEC member countries as following formula shows:

$$FDI_t = \beta_0 + \beta_1 GDP_t + \beta_2 NER_t + \beta_3 IPG_t + \beta_4 FTS_t + \beta_5 PAN_t + \beta_6 ER_t + \beta_7 GS_t + c \quad (1)$$

Where:

FDI = foreign direct investment ;

GDP = gross domestic product;

NER = fuel, metal, ore exports (percentage of merchandise export);

IPG = Imports of goods and services (percentage of GDP);

PAN = patent applications, nonresidents;

FTS = fixed telephone subscriptions (per 100 people);

ER i= exchange rate;

GS =Government stability;

β = the regression coefficient;

C = intercept;

t =year period starting from 1(1985) to 29(2013);

3.4.1.2 Models for panel data

Through the empirical analysis of panel data, it can be determined which factor has a great influence on FDI inward decline. It is important to find out key factors for APEC member countries in order to attract FDI during the global economic crisis.

Using Hausman test is easier to choose fixed effect model or a random effect model. Random effects (RE) is preferred under the null hypothesis due to

higher efficiency, while under the alternative fixed effects (FE) is at least consistent

and thus preferred to as the model in panel regression.

The equation for the fixed effects model is:

$$y_{it} = \beta_1 x_{it} + \alpha_i + \mu_{it} \tag{2}$$

Where:

$\alpha i(i = 1...n)$ is the unknown intercept for each entity (n entity-specific

intercepts).

y_{it} is the dependent variable FDI where i=entity and t=time.

x_{it} represents one independent variable.

β_1 is the coefficient for that independent variable.

μ_{it} is the error term.

Fixed-effects will not work well with data for which within-cluster

variation is minimal or for slow changing variables over time. Another way to see

the fixed effects model is by using binary variables. So the equation for the fixed

effects model becomes:

$$y_{it} = \beta_0 + \beta_1 x_{1,it} + ... + \beta_k x_{k,it} + y_2 e_2 + ... + y_n e_n + \mu_{it} \tag{3}$$

Where:

y_{it} is the dependent variable FDI where i=entity and t=time.

$x_{k,it}$ represents independent variables.

β_k is the coefficient for the independent variables.(GDP, NER, IPG, PAN,

ER, FTS, GS)

μ_{it} is the error term

e_n is the entity n. Entity are Canada, Chile, China, Japan, Korea, Malaysia, Mexico, Philippines, New Zealand and Thailand.

y_2 is the coefficient for the binary repressors (entities)

And the random effect model is:

$$y_{it} = \beta x_{it} + \alpha + \mu_{it} + \varepsilon_{it} \tag{4}$$

3.4.2 Research tool

This study will use EViews as the research tool, it is a statistical package for Windows, which used mainly for time-series oriented econometric analysis. It also can be used for general statistical analysis and econometric analyses, such as cross-section and panel data analysis and time series estimation and forecasting. In this research, there will be run multiple linear regression and panel data regression on Eviews.

3.4.3 Stationarity detection

Economic and financial data encountered in practice are mostly non-stationary time series, and non-stationary world series at various time points of the random sequences are different, thus it is difficult to grasp the time series of the whole random by the information of the time series.

The unit root test is used for checking the stationary qualification before using the data because the non-stationary variables will influence the behavior and properties of a series and result in a spurious regression. If the variable is non-stationary, it should go for first difference. If the stationary cannot be found at the first differences that may require further difference.

In linear regression, by using ADF test to detect stationary.

In panel regression, by using IPS W-statistic, LLC test, PP-Fisher test and ADF-Fisher test to detect stationary, if the original unit root hypothesis declined in these test said that this sequence is stable, unstable and vice versa.

The unit root test is used for checking the stationary qualification before using the data because the non-stationary variables will influence the behavior and properties of a series and result in a spurious regression. If the variable is non-stationary, it should move to first difference. If the stationary cannot be found at the first differences that may require further difference.

3.4.4 Descriptive statistics

Descriptive statistics are statistics that quantitatively describe or summarize features of a collection of information. Descriptive statistics are distinguished from inferential statistics (or inductive statistics).In that descriptive statistics aim to summarize a sample, rather than use the data to learn about the population that the sample of data is thought to represent. This generally means

that descriptive statistics, unlike inferential statistics, are not developed on the basis of probability theory. Even when a data analysis draws its main conclusions using inferential statistics, descriptive statistics are generally also presented.

Some measures are commonly used to describe a data set are measures of central tendency and measures of variability or dispersion. Measures of central tendency include the mean, median and mode, while measures of variability include the standard deviation (or variance), the minimum and maximum values of the variables, kurtosis and skewness.

3.4.5 Multicollinearity

Multicollinearity is a state of very high inter correlations or inter-associations among the independent variables. It is therefore a type of disturbance in the data, and if present in the data the statistical inferences made about the data may not be reliable. The certain reasons why multicollinearity occurs are an inaccurate use of dummy variables, the inclusion of a variable which is computed from other variables in the data set and the same kind of variable.

Multicollinearity can result in several problems. Such as the partial regression coefficient due to multicollinearity may not be estimated precisely, the standard errors are likely to be high. Multicollinearity makes it tedious to assess the relative importance of the independent variables in explaining the variation caused by the dependent variable.

This paper would like through correlation matrix to detect multicollinearity between dependent variable. A correlation greater than 0.8 is generally described as strong, whereas a correlationless than 0.5 is generally described as weak.

3.4.6 Model significance

Both the Joint F-Statistic and Joint Wald Statistic are measurement of overall model statistical significance. The Joint F-Statistic is trustworthy only when the Koenker (BP) statistic (see below) is not statistically significant. If the Koenker (BP) statistic is significant, it should be consult the Joint Wald Statistic to determine overall model significance. The null hypothesis for both of these tests is that the explanatory variables in the model are not effective. For a 95% confidence level, a p-value (probability) smaller than 0.05 indicates a statistically significant model.

3.4.7 Model performance

Both the multiple r-squared and adjusted r-Squared values are measurement of model performance. Possible values range from 0.0 to 1.0. The adjusted r-Squared value is always a bit lower than the Multiple R-Squared value because it reflects model complexity (the number of variables) as it relates to the data, and consequently is a more accurate measure of model performance. Adding

an additional explanatory variable to the model will likely increase the Multiple R-Squared value, but it will decrease the adjusted r-squared value.

3.4.8 Autocorrelation

If the expected value of the random error is related, it can be said that, there is autocorrelation or serially correlated between the random error term. It's possible to forecast the value of the residuals through this pattern. If there is sign of autocorrelation, it is possible to determine an outline in the residuals. Specially, using Durbin Watson statistic to test autocorrelation. The Durbin Watson statistic is a number that tests for autocorrelation in the residuals from a statistical regression analysis. The Durbin-Watson statistic is always between 0 and 4. A value of 2 means that there is no autocorrelation in the sample. Values approaching 0 indicate positive autocorrelation and values toward 4 indicate negative autocorrelation.

3.4.9 F-test

In general, an F-test in regression is used to compares the fits of different linear models. Unlike t-tests that can assess only one regression coefficient at a time, the F-test can assess multiple coefficients simultaneously. The F-test of the overall significance is a specific form of the F-test. It compares a model with no predictors to the model that specify. A regression model that contains no predictors is also

known as an intercept-only model.

The hypotheses for the F-test of the overall significance are as follows:

Null hypothesis: the fit of the intercept-only model and the model are equal.

Alternative hypothesis: the fit of the intercept-only model is significantly reduced compared to the model.

In the intercept-only model, all of the fitted values equal to the mean of the response variable. Therefore, if the P value of the overall F-test is significant, the regression model predicts the response variable better than the mean of the response.

CHAPTER 4

EMPIRICAL RESULTS

This chapter presented the empirical result of the factors affecting FDI in APEC member countries. This research used the annual data during the period of 1985-2013 for all factors include dependent variables FDI stocks and independent variables including GDP, NER, IPG, PAN, FTS, ER and GS.

4.1 Multiple regression analysis

This section will perform multiple regression for each sample of APEC member country. The research methods include unit root test results, descriptive statistics, correlation test, DW test, F test, and regression. Because the regression results for Canada, China, Malaysia, and Mexico did not pass the F test, the analysis was not carried out for these countries.

4.1.1 Multiple regression analysis (Chile)

4.1.1.1 ADF unit root test (Chile)

Unit root detection was performed according to chapter 3 introduces, finally result shows as following tables.

Table 5: ADF test results (Chile)

Variable	ADF test	t-Statistic			Prob.	Result
		1%	5%	10%		
FDI	4.5918	-3.6999	-2.9763	-2.6274	1.0000	No-stationary
D(FDI)	-7.1182	-4.3393	-3.5875	-3.2292	0.0000***	Stationary
GDP	2.4040	-3.6892	-2.9719	-2.6251	0.9999	No-stationary
D(GDP)	-3.2565	-3.6999	-2.9763	-2.6274	0.0275**	Stationary
NER	-2.0200	-4.3240	-3.5806	-3.2253	0.5656	No-stationary
D(NER)	-4.1414	-4.3393	-3.5875	-3.2292	0.0155**	Stationary
IPG	-4.5975	-4.3240	-3.5806	-3.2253	0.0053***	Stationary
FTS	-0.6670	-4.3393	-3.5875	-3.2292	0.9656	No-stationary
D(FTS)	-2.0375	-2.6534	-1.9539	-1.6096	0.0418**	Stationary
PAN	-1.5389	-3.7529	-2.9981	-2.6388	0.4965	No-stationary
D(PAN)	-4.0303	-3.7529	-2.9981	-2.6388	0.0054***	Stationary
ER	-2.0076	-3.6999	-2.9763	-2.6274	0.2820	No-stationary
D(ER)	-2.8622	-3.6999	-2.9763	-2.6274	0.0632*	Stationary
GS	-2.9188	-3.6892	-2.9719	-2.6251	0.0558**	Stationary

Note: ***, ** and * indicates significance at 1%, 5% and 10% level respectively

Table 5 shows results of unit root test that the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS. After ADF test, GS stationary in significant level is 0.1, IPG stationary in significant level is 0.01. Other variables are greater than 0.1, which means those variables are no-stationary and should go to process the first differencing. The probability of D(FDI), D(GDP), D(IPG), D(NER), D(PAN), and D(ER) are less than 0.01, the probability of D(FTS) is less than 0.05.

By using ADF, the result showed that logarithm series of FDI, GDP, NER, FTS, PAN, ER are non-stationary but the first difference is stationary. Thus those data after first difference is stationary and can be used to empirical analysis.

4.1.1.2 Descriptive statistics (Chile)

Descriptive statistics result of Chile original data are shown in this table:

Table 6: Descriptive statistics of ordinal data (Chile)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
ER	0.002576	0.0021	0.0062	0.0014	0.001158	29
FDI	61066.23	42311.3	198627.9	11987.88	55782.22	29
FTS	15.25517	18.8	22.2	4.4	6.630481	29
GDP	100733.6	75769.01	277078.7	16486.01	77552.14	29
GS	7.490345	8	10.71	2	2.096564	29
IPG	0.246207	0.25	0.35	0.19	0.034165	29
NER	0.532483	0.535	0.668	0.424	0.080657	29
PAN	1843.483	2076	3421	550	946.2094	29

Table 6 reports consolidated descriptive statistics of original data. Descriptive statistics result of Chile testing data are shown in this table which include the mean, maximum, minimum, and observed values of the raw data. Processed data of consolidated descriptive, such as mean, maximum, minimum, etc. were reported in table 7 as follows.

