Determinants of Foreign Direct Investment in Germany

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Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the Degree of

Master of Science
in
Banking and Finance

Eastern Mediterranean University
August 2014
Gazimağusa, North Cyprus

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ABSTRACT

Foreign direct investment is defined as the investment made by a firm or an individual or an entity based in local country, into a firm, or entity based in another country (Dunning, 1977). This thesis aimed to analyze the determinants of FDI in one of the most powerful economics at the world; Germany. The period chosen for the study was January 1985 − December 2013. The variables chosen for this study were foreign direct investment, effective exchange rate, real GDP, interest rate, inflation, labor cost, import and export. To analyze the obtained data on each variable, various approaches were introduced.

To investigate the determinants of FDI, gravity model was considered to be the most accurate and helpful approach (Egger, 2003). Hence the current study used the gravity model to implement the methodology. Two different equations were used to evaluate the financial and economical determinants of FDI separately. The first model described changes in FDI according to the changes in financial factor and the second model took the macroeconomic factors into consideration.

The results of unit root tests revealed that the data was stationary at first level. After this test Vector Error Correction model and Johansen Co-integration tests were applied. Results on these analysis showed that variables chosen for study were insignificant in the short run and it could be said that they did not have any short run association to foreign direct investment. On the other hand, in the long run, all variables except inflation could not significantly affect the amount of FDI in Germany.

Results showed that FDI in Germany was likely to be under the effect of changes in both economic and financial factors. However, economical factors tended to make more changes in FDI level in Germany.

ÖZ

Doğrudan yabancı yatırım, bir ülkedeki şirket, şahıs ya da kuruluşların başka bir ülkedeki bir şirkete ya da kuruluşa yatırım yapması olarak tanımlanır (Dunning,1977). Bu tezin amacı; dünyadaki önemli ülkelerden biri olan Almanyaiçin, doğrudan yabancı yatırımı belirleyen faktörleri analiz etmektir. Çalışmaiçin seçilen zaman periyodu January 1985 - December 2013 yıllarını arasındadır. Çalışmada kullanılan değişkenler; doğrudan yabancı yatırım, efektif döviz kuru, reel GSYİH, faiz oranları, enflasyon, işgücü maliyetleri, ithalat ve ihracattır. Her bir değişken için toplanan veriler ile ilgili çeşitli yaklaşımlar uygulanmıştır.

Yerçekimi modelinin, doğrudan yabancı yatırım ile ilgili faktörlerin belirlenmesinde ki en doğru ve en yardımcı model olduğu varsayılmaktadır (Egger 2003). Bu nedenle, bu çalışmadaki methodolojinin uygulanmasında yerçekimi modeli kullanılmıştır. Doğrudan yabancı yatırımın finansal ve ekonomik belirleyicilerini değerlendirmek için iki farklı denklem kullanılmıştır. Bu modellerden birincisi finansal faktörlerin doğrudan yabancı yatırımlar üzerindeki etkisini incelerken ikinci model de makroekonomik faktörlerin doğrudan yabancı yatırımlar üzerindeki etkisi dikkate alınmıştır.

Birim kök sınamasının sonuçları, çalışmada kullanılan verinin birinci derecede durağan olduğunu ortaya çıkarmıştır. Bu testin devamında yöney hata düzeltme ve Johansen eştümleşme modelleri uygulanmıştır. Bu analizlerden elde edilen bulgular, çalışmada kullanılan değişkenlerin kısa vade de anlamsız olduğunu ve doğrudan

yabancı yatırımla kısa vadede bir ilişkilerinin olmadığını ortaya çıkarmıştır. Bunun yanında uzun vadede enflasyon dışındaki değişkenlerin Almanya'daki yabancı doğrudan yatırımlarla anlamlı bir etkisi bulunamamıştır.

Elde edilen sonuçlar, Almanya'da ki doğrudan yabancı yatırımların hem finansal hem de ekonomik faktörlerden etkilendiğini göstermektedir. Ancak ekonomik faktörler, Almanya'daki doğrudan yabancı yatırımları daha çok etkileme eğilimindedir.

Anahtar Kelimeler: Doğrudan yabancı yatırım, Vektör hata Düzeltme modeli, Johansen Kointegrasyon, Almanya.

This thesis is dedicated to my parents

for their endless support

and encouragement

Thank you for giving me a chance to prove and improve myself
through all my walks of life

ACKNOWLEDGEMENT

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Chapter 1

INTRODUCTION

1.1 Background

Foreign direct investment (FDI) is defined as the investment made by a firm or an individual or an entity based in local country, into a firm, or entity based in another country (Dunning, 1977). FDI is known as one of the most important factors of growth for countries with capital deficiency and technological backwardness (Kleinert, 2001). Moreover, FDI could assist the technical progress in a country to improve as advances in technology could give a country a viable competitiveness in terms of domestic economy. FDI can positively affect the quality of products and help to build a more stable human resource. As a result, in a recipient country, the standards of living will significantly increase. Other advantages of FDI from investors' perspective is that, they can easily decrease the possible risk of investments by diversification in other countries (Kleinert, 2001).

In terms of local firms, the question is asked that whether FDI benefits the domestic firms or not. According to Córdova, & Ernesto (2002), FDI is known as to have a positive or negative influence on economies and on firms which are active in those economies. FDI is considered to be a vital aspect of cash flow transition in firms. There is strong evidence to support the different dimensions which cause this transition, such as, R&D cost, firm performance, innovation and productivity (Holland, & Pain, 1998). FDI causes a circle in the transition process, where

countries with high attractiveness in terms of FDI, attract high levels of cash flow, while other countries suffer from the lack of cash inflow in their economy (Nicholas Stern et al, 1999). Hence, inflow or outflow of FDI may affect the productivity of domestic firms through the horizontal and backward channels. However, the increase in the productivity of local companies via forward linkage is yet unknown and needs to be investigated (Córdova, & Ernesto, 2002).

Due to different motivations for investigating the FDI objectives, two different classifications can be presented (Duce, 2003). The first objective is called market-seeking. When FDI is used for developing the economic activities, market-seeking category is defined. Market seeking itself has two levels; export oriented and import oriented. When the aim is achieved through increase in exports, it is called export-oriented market seeking. On the other hand, when the focus is on the domestic market and the investment is preferred to be done in internal market rather than abroad markets, it is called internal oriented market seeking (Duce, 2003). The second category, which aims to improve the profit-cost structure via remodeling, is called efficiency seeking. In this approach, FDI is used to improve the profits and decrease the costs. It is usually possible by maintaining an effective balance between locations and different markets which help firms to remain profitable (Duce, 2003).

In order to invest in foreign countries, an investor supposedly considers a number of factors to choose the best destination. Egger (2003) list these factors as technological spillover, job creation, need of capital inflow, cheap labor cost, rich resources and more importantly stability. The owner of a business in a foreign country always seeks for a stable country in economics and political wise. Moving into another country would be extremely costly. That is the reason which makes the investors to

always aim for long term, but not short term, investments (Carr et al, 2001). If a country claims to be ideal to attract the foreign investors, the macroeconomic and microeconomic factors should be predictable. Furthermore, a strong institutional framework for contract enforcement should be designed, which makes the foreign investor to commit to a long term investment.

Since the collapse of Breton Woods's system, investors have always faced the threats of the exchange rate volatility. To be more on the point, there is a volatility caused by the creation of a phenomenon called "hot money." Investors and lenders are likely to create an environment in the market so called "asset bubble," which is caused by short term investments in the economy of those countries which they have invested. Lenders invest a huge amount of money in a short term period and sell those acquired assets just as quickly as they owned them which as the consequence exchange rate volatility is likely to occur because of market factors (equating supply and demand of domestic and foreign currency) and unstable macroeconomic frame which is considered to be an important risk factor to foreign investors. There are other risk factors which jeopardize the condition of a country to attract foreign investors even though most of these risks were mitigated. Now, when investors go after more long term investments such a FDI, the situation can be more stable since FDI has a long run nature and usually leaves permanent foot prints in a country (IMF 2010).

The main motivation for this study is the focus given to attract the FDI in both the receiving countries and the international financial institutions like the IMF and World Bank. Hence, the ensuing focus of this research is on the determinants of foreign direct investment for Germany. For this reason, this study firstly provides a

historical and empirical analysis of the trend of FDI in Germany from the 1984-2013 periods to identify the possible determinants of FDI by using descriptive statistics and econometric analysis.

This study has chosen Germany as the destination country since Germany is one of the most important recipient of FDI. Moreover, it is argued by the previous studies and reports (IMF, 2010) that Germany has a stable and reliable economy which can easily handle the turbulences and trials. It is obvious that Germany has shown to act more stable under the pressure of the mentioned events and that is the reason why this study tries to investigate the reasons which German economy can resist the challenges. Among European countries, Germany has proven to have a leading financial force which could make changes in both European and non-European countries. Germany is also known to be an innovative country which is offering grants to those investors who are willing to invest within this country and investors will benefit from significant tax benefits offered by the government. Also, interests paid on loans are very low for those investors willing to invest in Germany. Last but not least, no matter where they come from, Germany gives equal rights, benefits and regulations for all the investors.

Because of the features presented above, this thesis aims to analyze the determinants of FDI for Germany. The variables chosen to investigate the determinants of FDI in Germany are effective exchange rate, real GDP, interest rate, inflation, labor cost, import and export. To analyze the obtained data on each variable, there are numbers of approaches introduced. Among them, gravity model is considered to be the most accurate and helpful approach (Egger, 2003). Hence the current study uses the gravity model to implement the methodology.

The study follows the approaches of Egger (2003) and Carr et al. (2001). To do so, a number of statistical procedures are used. The study uses descriptive analysis to measure different characteristics of variables, such as mean, maximum, minimum and standard deviation. In order to investigate the interdependency of variables, a correlation matrix is applied. Also, a simple linear regression analysis will be conducted to observe the determinants of FDI in Germany.