Table 7: Descriptive statistics (Chile)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI)	6665.716	3031.4	35173.76	-5845.874	9714.241	28
D(GDP)	9306.882	6439.37	45581.31	-7669.71	12583.99	28
D(NER)	-0.000179	-0.002	0.112	-0.079	0.043026	28
IPG	0.248214	0.25	0.35	0.19	0.033004	28
D(FTS)	0.492857	0.25	3.4	-1.6	1.080099	28
D(ER)	-0.00015	-0.0001	0.0002	-0.001	0.000269	28
D(PAN)	77.92857	114	1705	-2047	573.9717	28
GS	7.686429	8	10.71	2	1.84447	28

4.1.1.3 Multicollinearity test (Chile)

Multicollinearity means independent variables are highly correlated to each other. In regression analysis, it's an important assumption that regression model should not be faced with a problem of multicollinearity. If two explanatory variables are highly correlated, it's hard to tell which has an effect on the dependent variable. Follow table shows correlation matrix of the independent variables:

Table 8: Correlation matrix of the independent variables (Chile)

	D(GDP)	D(NER)	IPG	D(FTS)	D(ER)	D(PAN)	GS
D(GDP)	1						
D(NER)	0.471	1					
IPG	0.3733	-0.1747	1				
D(FTS)	-0.3504	-0.204	-0.2591	1			
D(ER)	0.6052	0.4976	0.5533	-0.1034	1		
D(PAN)	0.3775	-0.0575	0.1491	0.1333	0.1299	1	
GS	-0.0855	0.2187	0.0793	0.3663	0.5262	-0.1443	1

Correlation coefficients can vary numerically between 0.0 and 1.0. The closer the correlation is to 1.0, the stronger the relationship between the two variables. A correlation of 0.0 indicates the absence of a relationship. If the correlation coefficient is –0.80, which indicates the presence of a strong relationship. According to the table there are no strong relationship between independent variables.

4.1.1.4 Regression result and interpretation

The regression results are as follow:

Table 9: Regression results of D(FDI) (Chile)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	5520275	11014468	0.501184	0.6223
D(PAN)	-3.551524	2.542203	-1.397026	0.1794
D(FTS)	-993.8032	1359.818	-0.730836	0.4743
D(NER)	929.1252	46052.76	0.020175	0.9841
GS	-205.045	1056.684	-0.194046	0.8483
IPG	61044.09	60911.83	1.002171	0.3295
D(GDP)	0.37953	0.179915	2.109499	0.0492**
C	-8869.667	20835.64	-0.425697	0.6754
AR(1)	-0.533333	0.212673	-2.507764	0.022
R-squared	0.603595			
F-statistic	3.426012			
Prob(F-statistic)	0.014286**			
DW stat	2.064842			

The estimation equation is:

$$D(FDI) = C(1) * D(GDP) + C(2) * D(NER) + C(3) * IPG + C(4) * D(FTS) \quad (5)$$
$$+ C(5) * D(PAN) + C(6) * D(ER) + C(7) * GS + C(8) + [AR(1) = C(9)]$$

The substituted coefficients are:

$$D(FDI) = 0.3795 * D(GDP) + 929.1252 * D(NER) + 61044.08867 * IPG \quad (6)$$
$$- 93.8032 * D(FTS) - 3.5515 * D(PAN) + 5520275.0500 * D(ER)$$
$$- 205.0450 * GS - 8869.6665 + [AR(1) = -0.5333]$$

F-Statistic = 3.4260

Prob.(F-Stat) = 0.0143**

Adjusted R2 = 0.6036

** = statistical significance at the 0.05 level

From equation, Prob. (F-Stat) is statistically significant at the 0.05 level, indicating that overall 7 independent variables produce the probability of error. A significant influence is 0.0143 on the dependent variable. All the 7 independent variables help explain the change in foreign direct investment 60.36%.

The result showed that variables D(GDP) significant in 0.5 level, others variables are no significant effect on D(FDI). It refers market size is the important factors that affecting FDI in Chile. Wherein, GDP increase 5%, inflow FDI will reduce 0.37953%.

4.1.2 Multiple regression analysis (Japan)

4.1.2.1 ADF unit root test (Japan)

Unit root detection result shows as following tables 10:

Table 10: ADF test results (Japan)

Variable	ADF test	t-Statistic			Prob.	Result
		1%	5%	10%		
FDI	-0.3110	-3.6892	-2.9719	-2.6251	0.9112	No-stationary
D(FDI)	-3.4258	-3.6999	-2.9763	-2.6274	0.0188**	Stationary
GDP	-2.4952	-3.6999	-2.9763	-2.6274	0.1277	No-stationary
D(GDP)	-3.0220	-3.6999	-2.9763	-2.6274	0.0454**	Stationary
NER	0.9283	-3.6892	-2.9719	-2.6251	0.9944	No-stationary
D(NER)	-4.0832	-3.6999	-2.9763	-2.6274	0.0040***	Stationary
IPG	-0.0277	-3.6892	-2.9719	-2.6251	0.9481	No-stationary
D(IPG)	-6.1916	-3.6999	-2.9763	-2.6274	0.0000***	Stationary
FTS	-2.5660	-3.6892	-2.9719	-2.6251	0.1117	No-stationary
D(FTS)	-5.2325	-3.6999	-2.9763	-2.6274	0.0002***	Stationary
PAN	-1.3065	-3.6892	-2.9719	-2.6251	0.6122	No-stationary
D(PAN)	-7.1155	-3.6999	-2.9763	-2.6274	0.0000***	Stationary
ER	-2.5561	-3.6999	-2.9763	-2.6274	0.1142	No-stationary
D(ER)	-3.8131	-3.7115	-2.9810	-2.6299	0.0079***	Stationary
GS	-1.9376	-3.6892	-2.9719	-2.6251	0.3112	No-stationary
D(GS)	-4.8598	-3.6999	-2.9763	-2.6274	0.0006***	Stationary

Note: ***, ** and * indicates significance at 1%, 5% and 10% level respectively

Table 10 shows the results of unit root test that the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS respectively. After ADF test, all of these variables are greater than 0.1, which means that these variables are no-stationary and should be move to process of the first difference. The probability of D(FTS), D(IPG), D(NER), D(PAN), D(GS) and D(ER) are less than 0.01, the probability of D(FDI), D(GDP) are less than 0.05.

The results that after ADF test shows that series of FDI, GDP, NER, IPG, FTS, PAN, ER and GS are non-stationary, but after first-difference these data were stationary. It means D(FDI), D(GDP), D(FTS), D(IPG), D(NER), D(PAN), D(GS) and D(ER) can be used to perform empirical analysis.

4.1.2.2 Descriptive statistics (Japan)

Descriptive statistics result of Japan original data are shown in this table:

Table 11: Descriptive statistics of ordinal data (Japan)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	75995.39	46115.46	225787.4	4743	75035.64	29
GDP	4196454	4356750	5957250	1384532	1073480	29
IPG	0.092414	0.08	0.17	0.05	0.034502	29
PAN	43167.07	46926	62793	21940	14666.11	29
NER	0.023655	0.017	0.052	0.011	0.01373	29
ER	0.008759	0.0086	0.0125	0.0042	0.001807	29
GS	7.657586	7.92	10.21	4.58	1.781694	29
FTS	46.55862	47.6	52.6	37.8	4.421742	29

Table 11 reports consolidated descriptive statistics of original data, descriptive statistics result of Japan testing data are shown in this table that including the mean, maximum, minimum, and observed values of the raw data.

Table 12: Descriptive statistics (Japan)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI)	5927.396	2475.5	70519.44	-35042.31	17540.19	28
D(GDP)	125868.9	307296.5	666529	-1048387	429129.5	28
D(PAN)	1114.357	520	22091	-11584	6541.162	28
D(FTS)	0.3643	-0.25	14.4	-3.8	3.1239	28
D(NER)	0.001429	0.0005	0.012	-0.004	0.003259	28
D(ER)	0.000214	0.0005	0.0017	-0.0023	0.000932	28
D(GS)	0.013571	-0.27	2.38	-3	1.294862	28
D(IPG)	0.002857	0.01	0.02	-0.05	0.015362	28

Table 12 reports consolidated descriptive statistics of processed data, including the mean, maximum, minimum, and observed values of the processed data.

4.1.2.3 Multicollinearity test (Japan)

Correlation matrix of the independent variables are as follows:

Table 13: Correlation matrix of the independent variables (Japan)

	D(GDP)	D(PAN)	D(FTS)	D(NER)	D(ER)	D(GS)	D(IPG)
D(GDP)	1						
D(PAN)	-0.2922	1					
D(FTS)	0.1886	-0.1627	1				
D(NER)	-0.1711	0.1322	-0.5506	1			
D(ER)	0.9645	-0.3114	0.2605	-0.1629	1		
D(GS)	-0.269	0.3088	0.1	-0.205	-0.232	1	
D(IPG)	-0.2579	0.2008	-0.7187	0.522	-0.3831	0.0529	1

Table 13 shows correlation among D(GDP) and D(ER)'s is high, OLS has very little information to estimate D(FDI). This makes this study relatively uncertain about estimate and it's hard to tell which has an effect on the dependent variable Thus, it means that these two variables can not be used to do regression test at the same time.

4.1.2.4 Regression result and interpretation (Japan)

Correlation coefficient between D(GDP) and D(ER) greater than 0.8, which means the correlation is too strong, so only use one of them to run the OLS regression. If results significantly represents both two variables have statistically significant, otherwise it means these two variables do not have statistical significance. This article uses D(ER) and other variables to perform OLS regression. The results of OLS regression are as follows:

Table 14: Regression results of D(FDI) (Japan)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	12216206	2986635	4.090291	0.0006***
D(PAN)	-0.016157	0.28321	-0.057051	0.9551
D(FTS)	-1116.884	1127.939	-0.990199	0.3345
D(NER)	2224699	859722.6	2.587694	0.0181**
D(GS)	-20.18247	1779.183	-0.011344	0.9911
D(IPG)	90449.05	231260.2	0.391114	0.7001
C	315.8459	6254.267	0.050501	0.9603
AR(1)	0.606793	0.237772	2.551991	0.0195
R-squared	0.68354			
F-statistic	5.862741			
Prob(F-statistic)	0.000983***			
DW stat	1.4083			

The estimation equation is:

$$D(FDI) = C(1) * D(NER) + C(2) * D(IPG) + C(3) * D(FTS) + C(4) * D(PAN) \quad (7)$$
$$+ C(5) * D(ER) + C(6) * D(GS) + C(7) + [AR(1) = C(8)]$$

The substituted coefficients are:

$$D(FDI) = 2224698.9368 * D(NER) + 90449.0518 * D(IPG) \quad\quad (8)$$
$$-1116.8841 * D(FTS) - 0.01615 * D(PAN) + 12216206.2071 * D(ER)$$
$$-20.1825 * D(GS) + 315.8459 + [AR(1) = 0.6068]$$

F-Statistic = 5.8627

Prob.(F-Stat) = 0.0010***

Adjusted R2 = 0.6835

*** = statistical significance at the 0.01 level

From equation, Prob. (F-Stat) is statistically significant at the 0.01 level indicating that at least one of the independent variables examined affects foreign direct investment significantly. All the 6 independent variables help explain the change in foreign direct investment 68.35%. According to the statistical significance of the coefficients of the independent variables, fuel, metal, ore exports (percentage of merchandise export) affect foreign direct investment at the 0.05 level. Since correlations between D(GDP) and D(ER) has multicollinearity problem, so both of exchange rate and gross domestic product affect foreign direct investment at the 0.01 level.

Wherein, NER increase 5%, inflow FDI will reduce 2,224,699 million dollars. The scarcity of natural resources in Japan will limit the international investment. Besides, ER increase 1%, inflow FDI will reduce 12216206 million

dollars. As the yen continued to devalue, investors worry about the return on investment is low, so the Japanese should be appropriate appreciation of the yen to give investor confidence.

4.1.3 Multiple regression analysis (Korea)

4.1.3.1 ADF unit root test (Korea)

Unit root detection result shows as following tables 15:

Table 15: ADF test results (Korea)

Variable	ADF test	t-Statistic			Prob.	Result
		1%	5%	10%		
FDI	1.5910	-3.6892	-2.9719	-2.6251	0.9991	No-stationary
D(FDI)	-5.0502	-3.6999	-2.9763	-2.6274	0.0004***	Stationary
GDP	0.0843	-3.6892	-2.9719	-2.6251	0.9587	No-stationary
D(GDP)	-4.9757	-3.7115	-2.9810	-2.6299	0.0005***	Stationary
NER	-2.3667	-3.6892	-2.9719	-2.6251	0.1597	No-stationary
D(NER)	-5.0802	-3.6999	-2.9763	-2.6274	0.0003***	Stationary
IPG	-0.8760	-3.6892	-2.9719	-2.6251	0.7808	No-stationary
D(IPG)	-6.9555	-3.6999	-2.9763	-2.6274	0.0000***	Stationary
FTS	-1.9510	-3.6892	-2.9719	-2.6251	0.3055	No-stationary
D(FTS)	-4.4390	-3.6999	-2.9763	-2.6274	0.0017***	Stationary
PAN	-0.7053	-3.6892	-2.9719	-2.6251	0.8295	No-stationary
D(PAN)	-4.4666	-3.6999	-2.9763	-2.6274	0.0016***	Stationary
ER	-1.3465	-3.6892	-2.9719	-2.6251	0.5935	No-stationary
D(ER)	-4.5380	-3.6999	-2.9763	-2.6274	0.0013***	Stationary
GS	-2.7558	-3.6892	-2.9719	-2.6251	0.0776*	Stationary

Note: ***, ** and * indicates significance at 1%, 5% and 10% level respectively

Table 15 shows that by using results of unit root test, that the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS. After ADF test, GS stationary in significant level at 0.1. Others variables are greater than 0.1, which means that those variables are no-stationary and should move to process the first differencing. The probability of D(FDI), D(GDP), D(NER), D(FTS), D(PAN), D(IPG) and D(ER) are less than 0.01.

By using ADF, the results show that data of FDI, GDP, NER, FTS, PAN, IPG, ER are non-stationary but data after first difference are stationary. It means D(FDI), D(GDP), D(FTS), D(IPG), D(NER), D(PAN)and D(ER) can be used to perform empirical analysis.

4.1.3.2 Descriptive statistics (Korea)

Descriptive statistics results of Korea original data are shown in following table:

Table 16: Descriptive statistics of ordinal data (Korea)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	57239.55	41850	180859.7	1803.286	55737.47	29
GDP	625748.6	560485.2	1305605	103729.9	359475.7	29
IPG	0.291379	0.26	0.44	0.21	0.065122	29
PAN	26722.86	25325	44611	7883	11626.17	29
NER	0.080862	0.072	0.178	0.028	0.03901	29
ER	0.001052	0.001	0.0015	0.0007	0.000223	29
GS	7.541034	7.67	10	4.67	1.189644	29
FTS	44.25862	47.4	61.6	16.1	13.51292	29

Table 16 reports consolidated descriptive statistics of original data. Including the mean, maximum, minimum, and observed values of the raw data are shown as following table:

Table 17: Descriptive statistics (Korea)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI)	6394.872	4797.2	27211.9	-27235	11206.85	28
D(GDP)	42924.11	49444.44	192564.4	-184003.3	79852.81	28
D(PAN)	1311.714	1960	6527	-7311	2579.411	28
D(FTS)	1.625	1.9	11.8	-3.5	2.808667	28
D(NER)	0.00275	0.009	0.027	-0.148	0.032172	28
D(ER)	-7.14E-06	0	0.0002	-0.0004	0.000121	28
GS	7.560357	7.71	10	4.67	1.206831	28
D(IPG)	0.003214	0	0.11	-0.07	0.032779	28

Table 17 reports consolidated descriptive statistics of processed data. including the mean, maximum, minimum, and observed values of the processed data.

4.1.3.3 Multicollinearity test (Korea)

The results show that the correlation coefficient between the variables is not greater than 0.8, which means there is no serious correlation between the variables. Therefore, all of the variables can perform a regression at the same time.

The test results of multicollinearity are as following:

Table 18: Correlation matrix of the independent variables (Korea)

	D(GDP)	D(PAN)	D(FTS)	D(NER)	D(ER)	GS	D(IPG)
D(GDP)	1						
D(PAN)	0.4707	1					
D(FTS)	0.0133	-0.3378	1				
D(NER)	0.066	0.27	-0.038	1			
D(ER)	0.7948	0.4296	0.1633	0.1909	1		
GS	-0.3116	-0.0546	0.2241	0.0418	-0.2988	1	
D(IPG)	0.1409	0.3984	-0.1337	0.3151	0.0525	0.0302	1

4.1.3.4 Regression result and interpretation (Korea)

The regression results are as follow:

Table 19: Regression results of D(FDI) (Korea)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP)	0.05082	0.037337	1.361127	0.1903
D(PAN)	-0.136958	0.936371	-0.146265	0.8853
D(FTS)	-520.8707	743.8849	-0.700203	0.4928
D(NER)	30927.18	52491.97	0.589179	0.5631
D(ER)	4932170	24958207	0.197617	0.8456
GS	1759.217	1878.888	0.936307	0.3615
D(IPG)	-272521	54294.47	-5.019315	0.0001***
C	-6346.039	14265.28	-0.444859	0.6617
AR(1)	0.356473	0.224937	1.58477	0.1304
R-squared	0.622513			
F-statistic	3.710478			
Prob(F-statistic)	0.009937***			
DW stat	2.0965			

The estimation equation is:

$$D(FDI) = C(1) * D(GDP) + C(2) * D(NER) + C(3) * D(IPG) + C(4) * D(FTS) \quad (9)$$
$$+ C(5) * D(PAN) + C(6) * D(ER) + C(7) * GS + C(8) + [AR(1) = C(9)]$$

The substituted coefficients are:

$$D(FDI) = 0.05082 * D(GDP) + 30927.1823 * D(NER) - 272521.0446 * D(IPG) \quad (10)$$
$$- 520.8707 * D(FTS) - 0.1370 * D(PAN) + 4932169.5665 * D(ER)$$
$$+ 1759.2166 * GS - 6346.0393 + [AR(1) = 0.3565]$$

F-Statistic = 3.7105

Prob.(F-Stat) = 0.0010***

Adjusted R2 = 0.6225

*** = statistical significance at the 0.01 level

From equation, Prob. (F-Stat) is statistically significant at the 0.01 level indicating that at least one of the independent variables examined affects foreign direct investment significantly. All the 7 independent variables help explain the change in foreign direct investment 62,25%. According to the statistical significance of the coefficients of the independent variables, IPG affect FDI at the 0.01 level.

The result showed that foreign trade is the most important factor affecting FDI in Korea. Wherein, IPG increase 1%, inflow FDI will reduce 272,521 million dollars. The reason may be that South Korea is a small-size country and may have the weakness of natural resources, over-dependence on foreign trade, imperfect industrial chain and incomplete industrial system. Therefore, Korea should adjust its industrial structure and improve its industrial system, so that attract foreign investment.

4.1.4 Multiple regression analysis (New Zealand)

4.1.4.1 ADF unit root test (New Zealand)

Unit root detection results show as following tables 20:

Table 20: ADF test results (New Zealand)

Variable	ADF test	t-Statistic			Prob.	Result
		1%	5%	10%		
FDI	0.1771	-3.6892	-2.9719	-2.6251	0.9660	No-stationary
D(FDI)	-5.8765	-3.6999	-2.9763	-2.6274	0.0000***	Stationary
GDP	1.2999	-3.6892	-2.9719	-2.6251	0.9980	No-stationary
D(GDP)	-4.0870	-3.6999	-2.9763	-2.6274	0.0040***	Stationary
NER	-2.2475	-3.6892	-2.9719	-2.6251	0.1951	No-stationary
D(NER)	-4.7713	-3.6999	-2.9763	-2.6274	0.0007***	Stationary
IPG	-2.8737	-3.6892	-2.9719	-2.6251	0.0612*	Stationary
FTS	-1.5486	-3.6892	-2.9719	-2.6251	0.4948	No-stationary
D(FTS)	-3.8573	-3.6999	-2.9763	-2.6274	0.0069***	Stationary
PAN	-2.6959	-3.6892	-2.9719	-2.6251	0.0873*	Stationary
ER	-1.1266	-3.6892	-2.9719	-2.6251	0.6908	No-stationary
D(ER)	-4.2332	-3.6999	-2.9763	-2.6274	0.0028***	Stationary
GS	-1.9687	-3.6892	-2.9719	-2.6251	0.2981	No-stationary
D(GS)	-4.2072	-3.6999	-2.9763	-2.6274	0.0030***	Stationary

Note: ***, ** and * indicates significance at 1%, 5% and 10% level respectively

Table 20 shows that by using unit root test, the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS. After ADF test, IPG and PAN are stationarity in significant level at 0.1, others variables are greater than 0.1.It means variables are non-stationary besides IPG and PAN, so these non-stationary variables should move to process the first-difference. The probability are less than 0.01 among D(FDI), D(GDP), D(GS), D(NER), D(FTS), and D(ER).

After ADF test, the result shows that series of FDI, GDP, NER, FTS, GS, ER are non-stationary, but after first-difference these data were stationary. It means D(FDI), D(GDP), D(FTS), IPG, D(NER), PAN, D(GS) and D(ER) can be used to perform empirical analysis.

4.1.4.2 Descriptive statistics

Descriptive statistics result of New Zealand original data are shown in following table:

Table 21: Descriptive statistics of ordinal data (New Zealand)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	32078.15	31507.18	76173.92	2042.901	22292.4	29
GDP	82681.16	63918.7	190690.9	24680.31	47373.29	29
IPG	0.218193	0.2184	0.2643	0.1625	0.021359	29
PAN	4591.69	4803	8259	1866	1345.58	29
NER	0.076069	0.07	0.117	0.057	0.013949	29
ER	0.6174	0.5882	0.8333	0.4167	0.107274	29
GS	7.725862	8.29	10.33	4.08	1.703214	29
FTS	43.77241	43.3	48	39.6	2.413636	29

Table 21 reports consolidated descriptive statistics of original data, including the mean, maximum, minimum, and observed values of the raw data as following table shows.

Table 22 reports consolidated descriptive statistics of processed data, including the mean, maximum, minimum, and observed values of the processed data. Table as following:

Table 22: Descriptive statistics (New Zealand)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI)	2647.536	2908.331	12466.48	-14753.62	5636.208	28
D(GDP)	5928.95	5525.33	25707.72	-11941.61	10102.54	28
PAN	4649.714	4851.5	8259	1866	1332.812	28
D(FTS)	0.0536	0.2	2.4	-2.3	1.003137	28
D(NER)	0	0.001	0.018	-0.032	0.011418	28
D(ER)	0.011904	0	0.1337	-0.1404	0.063344	28
D(GS)	-0.017857	0.13	2.87	-3.75	1.235327	28
IPG	0.217314	0.2175	0.2643	0.1625	0.021211	28

4.1.4.3 Multicollinearity test (New Zealand)

The results of multicollinearity test as following.

Table 23: Correlation matrix of independent variables (New Zealand)

	D(GDP)	PAN	D(FTS)	D(NER)	D(ER)	D(GS)	IPG
D(GDP)	1						
PAN	0.0329	1					
D(FTS)	-0.4355	-0.3591	1				
D(NER)	0.1583	0.0897	-0.2736	1			
D(ER)	0.8011	-0.0514	-0.2179	0.1551	1		
D(GS)	-0.0842	0.0956	0.3224	-0.475	0.1069	1	
IPG	-0.1897	0.4411	-0.3993	0.1689	-0.3148	-0.0876	1

The results shows correlation among D(GDP) and D(ER) is greater than 0.8, OLS has very little information to estimate D(FDI). This makes this study relatively uncertain about estimate and it's hard to tell which has an effect on the dependent variable. Thus, it means that these two variables can not be used to do regression test at the same time.