The current study used Johansen Co-integration test. According to Johansen (1988), investigating the co-integration between variables is feasible when all the variables are non-stationary and are integrated of the same order. When variables are not in the same order, the results on Johansen Co-integration could be spurious (Johansen, 1988).

All variables chosen for the study are found as I (1). Hence Johansen co-integration could be implemented among all 9 variables. According to the chosen model, FDI is chosen as the dependent variable and GDP, export, import, interest rate, inflation, and labor cost are assumed to cause changes in FDI.

After Johansen co-integration test, vector error correction model is used to understand the long-run relation between the variables. As it is discussed before, the study uses two different formulations. According to both Unit Root Test and Johansen Co-integration test, it is revealed that both equations have at least one long run co-integration. The study used EViews to run the Vector Error Correction Model. The results for both equations are represented in the following tables.

The rest of the study is organized as follows. Chapter two provides a review of literature on FDI, exchange rate regimes and their interaction. Chapter three focuses on the methodology used for the study. Chapter four focuses on the analysis, ranging from a detailed coverage of the sample chosen for analysis, the theoretical frame work, and econometric background to the model specification and econometric analysis of the data. Chapter five presents the conclusion, indicates areas of future research in this regard and limitations of the work.

Chapter 2

LITERATURE REVIEW

2.1 Definition & Importance of FDI

FDI is considered to be an external investment in a country from foreign countries. As it is common in the world of economics and finance, each term and concept including FDI has a different definition from different perspectives. Different definition of the term could arise from different perspectives of host country, local country and different economies.

One classification that is given by Hong, & Stein, (1999), divides FDI into two broad categories. Import substituting FDI describes the production of previously imported good and subsequent reduction of an import of the investment receiving country. Export increasing FDI is motivated by the search for new inputs, raw materials and intermediate products to the investing country. Yet, there is also an unpopular form of FDI, which is called as government initiated FDI. This type of FDI suggests that government should allow foreign investors to invest domestically rather than internationally.

There is a significant difference between FDI and portfolio investment (IMF, 2000). This difference comes from the lasting control on the asset. It is said that this type of controlling is expected to control the interest to constitute 10% of shareholding.

According to UNCTAD (2006) in terms of developing countries, it used to be believed that FDI could have a negative impact of economies in these countries. After almost four decades by development in economies, this view changed. FDI has developed rapidly among the countries in the world over the past two decades. Globalization and openness are growing by a fast pace in 21st century which lead higher FDI. FDI is now seen as beneficial, and nearly all countries try to provide a welcoming climate for the investment. Countries increasingly recognize that they can affect the attraction of FDI using both the general economic policies and the appropriate specific FDI policies. It is reported by the IMF that, FDI has been among the most important tools to transfer technologies.

As the economy grows worldwide and the relation between countries started to be more and in different ways, governments in different countries realized the positive and negative effect of FDI inflow and outflow on their economies. Hence they tried to come by new policies and strategies in trade, import and export to use the benefit of the phenomena and prevent the economy to get affected by the matter. They later found out that the relation between FDI and development in a country is dependent highly to FDI. In this path governments started to plan policies such as, training more local labor and increasing the technological capabilities of them so that they could raise the absorptive capacity to be productive.

The importance of FDI has become clearer since the growth of the return on it could increase significantly. The theoretical background, which this study used, tries to point out the evolution of the term with theories related to it. The following part categorizes the different perspectives, theories and studies done by different researchers on the subject matter.

2.2 Theories of FDI

Classical theories of FDI try to connect and link it to the return in a market. Most of these theories on the mentioned basis consider that the market is perfect and risk neutrality in undertaking the investment abroad considers capital flows from countries with lower rate of return to countries with higher rate of return. The main purpose of the classical theories is to express that FDI could also be effected under different types of risks and not only market risks (Tobin, 1958; Markowitz, 1999). Another important hypothesis which is called the portfolio diversification is brought to add more determinants which FDI is related to.

2.2.1 Market Size Hypothesis

Market Size Hypothesis characterize that the level of FDI injected into a foreign economy is heavily depended on the size of the host economy (Markowitz, 1999). The desirable host economy is the one which provides the exploitation of economies of scale. If the economy guarantees and supports the economies of scale, consequently would be the target for FDI for the investors. As Markowitz (1999) stated, the level of the FDI imported into an economy will increase as the market size increases. It is somehow expected that by growth in market size, more capital inflow enters to the economy of the host country.

2.2.2 FDI in Multinational Companies

In terms of multinational corporations, (Hymer, 1960) has contributed new perspectives to the field. He stated that, when a firm enters to a new market in a foreign country, it is highly expected to face many difficulties in terms of culture, language, legal system, regulations and labor force. Overcoming these difficulties is not achievable though. Many firms and corporations have successful businesses in

other countries which show the level of strength in their brand name, patent protected technology, managerial skill, economies of scale (Hymer, 1960).