4.1.4.4 Regression result and interpretation

Correlation coefficient between D(GDP) and D(ER) greater than 0.8, which means the correlation is too strong, so only use one of them to run the OLS regression. If results significantly represents both two variables have statistically significant, otherwise it means these two variables do not have statistical significance. This article uses D(ER) and other variables to perform OLS regression. The results of OLS regression are as follows:

Table 24: Regression results of D(FDI) (New Zealand)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PAN	0.911185	0.773586	1.177872	0.2534
D(FTS)	1268.066	1515.543	0.836707	0.4132
D(NER)	-262632.2	99357.5	-2.643306	0.0160**
D(GS)	-1548.639	1066.297	-1.452352	0.1627
IPG	-19442.49	55224.57	-0.352062	0.7287
D(ER)	47976.21	19786.32	2.424715	0.0255**
C	2110.389	12837.45	0.164393	0.8712
AR(1)	-0.468399	0.230127	-2.035396	0.0560
R-squared	0.446652			
F-statistic	2.190918			
Prob(F-statistic)	0.082513*			
DW stat	1.9578			

The estimation equation is:

$$D(FDI) = C(1) * D(NER) + C(2) * IPG + C(3) * D(FTS) + C(4) * PAN \quad (11)$$
$$+ C(5) * D(ER) + C(6) * D(GS) + C(7) + [AR(1) = C(8)]$$

The substituted coefficients are:

$$D(FDI) = -262632.2318 * D(NER) - 19442.4870 * IPG \quad (12)$$
$$+ 1268.0660 * D(FTS) + 0.9112 * PAN + 47976.2060 * D(ER)$$
$$- 1548.6388 * D(GS) + 2110.3885 + [AR(1) = -0.4684]$$

F-Statistic = 2.1909

Prob.(F-Stat) = 0.0825*

Adjusted R2 = 0.4467

* = statistical significance at the 0.1 level

From equation, Prob. (F-Stat) is statistically significant at the 0.1 level, indicating that overall 7 independent variables produce the probability of error. A significant influence is 0.0825 on the dependent variable. All the 6 independent variables help explain the change in foreign direct investment 44.67%. According to the statistical significance of the coefficients of the independent variables, fuel, metal, ore exports (percentage of merchandise export) affect foreign direct investment at the 0.05 level. Since correlations between D(GDP) and D(ER) has multicollinearity problem, so both of ER and GDP affect FDI at the 0.05 level.

The result showed that natural resource endowment and financial environment are important factors affecting FDI in New Zealand. Wherein, NER increase 5%, inflow FDI will reduce 262632.2 million dollars. The reason may due to New Zealand is a small-size country and lack of resources, which will limit its domestic industry development. And ER increase 5%, inflow FDI will increase 47976.21 million dollars. As the currency appreciation, investors' investment income will increase, so the currency appreciation will attract investors to invest.

4.1.5 Multiple regression analysis (Philippines)

4.1.5.1 ADF unit root test (Philippines)

Unit root detection result shows as following tables 25:

Table 25: ADF test results (Philippines)

Variable	ADF test	t-Statistic			Prob.	Result
		1%	5%	10%		
FDI	6.0971	-3.6892	-2.9719	-2.6251	1.0000	No-stationary
D(FDI,2)	-6.5517	-3.7115	-2.9810	-2.6299	0.0000***	Stationary
GDP	4.0859	-3.6892	-2.9719	-2.6251	1.0000	No-stationary
D(GDP)	-3.0990	-3.6999	-2.9763	-2.6274	0.0386**	Stationary
NER	-1.5676	-3.6892	-2.9719	-2.6251	0.4854	No-stationary
D(NER)	-4.8395	-3.6999	-2.9763	-2.6274	0.0006***	Stationary
IPG	-1.4288	-3.6892	-2.9719	-2.6251	0.5539	No-stationary
D(IPG)	-3.7324	-3.6999	-2.9763	-2.6274	0.0093***	Stationary
FTS	-2.1706	-3.7529	-2.9981	-2.6388	0.2214	No-stationary
D(FTS)	-3.2081	-3.6999	-2.9763	-2.6274	0.0305**	Stationary
PAN	-1.9982	-3.6892	-2.9719	-2.6251	0.2859	No-stationary
D(PAN)	-4.6725	-3.7115	-2.9810	-2.6299	0.0010***	Stationary
ER	-2.3347	-3.6892	-2.9719	-2.6251	0.1687	No-stationary
D(ER)	-4.5235	-3.6999	-2.9763	-2.6274	0.0014***	Stationary
GS	-1.4321	-3.6892	-2.9719	-2.6251	0.5523	No-stationary
D(GS)	-3.8987	-3.6999	-2.9763	-2.6274	0.0062***	Stationary

Note: ***, ** and * indicates significance at 1%, 5% and 10% level respectively

Table 25 shows that by using unit root test, the probability value of all variables include FDI, GDP, NER, IPG, PAN, FTS, ER, GS in ADF test are more than 0.1. It means that these variables are no-stationary and should move to process first-difference. The probability of D(FDI,2), D(IPG), D(NER), D(PAN), D(GS) and D(ER) are less than 0.01, the probability of D(GDP) and D(FTS) is less than 0.05.

By using ADF, the result shows that variables of FDI, GDP, NER, FTS, PAN, ER, IPG and GS are non-stationarity, but after first-difference these data were stationary. It means D(FDI), D(GDP), D(FTS), D(IPG), D(NER), D(PAN), D(GS) and D(ER) can be used to perform empirical analysis.

4.1.5.2 Descriptive statistics (Philippines)

Descriptive statistics results of Philippines original data are shown in following table:

Table 26: Descriptive statistics of ordinal data (Philippines)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	13115.7	11250.97	47276.1	2600.65	11132.23	29
GDP	100233.9	81357.6	271927.4	29868.36	67471.95	29
IPG	0.350624	0.3469	0.5074	0.1776	0.102445	29
PAN	2404.621	2538	3482	705	756.2317	29
NER	0.067483	0.065	0.121	0.021	0.031113	29
ER	0.030721	0.0244	0.0538	0.0179	0.011323	29
GS	6.617241	6.5	11	1	2.60461	29
FTS	2.8	3.3	4.5	0.9	1.385125	29

Table 26 reports that consolidated descriptive statistics of original data, including the mean, maximum, minimum, and observed values of the raw data.

Descriptive statistics results of Philippines original testing data are shown in following table.

Table 27: Descriptive Statistics (Philippines)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI,2)	396.6281	138.825	5353.768	-4709.965	1852.42	27
D(GDP)	8965.151	7463.03	31256.17	-10137.23	11050.63	27
D(PAN)	62.44444	155	1027	-1765	533.5201	27
D(FTS)	0.0815	0.1	0.5	-0.9	0.2962	27
D(NER)	-0.000519	-0.001	0.032	-0.028	0.015323	27
D(ER)	-0.000941	-0.0005	0.0028	-0.0095	0.002661	27
D(GS)	0.114444	0.17	2.66	-3.08	1.287748	27
D(IPG)	0.002259	0.0023	0.0646	-0.0744	0.0364	27

Table 27 reports consolidated descriptive statistics of processed data. Including the mean, maximum, minimum, and observed values of the processed data.

4.1.5.3 Multicollinearity test (Philippines)

The results show that the correlation coefficient between the variables is not greater than 0.8, which means there is no serious correlation between the variables. Therefore, all of the variables can perform a regression at the same time.

The results of multicollinearity test are as following:

Table 28: Correlation matrix of independent variables (Philippines)

	D(GDP)	D(PAN)	D(FTS)	D(NER)	D(ER)	D(GS)	D(IPG)
D(GDP)	1						
D(PAN)	0.1102	1					
D(FTS)	-0.402	-0.0073	1				
D(NER)	0.521	0.1089	-0.148	1			
D(ER)	0.7193	0.031	-0.2167	0.3784	1		
D(GS)	0.1119	-0.0352	-0.014	-0.3539	0.079	1	
D(IPG)	-0.3007	0.0697	-0.0045	-0.1473	-0.1928	0.0497	1

4.1.5.4 Regression result and interpretation (Philippines)

The regression results are as follow:

Table 29: Regression results of D(FDI,2) (Philippines)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	-90360.85	137602.8	-0.656679	0.5202
D(PAN)	0.230559	0.46782	0.492837	0.6284
D(FTS)	-1522.375	829.4122	-1.835487	0.0840*
D(NER)	28950.76	30600.85	0.946077	0.3574
D(GS)	331.8587	253.2185	1.310563	0.2074
D(IPG)	5866.719	7924.915	0.740288	0.4692
D(GDP)	0.048588	0.044665	1.087824	0.2919
C	-100.6283	539.9287	-0.186373	0.8544
AR(1)	-0.687774	0.209847	-3.277498	0.0044
R-squared	0.562274			
F-statistic	2.729638			
Prob(F-statistic)	0.038935**			
DW stat	2.0047			

The estimation equation is:

$$D(FDI,2) = C(1) * D(GDP) + C(2) * D(NER) + C(3) * D(IPG) + C(4) * D(FTS) \quad (13)$$
$$+ C(5) * D(PAN) + C(6) * D(ER) + C(7) * D(GS) + C(8) + [AR(1) = C(9)]$$

The substituted coefficients are:

$$D(FDI,2) = 0.0486 * D(GDP) + 28950.7558 * D(NER) \quad (14)$$
$$+ 5866.7191 * D(IPG) - 1522.3752 * D(FTS) + 0.2306 * D(PAN)$$
$$- 90360.8547 * D(ER) + 331.8587 * D(GS) - 100.6283 + [AR(1) = -0.6878]$$

F-Statistic = 2.7296

Prob.(F-Stat) = 0.0389**

Adjusted R2 = 0.5623

** = statistical significance at the 0.05 level

From equation 8, Prob. (F-Stat) is statistically significant at the 0.05 level, indicating that overall 7 independent variables produce the probability of error. A significant influence is 0.0389 on the dependent variable. All the 7 independent variables help explain the change in foreign direct investment 56.23%. According to the statistical significance of the coefficients of the independent variables, FTS affect foreign direct investment at the 0.1 level.

The result showed that infrastructure is the most important factor that affecting FDI in Philippines. Wherein, FTS increase 10%, inflow FDI will reduce 1522.375 million dollars. The reason may be that the investment of international investors in the Philippines is mainly based on construction, when the infrastructure getting better the prospect of investment is getting smaller, so the negative

correlation between infrastructure and attracting FDI

4.1.6 Multiple regression analysis (Thailand)

4.1.6.1 ADF unit root test (Thailand)

Unit root detection result shows as following tables 30:

Table 30: ADF test results (Thailand)

Variable	ADF test	t-Statistic			Prob.	Result
		1%	5%	10%		
FDI	4.2820	-3.7241	-2.9862	-2.6326	1.0000	No-stationary
D(FDI，2)	-5.1836	-3.7529	-2.9981	-2.6388	0.0004***	Stationary
GDP	1.7579	-3.6892	-2.9719	-2.6251	0.9995	No-stationary
D(GDP)	-3.4911	-3.6999	-2.9763	-2.6274	0.0162**	Stationary
NER	-0.6705	-3.6892	-2.9719	-2.6251	0.8384	No-stationary
D(NER)	-6.0643	-3.6999	-2.9763	-2.6274	0.0000***	Stationary
IPG	-1.5516	-3.6892	-2.9719	-2.6251	0.4933	No-stationary
D(IPG)	-5.3344	-3.7115	-2.9810	-2.6299	0.0002***	Stationary
FTS	-1.7708	-3.6999	-2.9763	-2.6274	0.3861	No-stationary
D(FTS,2)	-5.9725	-3.7115	-2.9810	-2.6299	0.0000***	Stationary
PAN	-1.8957	-3.7529	-2.9981	-2.6388	0.3283	No-stationary
D(PAN)	-3.3955	-3.7529	-2.9981	-2.6388	0.0219**	Stationary
ER	-1.5623	-3.6999	-2.9763	-2.6274	0.4875	No-stationary
D(ER)	-3.5372	-3.6999	-2.9763	-2.6274	0.0146**	Stationary
GS	-1.6253	-3.6892	-2.9719	-2.6251	0.4569	No-stationary
D(GS)	-5.1064	-3.6999	-2.9763	-2.6274	0.0003***	Stationary

Note: ***, ** and * indicates significance at 1%, 5% and 10% level respectively

Table 30 shows that by using unit root test, the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS. After ADF test, all of these variables are greater than 0.1, which means that these variables are no-stationary, but after first-difference these data were stationary. It means D(FDI), D(GDP), D(FTS),

D(IPG), D(NER), D(PAN), D(GS) and D(ER) can be used to perform empirical analysis.

4.1.6.2 Descriptive statistics (Thailand)

Descriptive statistics result of Thailand original data are shown in following table:

Table 31: Descriptive statistics of ordinal data (Thailand)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	50777.93	30944	178258.7	1999.493	54025.12	29
GDP	174543.1	146683.5	419888.6	38900.71	106946.8	29
IPG	0.448248	0.4185	0.627	0.2128	0.118581	29
PAN	3511.241	4329	5873	634	1809.965	29
NER	0.039379	0.035	0.077	0.013	0.021011	29
ER	0.0324	0.0322	0.0402	0.0225	0.006346	29
GS	7.533793	7.17	10.29	4.33	1.576498	29
FTS	7.075862	8.5	11.2	1.2	3.627539	29

Table 31 reports that consolidated descriptive statistics of original data, including the mean, maximum, minimum, and observed values of the raw data.

Table 32 reports that consolidated descriptive statistics of processed data, including the mean, maximum, minimum, and observed values of the processed data.

Descriptive statistics result of Thailand testing data are shown in this table:

Table 32: Descriptive statistics (Thailand)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI,2)	203.0924	153.9791	19946.77	-16677.97	8621.792	27
D(GDP)	13955.25	14004.1	59348.81	-36504.56	19589.63	27
D(PAN)	192.5185	227	2729	-4109	1161.771	27
D(FTS,2)	-0.0296	0	0.7	-0.9	0.3417	27
D(NER)	0.001593	-0.001	0.016	-0.014	0.007154	27
D(ER)	-0.0002	0.0003	0.0026	-0.0077	0.002418	27
D(GS)	-0.035556	0.17	2.41	-1.84	1.054989	27
D(IPG)	0.014207	0.0194	0.0925	-0.1402	0.05201	27

4.1.6.3 Multicollinearity Test (Thailand)

The results of multicollinearity test are as follow:

Table 33: the correlation of independent variables (Thailand)

	D(ER)	D(PAN)	D(FTS,2)	D(NER)	D(GS)	D(IPG)	D(GDP)
D(ER)	1						
D(PAN)	-0.112944	1					
D(FTS,2)	0.249018	0.259564	1.0000				
D(NER)	0.042691	0.340472	0.5345	1			
D(GS)	-0.289252	0.140009	-0.1466	0.142945	1		
D(IPG)	0.123993	0.141665	0.5814	0.524156	0.017826	1	
D(GDP)	0.871258	-0.141665	0.2905	0.212256	-0.340023	0.221485	1

Table shows correlation among D(GDP) and D(ER) is greater than 0.8, OLS has very little information to estimate D(FDI). This makes this study relatively uncertain about estimate and it's hard to tell which has an effect on the dependent variable Thus, it means that these two variables can not be used to do regression test at the same time.

4.1.6.4 Regression result and interpretation (Thailand)

Correlation coefficient between D(GDP) and D(ER) greater than 0.8, which means the correlation is too strong, so only use one of them to run the OLS regression. If results significantly represents both two variables have statistically significant, otherwise it means these two variables do not have statistical significance. This article uses D(ER) and other variables to perform OLS regression. The results of OLS regression are as follows:

Table 34: Regression Results of D(FDI,2) (Thailand)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	-212147.7	500159.6	-0.42416	0.6760
D(PAN)	-2.735954	1.052487	-2.599514	0.0171**
D(FTS,2)	-14073.14	4563.769	-3.083667	0.0059***
D(NER)	-167466.9	205663.7	-0.814275	0.4251
D(GS)	-129.2505	1152.145	-0.112182	0.9118
D(IPG)	8014.74	27956.58	0.286685	0.7773
C	418.6449	1236.882	0.338468	0.7385
R-squared	0.664203			
F-statistic	6.593303			
Prob(F-statistic)	0.000582***			
DW stat	2.2270			

The estimation equation is:

$$D(FDI,2) = C(1) * D(NER) + C(2) * D(IPG) + C(3) * D(FTS,2) + C(4) * D(PAN)$$
$$+ C(5) * D(ER) + C(6) * D(GS) + C(7) \qquad (15)$$

The substituted coefficients are:

$$D(FDI,2) = -167466.8998 * D(NER) + 8014.7395 * D(IPG) \qquad (16)$$
$$- 14073.1444 * D(FTS,2) - 2.7360 * D(PAN)$$
$$- 212147.6986 * D(ER) - 129.2505 * D(GS) + 418.6449$$

F-Statistic = 6.5933

Prob.(F-Stat) = 0.0006***

Adjusted R2 = 0.6642

*** = statistical significance at the 0.01 level

From equation, Prob. (F-Stat) is statistically significant at the 0.01 level indicating that at least one of the independent variables examined affects foreign direct investment significantly. All the 6 independent variables help explain the change in foreign direct investment 66.42%. According to the statistical significance of the coefficients of the independent variables, PAN affect foreign direct investment at the 0.05 level, FTS affect FDI at the 0.01 level.

The result showed infrastructure and scientific and technological level are the important factors that affecting FDI in Thailand. Wherein, D(PAN) increase 5%, inflow FDI will reduce 2,735,954 dollars. D(FTS,2) increase 1%, inflow FDI will reduce 14073.14 million dollars. The reason may be that the investment of international investors in the Thailand is mainly based on construction. When the

infrastructure getting better, foreign investments are less prospective, thus, there are

negative correlation between infrastructure and FDI.

4.1.7 Summary

The multiple regression results for six sample countries are summarized

below.

Table 35: OLS regression analysis results summary

	GDP	NER	FTS	IPG	PAN	ER	GS
Chile	+						
Japan	+	+				+	
Korea				-			
New Zealand	+	-				+	
Philippines			-				
Thailand			-		-		

The results show that:

GDP positively affecting FDI in Chile;

GDP, NER and ER positively affecting FDI in Japan;

IPG negatively affecting FDI in Korea;

NER negatively affecting FDI in New Zealand, but GDP and ER

positively affecting FDI in New Zealand;

FTS negatively affecting FDI in Philippines;

FTS and PAN negatively affecting FDI in Thailand.

As the result shows that GDP is the most active factor in which market size is the most import factor that affect the FDI inflows. However, GS is the least active factor in which the political environment is not that important in attracting FDI inflows.

4.2 Regression with panel data (whole period)

4.2.1 Stationaritydetection

As mentioned before, the problem with non-stationary or trended data is that a standard OLS regression can lead to incorrect conclusions, in a case of a spurious regression for example. Therefore, it is necessary to detect the stationarity of the panel data, through first-difference made every variables stationarity. Differencing can help stabilize the mean of a time series by removing changes in the level of a time series, and the results of stationarity detection are as follows:

Table 36: The result of stationary detection

	LLC test		IPS W-stat		ADF test		PP test	
	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**
FDI	10.7515	1	13.1461	1	0.277	1	0.2832	1
D(FDI)	-2.6617	0.0039 ***	-4.4622	0.0000 ***	100.22	0.0000 ***	118.832	0.0000 ***
GDP	8.4416	1	9.6514	1	4.2955	0.9999	9.0479	0.9823
D(GDP)	-4.4828	0.0000 ***	-6.524	0.0000 ***	98.7186	0.0000 ***	111.582	0.0000 ***
NER	-2.3051	0.0106 **	-2.6627	0.0039 ***	56.6264	0.0000 ***	51.7237	0.0001 ***
IPG	-1.7546	0.0397 **	-0.575	0.2827	22.8653	0.2955	21.4123	0.3732
D(IPG)	-13.1693	0.0000 ***	-12.8313	0.0000 ***	164.276	0.0000 ***	186.998	0.0000 ***
FTS	-2.7669	0.0028 ***	-0.96889	0.1663	22.0499	0.3378	17.2473	0.6369
D(FTS)	-4.318	0.0000 ***	-5.0108	0.0000 ***	65.3592	0.0000 ***	62.7475	0.0000 ***
PAN	-0.4873	0.313	0.37106	0.6447	17.2071	0.6395	15.9883	0.7173
D(PAN)	-13.2493	0.0000 ***	-12.4737	0.0000 ***	162.033	0.0000 ***	192.185	0.0000 ***
ER	-3.6331	0.0001 ***	-5.6502	0.0000 ***	79.1959	0.0000 ***	76.7702	0.0000 ***
GS	-1.9408	0.0261 **	-2.2219	0.0131 **	33.9066	0.0268 **	25.885	0.1696
D(GS)	-10.1171	0.0000 ***	-9.7193	0.0000 ***	120.993	0.0000 ***	117.534	0.0000 ***

Table 36 shows the results of the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS base on unit root test, which the probability of NER less than 0.05 and ER less than 0.01, but others variable are more than 0.05. It means FDI, GDP FTS IPG PAN and GS are no-stationary and should move to process the first difference. The probability value of D(FDI), D(GDP) D(FTS), D(PAN), D(IPG) and D(GS) are less than 0.01 after first difference. It means D(FDI), D(GDP), D(FTS), D(IPG), NER, D(PAN), D(GS) and D(ER) can be used to perform empirical analysis.

4.2.2 Descriptive statistics (whole period)

The data will be more intuitive understanding by using distribution during the period 1985-2013 by annual in 290 observations. The mean of each variables and standard deviations are shown in following table:

Table 37: Descriptive statistics of ordinal data (whole period)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	98197.42	43264.27	956793	1803.286	141895.4	290
GDP	920865.1	268290.7	9490603	16486.01	1560515	290
NER	0.149062	0.085	0.668	0.011	0.158357	290
ER	0.233707	0.063919	3.333333	0.000714	0.344548	290
IPG	0.302919	0.250954	0.875836	0.054728	0.175055	290
FTS	25.50897	18.95	68.2	0.3	20.19385	290
PAN	16907.07	5643.5	120200	233	21645.4	290
GS	7.708621	7.833333	12	1	1.981141	290

Table 37 reports that consolidated descriptive statistics of original data, including the mean, maximum, minimum, and observed values of the raw data.

Processed data of consolidated descriptive, such as mean, maximum, minimum, etc. Were reported in table 38 as follows:

Table 38: Descriptive Statistics (whole period)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI)	10267.66	3841.447	143277.9	-68868.99	22369.03	280
D(GDP)	63572.51	17146.45	1452774	-1048387	212606	280
NER	0.145832	0.085	0.668	0.011	0.15482	280
D(IPG)	0.00433	0.004142	0.117818	-0.140223	0.033383	280
D(PAN)	768.8821	237.5	22091	-11584	3476.717	280
D(FTS)	0.435714	0.3	14.4	-8.1	1.705129	280
ER	0.222787	0.061547	1.666667	0.000714	0.293877	280
D(GS)	0.031399	0	4.083333	-3.833333	1.171101	280

4.2.3 Hausman test (whole period)

Base on previous section, Hausman test was used to establish the random effect regression, the result of Hausman test is as follow:

Table 39: Hausman test result (whole period)

Test Summary	Chi-Sq.Statistic	Chi-Sq.d.f.	Prob.
Cross-section random	18.923919	7	0.0084***

Shown as table 39, the result of Hausman test statistic (W) is18.923919, P value is 0.0084. After rejecting the null hypothesis, the model is fixed model.