Other scholars such as (Kindelberg, 1969) stated that if the operating costs of firms are at minimum, they prefer FDI. In this case, the additive production for export would shift them up to an increasing cost category.

2.2.3 Internalization Hypothesis

The main concept of Internalization Hypothesis is that FDI is the result of motives to replace the transactions in markets by internal transactions. In other words, when a host country of FDI does not have the locational specific features and advantages, firms try to capture the local market entirely and when this process is done, the additional leftovers could be exported. Hence, when the host country does not have the specific features for both the investors and the firms, the main target should be the local market and later on the firm could exploit the market in a foreign country by exporting. Conversely, when a host country has the specific advantage that is desirable for the firm, firms prefer internalization of the foreign market (Chen, 1983).

On the mentioned hypothesis, there are a number of empirical studies done. For instance, (Chen, 1983), in his study, concluded that "Japanese tend to transfer labor intensive technologies to developing countries as these countries have a comparative advantage with respect to labor endowment." Moreover, he mentioned that the theory is not able to describe the FDI inflow in United States of America.

2.2.4 Location Specific Hypothesis

Another interesting explanation of FDI comes from the Location Specific Hypothesis. This theory develops from the understanding that FDI emanates, because

there are non-transferable location specific advantages. One can be related to a low production cost in one location, and take a lower wage rate in one part of a country or the availability of some inputs, or factors related to favorable government policy. Thus the relative wage in one part of a country relative to the wage in the other country is an important determinant of FDI inflow. This theory can be traced back to (Mundell, 1957). That is why countries like India attract labor intensive production (for example, foot wear and textiles) from high wage countries. That is also why Mexico is the preferred destination for MNC's in North America to Canada (Moosa, 2002).

The theory developed by Dunning (1977, 1979 and 1988) combines the micro economic and macroeconomic perspectives to develop the so called OLI diagram. According to Dunning (1977), the growth of MNC's is the result of simultaneous combination of three sets of advantages relative to other firms:

1) Ownership specific advantages which are mainly intangible knowledge based assets, such as superior technology, monopoly power, better resource availability and usage, etc.

2) Internalization advantages implying that FDI occurs only if the ownership specific advantages can profitably be internalized. This is made possible when FDI enables the firm to avoid risks and uncertainties that stem from exporting and/or licensing.

3) Location specific factors of the home and host country.

2.2.5 Product Life Cycle Hypothesis

Product Life Cycle Hypothesis, which was developed by Vernon (1966), traces the source of FDI to a product life cycle. Products go through different life cycles: initiation, exponential growth, slowdown and decline.

In early stages of a product life cycle, a firm serves a domestic market. As the production expands and the product reaches to maturity, the firm resorts to export to foreign markets. As this product develops and competition begins, the firm resorts to FDI. Finally, the product ceases to be the sole ownership of the innovating firm and the firm faces firm competition. Finally, the firm moves into a developing economy in search of cost advantage.

This prediction is consistent with the pattern of dynamic changes observed for many products. For example, personal computers were first developed by US firms (such as IBM and Apple computers) and exported to foreign markets. When personal computers were standardized, USA became an importer from producers based in Japan, Korea and Taiwan (Moosa, 2002).

2.2.6 The Oligopolistic Reactions Hypothesis

The Oligopolistic Reactions Hypothesis considers FDI as a result of competition holding between major players of the market. A move by one firm to engage in foreign investment might be taken as a threatening move by the other firm against its market share and thus considers moving into the market to maintain its status quo. The first firm moving for FDI might either be attracted by government policy or its R&D effort.

Knickerbocker (1973) considered these competitive reactions between firms as an oligopolistic reaction. Oligopolistic reaction (for FDI) increases with the concentration, and decreases with the diversity of the product. Horizontal investments will be made if there is product differentiation, and vertical investments will be made if there is no product differentiation.

Each of the underlying theories has a share in factors determining FDI across the countries. However, none of the theories address the full image of FDI determinants. Thus many scholars have tried to incorporate additional variables that are thought to influence FDI inflow across countries such as the market size, the economic stability of the host country, the growth rate of the domestic economy, the political stability and other political and geographic factors.

2.3 Determinants of FDI

2.3.1 Exchange Rate

One of the most important factors which usually investors consider is the fluctuations in exchange rate when planning to invest in other countries. Many studies are conducted on FDI and its relation to exchange rate fluctuation and interestingly most of them concentrated mainly on two concepts: the fluctuation in exchange rate and its level. Froot et al. (1991) argued that exchange rate and its movements could affect the FDI decisions.

There are two important facts related to exchange rate: appreciation and depreciation. Depreciation is defined as the loss of value of a country's currency with respect to one or more foreign reference currencies. On the other hand, an increase in the value of one currency in terms of another is called appreciation. It is known that depreciation of a country's currency (host country and currency) is likely to increase the FDI in the country, and inversely, while the currency of the country appreciates the level of FDI is expected to decrease Froot et al. (1991).

In finance and investment literature it is fully described that rate of return of an asset is more important than the price of that asset (Campa, 1993). While depreciation of a

currency occurs, both price and nominal return of assets are likely to decrease. As Froot et al. (1991) showed, since nominal return and price go down simultaneously, the attractiveness of FDI should not decrease. In other words, it is likely to remain constant. When capital markets are under the negative impact of information imperfections, fluctuations of exchange rate could affect the FDI. The other factor which could cause "divergence" between internal and external financing is the information asymmetry. In an economy where the risk of information asymmetry exists, the investors tend to keep their money in other currency. Whenever a depreciation in value of the local currency happens, the wealth of those investors will increase due to their investment in foreign currency, and hence lead the investors from abroad to bid tenser on domestic assets Froot et al. (1991). To prove their hypothesis, Froot et al. (1991) used industry data on direct investment inflow in United States of America for a 10 years period from 1970 to 1980.

Other studies such as Jayaratnam (2003) and Campa (1993) concluded different results and relationships between FDI and exchange rate. In their model, the future decision of investing in a foreign country relies on the level of profitability in future. As the level of exchange rate increases, the expectations of future profits from entering in a foreign market will be higher. In his empirical study, he supported his model which showed the inflow of FDI in the United States of America.

Another study which considered being a unique one since focused on both FDI inflow and outflow is conducted by Gorg, & Wakelin (2001). They investigated the FDI outflow from US to 12 other countries and inflow to US from those 12 countries. They result showed a positive relation between FDI outflow in US and the

appreciation in the currency of the host country, and the vice versa happened for FDI inflow to US.

Blonigen (1997) in his study focused on FDI in Japan from 1975 to 1992. His results stated that FDI could be effected by movements in exchange rates as this involves purchasing firm specific assets in the foreign currency that can generate returns in another currency. Although Froot et al, (1991) had the same outcome, the results of Stein's study are in contradiction to theirs.

2.3.2 Exchange Rate Volatility

Previous literature used two different approaches to connect the exchange rate volatility to FDI, production flexibility and risk aversion. Production flexibility describes that movements and volatility in exchange rate could cause the FDI to increase since companies could adjust the application of one of their variable factors according to the nominal or real returns. The risk aversion theory discusses that when there are fluctuations in exchange rate, FDI is likely to decrease. The reason is that, the higher fluctuations in exchange rate lower the safe investment and equivalent expected rate of exchange Goldberg, & Kolstad (1995). According to Goldberg, & Kolstad (1995),in the profit functions for firms the equivalent levels are used which make the decision related to investments today in order to realize the future profits. When the effect of volatility is short term, arguments on risk aversion are more convincing since companies are not able to adjust the factors in short-run.

There is no clear study which shows the absolute relation and effect of exchange rate fluctuation and FDI. Different studies revealed different results. Some researchers, such as Dixit, & Pindyck (1999), concluded that the relation between exchange rate fluctuation and FDI is positive. Others, such as Jayaratnam (2003), found a negative

relation between them, and some found intermediate relation Goldberg, & Kolstad (1995).

When there is a positive effect between these two factors it can be said that the FDI exports substituting. When there is an increase in volatility of exchange rate between the host country and headquarters, a local production facility rather than exports could help the economy which leads to insulating against the currency risk. Adjustment of the negative effect of exchange rate on FDI was found in the study done by Dixit, & Pindyck (1999). In an economy with a high volatile exchange rate, the level of profit is uncertain. Hence there is no certainty on the level of future profits which decreases the attractiveness of the host country for investors.

According to Foad (2005), there are many different potentials of FDI, those countries with stable economies and stable volatility of exchange rate are more likely to be targeted by foreign investors. Companies usually engage in FDI to prevent the international trade costs which involve the risk of currency Markusen (1995). He concluded that, by increase in volatility of exchange rate, firms and companies tend to shift to foreign markets via a local production facility rather than exports. There are other studies which are in line with the previous statement. Among them are Stokman, & Vlar (1996) and Cushman (1988). They resulted by showing a positive relation between FDI and exchange rate volatility in United States of America and Netherlands.

Another study was done by De Menil (1999) in most European countries. He found that if the level of FDI is expected to increase by 15%, a 10% increase in exchange rate volatility is required. Pain, & Van Welsum (2003) found the same results for

industrialized countries. They found positive impact of exchange rate for inflows of FDI in the UK, Germany, Canada, and the US.

Darby et al. (1999) focus on threshold model to investigate the long run relation between FDI and exchange rate volatility in countries such as France, Germany and United States of America. They also investigated a negative short run relationship between FDI and exchange rate in the UK and Italy.

Bryne, & Davis (2003) stated that an increase in monthly volatility by 10% in exchange rate could cause the FDI to decrease by 1.5% in total volume. Other studies such as Benassy-Quere et al. (2001) concluded a negative effect of volatility of exchange rate on FDI in developing countries. When there is a currency risk, the level of FDI decreases Hubert, & Pain (1999).