4.2.4 Regression result and interpretation (whole period)

Regression results are as following:

Table 40: Regression results of D(FDI) (whole period)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	-7543.459	11004.62	-0.685481	0.4936
PAN	0.141584	0.131244	1.078791	0.2885
D(NER)	-1676.915	22244.29	-0.075386	0.9400
GS	-148.6042	936.4437	-0.158728	0.8740
D(IPG)	-63372.75	32613.33	-1.943155	0.0531***
D(GDP)	0.048411	0.005681	8.521948	0.0000***
D(FTS)	-2118.459	667.8093	-3.172251	0.0017***
C	10299.63	3220.111	3.198534	0.0016
R-squared	0.399628			
F-statistic	10.94137			
Prob(F-statistic)	0.000000***			
DW stat	2.145409			

The estimation equation is:

$$D(FDI) = C(1) * D(GDP) + C(2) * NER + C(3) * D(IPG) + C(4) * D(FTS) \quad (17)$$
$$+ C(5) * D(PAN) + C(6) * ER + C(7) * D(GS) + C(8) + [CX = F]$$

According to the result, the substituted coefficients are:

$$D(FDI) = 0.0484 * D(GDP) - 1676.9152 * NER - 63372.7537 * D(IPG) \quad (18)$$
$$- 2118.4589 * D(FTS) + 0.0230 * D(PAN) - 7543.4593 * ER$$
$$- 148.6402 * D(GS) + 10299.6343 + [CX = F]$$

F-Statistic = 10.9414

Prob.(F-Stat) = 0.0000***

Adjusted R2 = 0.3996

*** = statistical significance at the 0.01 level

From equation, Prob. (F-Stat) is statistically significant at the 0.01 level indicating that at least one of the independent variables examined affects foreign direct investment significantly. All the 7 independent variables help explain the change in foreign direct investment 39.96%. According to the statistical significance of the coefficients of the independent variables, D(GDP), D(IPG) and D(FTS) affect FDI at the 0.01 level.

According to the results of the table, variable D(GDP), D(FTS), and D(IPG) are significant. The APEC members' market size positively affects FDI, infrastructure and foreign trade level negatively affect FDI. The results of the surface and the theoretical assumptions are somewhat inconsistent, based on the in-depth analysis of the measurement results:

The estimated coefficient of variable GDP is 0.048411, and the level of the variable is significant at 1%. It means that when the host country's GDP increase 1%, the FDI inflow increase by 0.048411%. This positive relationship is elastic, that lots of international investor FDI in APEC member countries is market-oriented. It shows that international investors adhere to the market oriented, technological innovation, consider the market demand, put the foothold on the product "sell out".

The estimated result of variable NER is negative, but not significant. It means that the natural resources of APEC member countries are not a significant factor on attracting FDI. Investment in APEC member countries is not a

resource-oriented. It may be due to the sample countries don't have highlight the resource advantages, so the reaction is not obvious in the results.

The estimated coefficient of the variable D(IPG) is -63372.75, and the level of the variable is significant at 10%. It means that when the host country imports of goods (percentage of GDP) increased by 10%, FDI inflow will reduce 63372.75%. International investors don't like to invest in countries with high foreign trade level.

The estimated coefficient of variable D(PAN) is not significant. This shows that science and technology are not significant factors affecting the FDI. Because international investors direct investment in APEC member countries are not technical-seeking.

The estimated coefficient of the variable D(FTS) is -2118.459, and the level of the variable is significant at 1%. It means that in the host country infrastructure increased by 1%, FDI will reduce by 2118.459%. The international investors FDI to APEC member countries is inclined to the country with inadequate infrastructure.

The estimated result of variable ER is not significant, which indicated that the exchange rate level is not a significant factor affecting the FDI in APEC member countries.

The estimated coefficient of variable D(GS) is not significant, it means that the political environment is not a significant factor influencing FDI. The reason may be due to the world development and the international situation stabilized, almost all of the APEC member countries' political environment can basically meet the investment needs.

4.3 Regression with panel data (financial crisis period)

As the financial situation during the financial crisis is very different that international investor's investment tend to conservative. How to attract FDI during the economic crisis to help the host country out of the woods, and clear what factors affect international investors FDI during the economic crisis is an objective of this study.

4.3.1 Regression with panel data (Asian financial crisis)

In 1997, the Asian financial turmoil swept Thailand, which lead to Thai baht depreciation. Soon, the crisis swept through Malaysia, Singapore, Japan and South Korea, China and other countries. It broke the scene of economic development in Asia with Asia's economies begun to slacken, and the political situation in some countries begun to wane. The financial crisis ended until 1999, data from 1996 to 2000 will be used in this study base on panel data selection complete regression analysis.

4.3.1.1 Stationarity detection (Asian financial crisis)

By using unit root test and previous statement, the detection results of stationary as listed in the following table:

Table 41: Detection results of stationary (Asian financial crisis)

	LLC test		IPS W-stat		ADF test		PP test	
	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**
FDI	-4.51597	0.0000 ***	1.35737	0.9127	14.3703	0.8112	24.2296	0.2325
D(FDI)	-39.283	0.0000 ***			45.3553	0.0010 ***	50.3333	0.0002 ***
GDP	-1.03053	0.1514	0.30664	0.6204	15.3537	0.7558	21.3831	0.3749
D(GDP)	-3.30241	0.0005 ***	37.4281	0.0104 **	39.6069	0.0056 ***	-3.30241	0.0005 ***
NER	-2.38798	0.0085 ***	-0.83056	0.2031	17.4934	0.4895	20.7938	0.2899
D(NER)	-4.41887	0.0000 ***			36.7749	0.0056 ***	37.8185	0.0041 ***
IPG	-3.84862	0.0001 ***	0.20741	0.5822	17.8749	0.5956	22.7519	0.3011
D(IPG)	-3.66543	0.0001 ***			34.2528	0.0245 **	39.0642	0.0065 ***
FTS	8.08068	1	4.16597	1	26.1491	0.1609	40.1912	0.0047 ***
D(FTS)	3.7924	0.9999			28.0124	0.1091	39.3689	0.0060 ***
PAN	-7.11134	0.0000 ***	-2.75159	0.0030 ***	35.5464	0.0174 **	41.1747	0.0035 ***
ER	-3.10112	0.0010 ***	0.04979	0.5199	13.0057	0.7912	23.9332	0.1572
D(ER)	-3.38971	0.0003 ***			26.4602	0.0479 **	27.5612	0.0357 **
GS	-18.1783	0.0000 ***	-4.5146	0.0000 ***	39.6434	0.0055 ***	53.733	0.0001 ***

Table 41 shows the results of the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS base on unit root test, which the probability of PAN less than 0.05 and GS less than 0.01, but others variable are more than 0.05. It means that FDI, GDP, FTS, IPG, NER and ER are no-stationary and should move to process the first difference. The probability value of D(FDI), D(GDP), D(NER), D(IPG) and D(ER) are less than 0.01 after first difference, but D(FTS) is still

no-stationary that after first difference. It means D(FDI), D(GDP), D(NER), D(IPG), PAN, D(ER) and GS can be used to perform empirical analysis, and D(FTS) can't be used to perform empirical analysis.

4.3.1.2 Descriptive statistics (Asian financial crisis)

Table 42 reports that consolidated descriptive statistics of original data, including the mean, maximum, minimum, and observed values of the raw data.

Row data standard deviation are shown in this table:

Table 42: Descriptive statistics of ordinal data (Asian financial crisis)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	61785.4	39740.05	212715.6	8249.887	56254.75	50
GDP	761044.7	279758.6	4731199	52623.28	1276646	50
NER	0.1066	0.0660	0.4840	0.0160	0.1251	50
ER	0.186783	0.071846	0.714286	0.000714	0.24327	50
IPG	0.318732	0.25525	0.873902	0.069935	0.197154	50
PAN	15445.08	7400	52407	1771	14142.89	50
GS	9.545	9.833333	12	5	1.296713	50

Processed data of consolidated descriptive, such as mean, maximum, minimum, etc. Were reported in table 43 as follows:

Table 43: Descriptive statistics (Asian financial crisis)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI)	7459.279	4050.911	37725.68	-11560	11199.66	40
D(GDP)	16203.78	6657.275	518024.4	-409703.2	141548.8	40
D(NER)	0.000825	0.0005	0.058	-0.051	0.01853	40
D(ER)	-0.011347	-0.000152	0.006748	-0.140351	0.029777	40
D(IPG)	0.010517	0.010048	0.092505	-0.043782	0.026909	40
PAN	16248.3	9185	52407	2411	14664.95	40
GS	9.910417	10	12	7.416667	0.968409	40

4.3.1.3 Hausman test (Asian financial crisis)

Base on previous section, Hausman test was used to establish the random effect regression, the result of Hausman test is as follow:

Table 44: Hausman test result (Asian financial crisis)

Test Summary	Chi-Sq.Statistic	Chi-Sq.d.f.	Prob.
Cross-section random	5.885134	6	0.4362

Shown as table 44, the result of Hausman test statistic (W) is 5.885134, P value is 0.4362. Pass the null hypothesis, the model is random model.

4.3.1.4 Regression result and interpretation (Asian financial crisis)

Regression results are in following table.

Table 45: Regression results of D(FDI) (Asian financial crisis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	9103.423	49339.91	0.184504	0.8547
PAN	0.141584	0.131244	1.078791	0.2885
D(NER)	120684.3	72384.08	1.667277	0.1049
GS	3153.685	1577.692	1.998924	0.0539*
D(IPG)	-128943.1	49310.71	-2.61489	0.0134**
D(GDP)	0.024397	0.00929	2.626211	0.013**
C	-25131.04	15654.19	-1.605388	0.1179
R-squared	0.435175			
F-statistic	4.237537			
Prob(F-statistic)	0.002865***			
DW stat	1.344277			

The estimation equation is:

$$D(FDI) = C(1) * D(GDP) + C(2) * D(NER) + C(3) * D(IPG) + C(4) * PAN$$
$$+ C(5) * D(ER) + C(6) * GS + C(7) + [CX = R] \qquad (19)$$

According to the result, the substituted coefficients are:

$$D(FDI) = -0.0244 * D(GDP) + 120684.3191 * D(NER) - 128942.1058 * D(IPG) \quad (20)$$
$$+ 0.1416 * PAN + 9103.4227 * D(ER) + 3153.6851 * GS + 25131.0434 + [CX = R]$$

F-Statistic = 4.2375

Prob.(F-Stat) = 0.002865***

Adjusted R2 = 0.435175

*** = statistical significance at the 0.01 level

From equation, Prob. (F-Stat) is statistically significant at the 0.01 level indicating that at least one of the independent variables examined affects foreign direct investment significantly. All the 6 independent variables help explain the change in foreign direct investment 43.52%. According to the statistical significance of the coefficients of the independent variables, D(GDP) and D(IPG) affect FDI at the 0.05 level, GS affect FDI at the 0.1 level.

Variable D(GDP), D(IPG)and GS are significant. In the Asian economic crisis, the political environment has also become an important factor in attracting FDI.

The estimated coefficient of the variable GS is 3153.685, and the level of the variable is significant at 10%. Means that the host country's GS per increase by 10%, FDI will be increased by 3153.685%. Countries with a higher degree of political stability can attract more FDI. It shows that the influence of the political environment on the attraction of FDI is remarkable. International investors are more inclined to invest in political stability, countries with lower risk.

4.3.2 Regression analysis of panel data during the 2008 financial crisis

The financial crisis of 2007 to 2009, also known as the global financial crisis is worst financial crisis since the Great Depression of the 1930s as many economist said. So this study chose this period data by using the panel data selected include one year ahead and one year lag.