2.3.3 GDP

Gross domestic product is considered to be the primary factor of economic activity in every country Qaiser Abbas et.al. (2011). It is the result of three important elements, which are expenditure, income and the output which is led to income. GDP could provide a general view of how a country is performing the economic wise. Although the factor considers most important parts of an economy, it ignores many other factors such as the environment, life expense, population and safety Walsh (2003). The factor is reported to cause significant changes on the level of FDI. Different studies pointed the positive relation between FDI and GDP such as Wei, & Liu (2001) for China, while others such as Pantulu, & Poon (2003) have found the reverse relationship.

2.3.4 Import

Import is defined as the goods or services brought from one country to another Aizenmana, & Noy (2006); Pantulu, & Poon (2003). When imports are increased and exports are not increased with the same pace, it can be said that the country is facing a negative balance of trade Fontagne, & Pajot, (2002).

Since the factor is incorporated with FDI, it is shown in previous studies that changes in amount of imports can alter the FDI in a country. Previous studies such as Wei, & Liu (2001) resulted that there existed a causal relationship between FDI and import in China for the period 1984 to 2000. It was concluded that the growth of China imports caused the growth in inward FDI from home country, which in turn causes the growth of exports from China to home country.

2.3.5 Export

One of the key elements in international trade is export. It is defined as those goods which are produced or manufactured in home country and are sent to other countries. Ahmad et al. (2007); Yu et al. (2011); Iqbal et al. (2010) investigated the correlation among export and FDI in different countries such as Ghana, Kenya, Nigeria, South Africa and Zambia, Taiwan and South Korea and in Pakistan. Their results show a long run relationship between these two factors. They concluded that government in these countries must play a positive role in providing security to the investors around the globe.

2.3.6 Labor Cost

Labor market is defined as the market where those who are demanding a job, are given one by those employers who seek work force and are willing to pay a determined wages (Wood, 1994; Leamer 1998, 2000).

It is said that labor market could significantly affect FDI in many countries. Many studies are done on this subject. Among others, Cline (1997); Pflüger (2002) and Feenstra (2010), concluded that sometimes the effect of labor market on FDI could be negative. They concluded that when wages in a country increases, investors turn away from such countries since the cost of production can be high.

2.3.7 Inflation

Inflation is defined as "the rate at which the general level of prices for goods and services is rising, and, subsequently, purchasing power is falling" Leamer (2000).

One of the most important factors which can significantly affect the FDI inflow in countries is the inflation. This factor can reveal many aspects of an economy. When inflation is not stable and fluctuates frequently, investors are most likely to turn away from such countries since investing in those economies can result in failure. Pflüger (2002) & Feenstra (2010) concluded that inflation could alter the total amount of FDI in countries such as Pakistan and Kenya.

2.3.8 Interest Rate

Interest rate is defined as "The amount charged, expressed as a percentage of principal, by a lender to a borrower for the use of assets. Interest rates are typically noted on an annual basis, known as the annual percentage rate (APR)" Wood (1994).

Some previous studies indicate that the relation between FDI and interest rate can exist but not necessarily (Cline, 1997; Pflüger, 2002 ; Feenstra, 2010). However, other studies, such as Walsh (2003) resulted that if the investors are to borrow within the destination country, when interest rates are high, they would choose other countries with lower interest rate.

2.4 Germany

2.4.1 FDI Background in Germany

The previous studies and reports (IMF, 2010) proved that Germany has a stable and reliable economy which can easily handle the turbulences and trials. Among European countries, Germany has proven to have a leading financial force which could make changes in both European and non-European countries. Germany is also known to be an innovative country. Germany is offering grants to those investors who are willing to invest within this country. Investors benefit from significant tax benefits offered by the government. Also, interests paid on loans are very low for those investors willing to invest in Germany. Unlike other countries, that discriminate local and overseas investors, Germany offers equal benefits and limitations to any investor without noting the country of origin.

Official Bundesbank in 2011 announced that, EU-27 was responsible for more than 50% of the FDI inflow stocks in Germany. 23% of FDI stocks came from North America and the rest from the other counties worldwide. It is said that only 6% of the FDI stocks in Germany was the share of Asia.

During the past decade, interestingly not many studies targeted the FDI in Germany. In their descriptive study with the focus in Germany, Juhl, & Donges (1979), analyzed the effect of FDI in Germany on the domestic employment. Wilkens, & Hackenbruch (1988) evaluated the developments of FDI within the federal republic system. However, they did not focus entirely on the economic determinants of German FDI.

It is worthy to mention that number of studies with the focus on the factors which effect FDI in Germany is very low.

2.4.2 Fundamentals of German FDI

In 2010, FDI stocks in Germany are increased by almost 7% in terms of EURO currency. On the other hand, when the currency changes to US Dollar there was a slight decrease of 1%. This happened because of the depreciation of EURO against the US Dollar.

By the end of 2010, German inward FDI reached 70% of the outflow FDI. This caused an employment of almost 3 million workers in Germany. They could produce the income of over 1.5 billion US Dollar for Germany. This caused a reduction in foreign employment in Germany (Central Bank of Germany, Annual Report 2012).

It is important to mention that a high number of the largest MNEs are operating in Germany, which is an advantage for them, since Germany has a great economy in Europe and has also a great geographical location. In 2011, FDI inward in Germany started to increase to 49 US$ billion, however, this amount could only reach to 11 billion US$, after that (Deutsche Bundesbank data). It is reported that the equity investments were 7 billion US$ in Germany. According to BMWI (2012), the German FDI inflow declined rapidly in the second half of 2012. This was because of the situation in the whole Europe and it cannot be considered as the German's weak economy. In fact, Germany tried to help other countries such as Greece, Spain and Portugal to cope with their current situation and bypass the recession.

The first sector which attracts more FDI is the services sector with almost 66% of FDI. Germany has developed a strong economy during the past decades and that's

why most of the largest multinational firms in large industries are located in Germany. For instance, high tech sectors, such as automobile, computer and IT, chemical, machineries, and warfare.

In 2010, the FDI inflow to manufacturing grew by almost 15%. Although it had a decline with respect to previous years, it was still the highest among other European countries. Developed countries are reported to have the most share of FDI inflow in Germany. However, since most of MNCs are located in Germany and they are also active in developing economies and markets, the share of developing countries is far greater than 4% of FDI inward to Germany Wilkens, & Hackenbruch (1988).

Chapter 3

DATA AND METHODOLOGY

This chapter will explain the data used for the study and those approaches used to obtain the results from data.

3.1 Research Data

The current study focuses on determinants of FDI from two different perspectives: economic wise and financial wise. Different variables are introduced according to each perspective. These variables will be discussed later in this chapter accordingly. Generally, each study uses two different types of information: theoretical information and statistical-econometric analysis which is usually used to calculate the final results of the study. The author of the current study follows the same direction. The numerical data of different variables are fetched via two different databases; Thomson Reuters' Data Stream and World Bank Data Base (2013). Since the focus of the study is on developed markets, Germany is chosen, which is proved to have one of the most stable and strongest economies in the world Kotov (2008).

The period chosen for the study is 29 years from January 1984 to December 2013 and data is obtained quarterly. The study uses quarterly data since according to Kotov (2008). quarterly data could increase the reliability and accuracy of the estimates when econometric factors such as GDP or FDI are being investigated.

3.2 Choice of Variables

As it is mentioned before, this thesis uses two different models to capture those factors which are likely to make changes on FDI in Germany. For the models which investigate the determinants of foreign direct investment economic wise, following variables are chosen:

i. Gross Domestic Product (GDP)

   GDP is the sum of all goods and services which are officially recognized in a specific country within a period of a year. It is known that the standard of living in a country is to be shown by GDP per capita. The current study obtained the data of German GDP from Thomson Reuters' Data Stream by using the key word of "BD GDP". As it is mentioned before, the GDP is extracted from National accounts and is obtained seasonally.

ii. Interest Rate

   The interest rate is the rate which is charged or paid for the use of money or more precisely the cost of borrowing. Gross, & Trevino (1996) argue that, a relatively high interest rate in a host country has a positive impact on FDI inward. However, the direction of the impact could be reverse if the foreign investors would depend on host countries' capital market for raising the FDI fund. The researcher has used prime lending rates because the investors are lenders and borrowers.

iii. Effective Exchange Rate

   Froot et al. (1991) claim that, effective exchange rates can affect FDI through an imperfect capital market channel. In this case a real depreciation of the domestic currency raises the wealth of foreign investors relatively to that of

domestic investors and thereby increases the FDI. Overvalued effective exchange rates are associated with shortages of foreign currency, rent-seeking and corruption, unsustainably large current account deficits, BOP crises, and stop and go macroeconomic cycles all of which are damaging the FDI. In addition, high levels of exchange rate volatility can be disruptive to exports and investment. In this study, effective exchange rate is defined as the rate adjusted for relative movements in national price indicators (CPI) of the home country and selected countries. The data related to the variable is extracted from Thomson Reuters' Data Stream by using the key word of "EM EFFECTIVE EXCH.RATE - REAL CPI NADJ".

iv. Inflation

Akinboade (2006) claimed that "low inflation is taken to be a sign of internal economic stability in the host country. Any form of instability introduces a form of uncertainty that distort investor perception of the future profitability in the country." Wint, & Williams (1994) showed that a stable economy attracts more FDI, thus a low inflation environment is desired in countries that promote FDI as a source of capital flow. The data related to the variable is extracted from Thomson Reuters' Data Stream by using the key word of "BD INFLATION NADJ."

v. Labor Cost

Since labor cost is the cost of production, the higher the labor cost the greater it will have a negative effect on FDI. Average salaries paid by the government of Germany to its employees were used, that is total wage bill per month divided by the total employment base and was expressed as labor cost per capita. The data related to the variable is extracted from Thomson