4.3.2.1 Stationarity detection (2008 financial crisis)

By using unit root test and previous statement, the detection results of stationary as following:

Table 46: Detection results of stationary (2008 financial crisis)

	LLC test		IPS W-stat		ADF test		PP test	
	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**
FDI	1.76344	0.9611	3.38062	0.9996	5.46042	0.9995	7.72589	0.9935
D(FDI)	-6.82417	0.0000 ***	-2.6402	0.0041 ***	45.6011	0.0009 ***	61.0933	0.0000 ***
GDP	0.01106	0.5044	2.03663	0.9792	6.82899	0.9972	4.11135	0.9999
D(GDP)	-4.17047	0.0000 ***			48.2192	0.0004 ***	47.3891	0.0005 ***
NER	-6.94661	0.0000 ***	-2.12192	0.0169	39.2117	0.0063	32.9253	0.0344
IPG	-5.29506	0.0000 ***	-1.67202	0.0473 **	32.5322	0.0379 **	54.5425	0.0000 ***
FTS	-6.16498	0.0000 ***	1.19782	0.8845	19.5466	0.4866	6.29995	0.9984
D(FTS)	-3.63745	0.0001 ***			43.419	0.0018 ***	46.9185	0.0006 ***
PAN	-10.3384	0.0000 ***	-1.99851	0.0228 **	36.0889	0.0150 **	18.6188	0.5467
D(PAN)	-13.8791	0.0000 ***	-3.95094	0.0000 ***	52.8782	0.0001 ***	61.326	0.0000 ***
ER	-7.04898	0.0000 ***	-1.29961	0.0969 *	29.3933	0.0803 *	26.7984	0.141
D(ER)	-7.7807	0.0000 ***			65.6499	0.0000 ***	62.2111	0.0000 ***
GS	-4.27753	0.0000 ***	-0.70011	0.2419	25.0153	0.2008	36.7384	0.0126 **
D(GS)	-7.31219	0.0000 ***			66.8398	0.0000 ***	76.1007	0.0000 ***

Table 46 shows the results of the probability value of variable FDI, GDP, NER, IPG, PAN, FTS, ER, GS base on unit root test, which the probability of NER and IPG are less than 0.05, but others variable are more than 0.05. It means FDI, GDP, FTS, ER, PAN and GS are no-stationary and should move to process the first defferencing. The probability value of D(FDI), D(GDP) D(FTS), D(PAN), D(ER) and D(GS) are less than 0.01 after first differencing. Thus those data which after

first difference is stationary can be used to test.

4.3.2.2 Descriptive statistics (2008 financial crisis)

The data will be more intuitive understanding by using distribution during the period 2006-2013 by annual in 80 observations. The mean of each variables and standard deviations are shown in following table:

Table 47: Descriptive Statistics of ordinal data (2008 financial crisis)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI	220471.2	137657.2	956793	16914	203609.5	80
GDP	1594159	657418.7	9490603	111606.9	2167553	80
NER	0.1756	0.0930	0.6680	0.0270	0.1767	80
ER	0.228614	0.05343	1	0.000783	0.32699	80
IPG	0.338279	0.275553	0.801774	0.109626	0.16184	80
FTS	28.88	20.8	61.6	3.2	18.19591	80
PAN	26680.63	9498	120200	723	31235.54	80
GS	7.503125	7.583333	11	4.666667	1.436994	80

Table reports consolidated descriptive statistics of original data, including the mean, maximum, minimum, and observed values of the raw data.

Processed data of consolidated descriptive, such as mean, maximum, minimum, etc. Were reported in table 48 as follows:

Table 48: Descriptive Statistics (2008 financial crisis)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
D(FDI)	10267.66	3841.447	143277.9	-68868.99	22369.03	280
D(GDP)	63572.51	17146.45	1452774	-1048387	212606	280
NER	0.145832	0.085	0.668	0.011	0.15482	280
D(IPG)	0.00433	0.004142	0.117818	-0.140223	0.033383	280
D(PAN)	768.8821	237.5	22091	-11584	3476.717	280
D(FTS)	0.435714	0.3	14.4	-8.1	1.705129	280
ER	0.222787	0.061547	1.666667	0.000714	0.293877	280
D(GS)	0.031399	0	4.083333	-3.833333	1.171101	280

4.3.2.3 Hausman test (2008 financial crisis)

Base on previous section, Hausman test was used to establish the random

effect regression, the result of Hausman test is as follow:

Table 49: Hausman test result (2008 financial crisis)

Test Summary	Chi-Sq.Statistic	Chi-Sq.d.f.	Prob.
Cross-section random	18.973629	7	0.0083***

Shown as table 49, the result of Hausman test statistic (W) is 18.973629, P

value is 0.0083. Rejecting the null hypothesis, the model is fixed model.

4.3.2.4 Regression result and interpretation (2008 financial crisis)

The results of regression are as following.

Table 50: Regression results of D(FDI) (2008 financial crisis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	-81440.81	169116.2	-0.481567	0.6321
D(PAN)	-1.180361	1.394363	-0.846523	0.4011
D(FTS)	-1980.389	1930.757	-1.025706	0.3097
NER	-571510.4	195063.2	-2.929872	0.005***
D(GS)	-2319.802	3362.931	-0.689815	0.4933
IPG	61044.09	60911.83	1.002171	0.3295
D(GDP)	0.041738	0.020688	2.017542	0.0487**
C	160151.5	49068.19	3.263857	0.0019
R-squared	0.603595			
F-statistic	3.426012			
Prob(F-statistic)	0.000009***			
DW stat	2.460666			

The estimation equation is:

$$D(FDI) = 0.0417 * D(GDP) - 571510.3634 * NER - 124635.0287 * IPG \qquad (21)$$
$$- 1980.3890 * D(FTS) - 1.1804 * D(PAN) - 81440.8073 * D(ER)$$
$$- 2319.8016 * D(GS) + 160151.546 + [CX = F]$$

F-Statistic = 3.4260

Prob.(F-Stat) = 0.0000***

Adjusted R2 = 0.6036

*** = statistical significance at the 0.01 level

From equation, Prob. (F-Stat) is statistically significant at the 0.01 level indicating that at least one of the independent variables examined affects foreign direct investment significantly. All the 7 independent variables help explain the

change in foreign direct investment 60.36%. According to the statistical significance of the coefficients of the independent variables, NER affect FDI at the 0.01 level, D(GDP) affect FDI at the 0.05 level.

According to the results of the table, variable D(GDP)and NER are significant. It means that in the economic crisis, the natural resource endowments also become an important factor in attracting FDI.

The estimated coefficient of the variable NER is -571510.4, and the level of the variable is significant at 1%. It means that the host country's NER increase1%, FDI will be reduce by 571510.4%. This is probably due to the fact that countries that rely on exports of resources are generally less economic in nature and less resilient to risks, so international investors do not like to invest in countries with large exporters of natural resources during the economic crisis.

CHAPTER 5

CONCLUSION AND DISCUSSION

According to the result of analysis presented in last chapter, this chapter will present the conclusion and discussion about the factors affecting FDI in APEC member countries.

5.1 Summary

This paper studied about the factors affecting FDI in APEC member countries during the period of 1985-2013 and special period of 1996-2000 and 2006-2013. The data are from 10 countries covered 29 years by 8 variables: FDI, GDP, NER, IPG, PAN, FTS, ER, GS. This paper found that market size, foreign trade level and infrastructure affecting FDI in APEC member countries.

As table 51 shows, the summary of factors affecting FDI in APEC member countries. Major factors affecting FDI in APEC member countries are GDP, FTS and IPG, especially the GDP is positive impact on APEC member countries attract FDI, FTS and IPG have negative impact on APEC member countries in attracting FDI. The null hypotheses of variable GDP has been accept, others null hypotheses have been reject.

Summarize for testing hypothesis is in table as the follow:

Table 51: Hypothesis testing summary

Variable	Hypothesis	Conclusions	Results
Gross domestic product (GDP)	Positively affects FDI.	Positively affects FDI.	Accept
Fuel, metal, ore exports (NER) (percentage of merchandise export)	Positively affects FDI.	No effects	Reject
Imports of goods (IPG) (percentage of GDP)	Positively affects FDI.	Negatively affects FDI	Reject
Patent applications, nonresidents (PAN)	Negatively affects FDI	No effects	Reject
Fixed telephone subscriptions (FTS) (per 100 people)	Positively affects FDI	Negatively affects FDI	Reject
Exchange rate (ER)	Negatively affects FDI.	No effects	Reject
Government stability (GS)	Positively affects FDI	No effects	Reject

In addition, this paper also studies the influence of the variables on the FDI during special period, intercepted 1996-2000 and 2006--2013 years data, the empirical results are as follows:

Table 52: Hypothesis testing summary (2)

Variable	Hypothesis	Conclusions	Results
Gross domestic product (GDP)	Positively affects FDI.	Positively affects FDI	Accept
Fuel, metal, ore exports (NER) (percentage of merchandise export)	Positively affects FDI.	Negatively affects FDI	Reject
Imports of goods (IPG) (percentage of GDP)	Positively affects FDI.	Negatively affects FDI	Reject
Patent applications, nonresidents (PAN)	Negatively affects FDI	No effects	Reject
Fixed telephone subscriptions (FTS) (per 100 people)	Positively affects FDI	No effects	Reject
Exchange rate (ER)	Negatively affects FDI.	No effects	Reject
Government stability (GS)	Positively affects FDI	Positively affects FDI	Accept

Table 52 shows major factors affecting FDI in APEC member countries during the economic crisis are GDP, NER, IPG and GS, especially the GDP and GS have positive impact on APEC member countries attract FDI, FTS and NER have negative impact on APEC member countries in attracting FDI. The null hypotheses of variable GDP and GS has been accept, others null hypotheses have been reject.

5.2 Discussions

As the result of chapter 4 shows, there were some variables did not affect FDI in APEC member countries. Therefore, the reason of the result will be discussed in this part.

5.2.1 Gross domestic product (GDP)

According to the result, GDP has a significant positive impact on FDI inflows, regression results seem to be the same as literature reviews, such as Cheng and Ma (2007), Kolstad (2010) and so on.

Generally, economists traditionally use Gross Domestic Product (GDP) to measure economic progress. When GDP is rising, the country has been highly successful in attracting FDI, due to favourable economic conditions. On the contrary, it will be difficult to attract FDI when the country's GDP suspend or decline. From a strict numerical perspective, GDP provides an easy-to-follow indicator of economic health. Therefore, a country's GDP growth usually means that there are potential market and potential investment environment. Thus, investors prefer to invest in

countries where the GDP is raising.

5.2.2 Fuel, metal, ore exports (Percentage of merchandise export) (NER)

As it can be seen that NER has effect on FDI during financial crisis. The result shows that NER negatively affecting FDI in APEC member countries. It seems to be different from other related literature, Suvakunta (2010), Li (2012), Pradhan(2011).

The reason may be that when NER getting higher the country may possess single economic structure and industry unreasonable distribution. In many countries, state-owned enterprises controlled resource development, international investors are difficult to make direct investments, so that international investors do not like to carry on FDI in the high NER countries.

5.2.3 Imports of goods (Percentage of GDP)(IPG)

From the above analysis, it can be concluded that the IPG has a negative effect on APEC member countries attract FDI. It seems to be different from other related literature, such as Zhang (2007), Lall and Siddharthan (1982), Meredith and Maki (1992), Caves (1996), Wilamoski and Tinkler (1999) and so on. If IPG increasing, FDI inflow decline, it should be changed the mode of economic development by vigorously develop the tertiary industry, expand domestic demand

and domestic market, strengthen technological innovation and support high-tech industries.

5.2.4 Patent applications, nonresidents (PAN)

According to the result, there is no correlation between PAN and FDI according to the result describe in last chapter. The result seemly is not consistent with literature reviews, such as Lall (1983), Wells (1983), Chen (2014) and Huang (2015).

Lall (1983) believed that domestic enterprises can create new technology actively to expand on the FDI. According to Chen (2014) suggested that factors affect the FDI of multinational enterprises in other countries were politic factors, government factors, location factors, market factors, social and cultural factors.

This paper used PAN as the proxy variable of the host country's science and technology level, in which PAN can't comprehensive reflection science and technology level, for the reason that science and technology level affecting FDI in APEC member countries not significant on the result shows. In future study, it can choose other variables as the proxy variable of science and technology level.

5.2.5 Fixed telephone subscriptions (per 100 people) (FTS)

According to previous description in chapter 4, the results shown that the FTS has negative effect on FDI in APEC member countries. The results seem to be different from other related literatures, Zhang and Yang (2010), Duan (2010).

The results shown that international investors prefer to invest in the country that have imperfect infrastructure, it can be said that developing countries are generally more favored by international investors. The ROI in developing countries is generally higher than that in developed countries because of developed countries' investment fields have been developed and Investment space is very limited. But developing countries are full of reasonable area to be developed with huge market potential, high rate of return, market saturation low rate of return. Thus, FTS has negative effect on FDI in APEC member countries.

5.2.6 Exchange rate (ER)

In general, the exchange rate is not a significant factor affecting FDI. But in the economic crisis, the exchange rate is very important for attracting FDI. This result is in accord with literature reviews such as Froot and Stein (1991), Gross (2002). It was believed that the host country currency devaluation will increase FDI. The home country currency devaluation means that investors currency appreciation, investors can use the same money to invest more as devaluation is a simple way to attract FDI. But it should be noted that foreign capital will tend to flow into

countries that have strong governments, dynamic economies and stable currencies. It is important to keep currency stable to attract investment capital from foreign investors. Otherwise, the prospect of exchange losses inflicted by currency depreciation may deter overseas investors.

5.2.7 Government stability (GS)

The result of the study shows the hypothesis of GS was reject. This result is difference with literature reviews such as He and Guo (2009).

Results shows political environment is not important for attracting FDI, but the host country also should strive to create a stable political environment for investors. Stable political environment generally means that the economy is stable and fair as it conducts activities orderly. stability ensures that policies that are formulated by a certain political dispensation can be advanced, and can be made to reach their desired conclusion. Political instability also leads to instability in policy, and creates friction in implementation. In addition to this, political stability leads to predictable patterns in economic policies, and allow investors, tax-payers, bankers, etc. to take long-term decisions, which also aids in long-term development in a country. So it requires the APEC member countries should strive to create a more stable political environment to attract FDI.

5.3 Management implication

This paper draws a conclusion through empirical research and founds out the factors that affect FDI in APEC member countries. The results showed that market size, infrastructure and foreign trade are the important factors influencing FDI inflow. Therefore, in order to expand the market scale, APEC member countries should change the mode of economic development by developing the tertiary industry vigorously, expanding domestic demand, and the domestic market, promoting the development of the domestic market, strengthening technological innovation and supporting high-tech industries development.

In addition, the result shown that during the economic crisis, the political environment and natural resource endowments are also important factors to attract FDI inflows. Therefore, in order to better attract FDI during economic crisis and economic development, APEC member states should improve domestic investment environment, improve relevant laws and regulations, punish corruption and corruption, strengthen social order. In addition, APEC member countries should adjust the industrial structure, improve the domestic industrial chain, reduce dependence on exports of resources.

As the international investors and managers, they should rethink on their previous investment behavior. As the level of science and technology and financial environment is not an important factor influencing FDI inflows, which indicate that investment decision-making ignored the level of science and technology and

financial environment considerations in previous FDI. Currency risk is increasing in the context of the global economic crisis, managers should consider the financial environment of the investor, the adequacy of foreign exchange reserves, the soundness of the currency in the subsequent international investment, it should be settled in the national currency or the host country's currency. In addition, investors should recognize the importance of scientific and technological factors, not pursue low-cost labor blindly, investment in the infrastructure industry and population-intensive industries should be in the future investment in science and technology to strengthen attention to adjust the investment structure.

5.4 Research recommendation

This section focus on giving recommendations from the perspective of international investors and APEC member countries, put forward the corresponding research recommendation.

5.4.1 Recommendation from the perspective of factors

The market size is the important factor that affect FDI both in ordinary times and economic crisis. Therefore, APEC member countries should pay more attention to expand the market size, tax incentives to all kinds of long-term investment funds, attaches great importance to the economic development and stimulate domestic demand.

Natural resources plays a significant role in attracting FDI during the economic crisis. Therefore, during the economic crisis, APEC members should adjust the industrial structure, to reduce dependence on exports of resources, improve the industrial chain, develop the tertiary industry and high-tech industry. Thus reduce the natural resources accounted for the proportion of exports, and to attract more FDI.

Foreign trade level is always an important factor in affecting FDI. APEC members should change the mode of economic development, develop the tertiary industry vigorously. Expanding domestic demand and developing the domestic market. Strengthen technological innovation, the development of high-tech industries.

The political environment is an important factor influencing FDI in the general period, which requires the APEC members to improve the political environment, reduce corruption, improve political system, reduce the foreign investment access threshold. At the same time to reduce crime rate, adjust social order, so that create a good investment environment for investor to achieve win-win cooperation.

The financial environment sometimes could influencing host countries attracting FDI. Therefore the APEC members should pay attention to the stability of the financial environment, increase foreign exchange reserves, enhance their ability to resist financial risks. At the same time strengthen financial regulation and

implementation of monetary policy based on stable financial environment, thereby attract FDI inflow.

5.4.2 Recommendation from the perspective of international investors

International investors should improve the micro environment for investment in the APEC member countries, to seek maximum benefits.

Establishing and improving the management system of the enterprise. Enterprises have to establish a modern enterprise system and scientific management system in order to develop FDI in APEC member countries to participate in global competition. This requires enterprises base on their actual situation, learn from the world famous multinational company management experience, intensify reform, strengthen the internal governance structure, improve operational efficiency, reduce operating costs. So that to establish a set of clear property rights, scientific management, incentive and restraint mechanisms to fit the company system, and strengthen the internal audit supervision, investment behavior specification for enterprises.

Emphasis on R & D and innovation, and improve competitiveness. Companies want to win in international competition must continuously strengthen technological innovation. On the one hand, it requires enterprises to increase investment in research funding, to establishment independent innovation incentives. On the other hand, it has to strengthen FDI for learning that in APEC member

countries, the introduction of advanced technology, and through digestion, absorption, re-innovation success free technology into the enterprise. Thereby improving product technology content and added value, enhance the competitiveness of enterprises. Introducing advanced technology through digestion, absorption, and re-innovation to transformation as the enterprise's free technology. At last, improving the technical content and added value of products, enhancing the competitiveness of enterprises.

Strengthening market research, optimizing investment decisions, reducing investment risks. As investment environment of each APEC member economies are different, enterprises should strengthen market research, collect market information according to the drivers of investment, to choose a different country and investment industry when making investment decisions. Enterprise can find more market information through export trade, and select investment ways flexibly. In addition, enterprises should make full use of the information exchange platform, and establishment effective communication and coordination mechanism with APEC member countries enterprises and consumers, understanding APEC member countries market information, grasp the opportunity at the first time.

5.4.3 Recommendation from the perspective of APEC member countries

Canada should actively explore the domestic market, optimize the industrial structure, develop high-tech industries, such as aerospace industry, automobile manufacturing to the steady development of services, such as education, health and finance, and so on. Because Canada is a trading nation, a trading nation means this country where international trade makes up a large percentage of its economy. Canadian exports to the US (mostly raw materials) account for 20% of its GDP 73% of Canadian exports go to the US, while 63% of its imports come from the US (2009).If trade between the nations ceased today, it will be a minor inconvenience to America. Canada on the other hand will cease to exist. Therefore, Canada should reducing dependence on foreigners through adjust the domestic industrial structure and open up the domestic market.

Market size is a significant factor in attracting FDI in Chile. Copper is a pillar industry in Chile, so the Chilean government should increase development of copper resources. At the same time to adjust the industrial structure, develop the tertiary industry to make the economic structure reasonable and healthy. Thereby promoting economic growth and expanding the domestic market.

China should actively adjust the industrial structure, develop science and technology, education, increased domestic demand and open up the domestic market, promote GDP healthy and reasonable growth, reduce dependence on real estate.

Meanwhile, China should implement a "prudent and neutral" policy to keep exchange rate stable, so that create a favorable financial environment. Finally, actively explore and develop domestic resources and increase reserves, reduce resource exports.

The foreign trade level is the significant factor influencing Korea's attracting FDI. Korea should develop domestic industry, adjust the industrial structure, improve the supply chain, rational allocation of resources, thereby reducing dependence on foreign trade, so that it can better attract international investors to FDI.

Market size, natural resource endowment and financial environment are the significant factors influencing Japan's attracting FDI. Japan should develop the surrounding marine resources vigorously, reduce domestic dependence on imported resources. Japan's foreign exchange reserves should be increased to create a stable financial environment, steady improvement in the Yen exchange rate.

Market size is a significant factor in influencing Malaysia's attracting FDI. Malaysia government should focus on the developing agricultural and infrastructure construction, promoting consumption and attracting foreign investment. And Malaysia should develop the tourism industry vigorously, actively develop a diversified economy, and actively support SMEs, so as to promote the economic progress. It should be noted that the large number of people engaged in the service sector in Malaysia, so Malaysia should develop education, strengthen professional

skills training, improve the quality of personnel.

Market size is a significant factor influencing Mexico's attracting FDI. Mexican government should increase to exploit and utilize resources, and at the same time to crack down on illegal and criminal, stable social order, stable social order, promoting the construction of infrastructure, and enhance investor confidence in order to attract FDI.

Natural resource endowment and financial environment are the significant factors influencing New Zealand's attracting FDI. New Zealand should increase resources reserves, appropriate to reduce the export of resources, while increase the foreign trade level, enhance trade with other countries, developing domestic infrastructure construction and keep the exchange rate stable. In addition, New Zealand's national conditions should be based on the development of services, such as finance, education, health and creative industries.

Infrastructure is a significant factor in attracting FDI to the Philippines. Philippines should open up the domestic market, adjust the industrial structure, promote the rational use of resources, thus promote the growth of GDP. Secondly, Philippines should improve the domestic industrial chain, reduce the dependence on foreign trade, and vigorously develop the infrastructure, so that the domestic infrastructure can meet the needs of investors. Next, Philippines need to maintain the stability of the financial environment, increase foreign exchange reserves, to resist financial risks, to maintain the stability of the exchange rate. In the end, Philippines

should strengthen its good neighbor relations with its neighboring countries, strengthen cooperation with neighboring countries, and promote political stability and enhance investor confidence.

Infrastructure and science and technology are the significant factors influencing Thailand's attracting FDI. Thailand should actively adjust the industrial structure, strengthen economic exchanges and cooperation with neighboring countries, develop domestic and foreign markets, promote GDP growth and economic development. At the same time, Thailand should increase their reserves, pay attention to the international economic situation, maintain a stable financial environment, growth exchange rate in exchange rate stable, alert international capital short or long, to create a good financial environment for international investors.

5.5 Limitations and further research

After empirical test for this study, the estimation in this study is conducted in a limited scope which can be listed as follows:

The APEC have a total of 21 countries and regions, but in this study only use 10 countries relevant data, this may cause the results have certain biases and limitations. In future studies, it is better that to collect all APEC members' data to study factors affecting FDI in APEC member countries. In addition, OLS regression for Canada, China, Malaysia, and Mexico's related data did not pass the F test,

possibly because of too little observations.

There are a lot of factors affecting FDI in APEC member countries, but this paper just focus on seven factors including GDP, NER, ER, FTS, IPG, PAN, GS. There are some factors which effecting FDI in APEC member countries might be missed to examine in this research. Future study should add more variables to investigate the impact of factors affecting FDI.

The results of r-squared are not high which indicates that the explanatory power of the model is not very strong. Future research should increase the variable or replacement model to improve it.

In the OLS regression results, Japan DW value is too small, the panel data regression, the financial crisis of the regression results of the DW value is too large. Therefore, the conclusions may be biased with the reason that it may be insufficient observation. If future research want to refer to the relevant conclusions should pay attention in this point.

Studies have shown that factors affecting FDI are different that during the financial crisis and the general periods, future research could choose other financial crisis data to empirical research to verify this conclusion is reliable.

In this study, the OLS model is used to examine the factors affecting FDI in APEC member countries. But using OLS has many defects, study can try to use other methods, in future research, such as GMM empirical analysis.

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