Reuters' Data Stream by using the key word of "LABOR COSTS PER EMPLOYEE."

vi. Export

One of the main factors which could affect the level of FDI in a host country is export. It is reported that export could have different effects on FDI which could differ from one country to another. For instance, in a study done by Pfaffermayr (1994, 1996), he concluded that the causal relationship was positive and direct between FDI and export. In another study, Eaton, & Tamura (1994), concluded that the relation was complementary. Lipsey, & Weiss (1981), found a positive relation for USA, while Marchant et al. (2002) found a complementary relation. According to Lipsey, & Weiss (1981), it is generally said that, the specific trend of market in the host country, could have influence on the relation between FDI and export in firms. The data related to the variable is extracted from Thomson Reuters' Data Stream by using the key word of "BD EXPO."

vii. Import

There are two different relations recognized between imports and FDI. FDI could be injected to a country, if imports were the proof that a market existed for a commodity. Hence the market would open to the investors to either import or establish firms in the host country. In the second condition, when the firms are established, they would import different types of goods (basic components and intermediate goods produced by the headquarters) to satisfy the quality standards required by the international market; therefore, FDI inflows increase the demand for imports.

3.3 Research Methodology

Different approaches used in this study are described in the previous chapters. This section however, tries to describe the research methodology used in the study. The analysis which tries to explain the techniques and methods used for the study is called methodology Irony et al. (2005). This also describes the methods body and principles used in the study. The current section, explains the analytical and theoretical models and hypothesis and qualitative or qualitative approaches.

Based on the specific characteristics of the current study, two different methodologies are proposed. Figure 1 illustrates the procedure that the study plans to undertake.
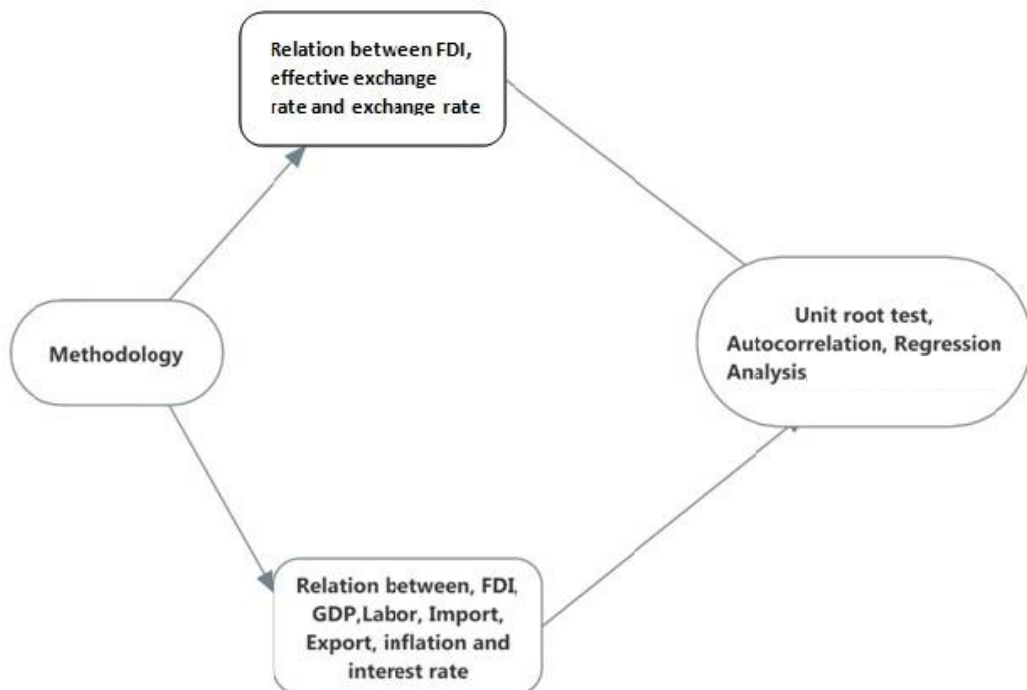

Figure 1. The Procedure of the Study

According to the specific characteristics of the current study the following research questions are considered to be answered.

1) What are the macroeconomic determinants of FDI in Germany?

This question considers the macroeconomic factors. According to this research question, GDP, inflation, interest rate, export, import and labor cost are assumed to cause changes in the level of FDI in Germany.

2) Could effective exchange rate cause changes in FDI?

3.4 Hypothesis and Models

As it has been mentioned earlier, this study uses the linear regression with 8 different variables. To do so, two different equations are implemented. In each of them FDI is the dependent variable. Each equation has its own task and tries to show the effect of independent variables individually and in a group. All results including the regression and equation are separately given in a table. According to the chosen equation various hypotheses are developed.

The first equation tries to understand the effect of the most important macroeconomic factors on FDI. The formulation is as following:

$$lnfdi = \beta0 + \beta1 lnGDPit + \beta2 lnINFit + \beta3 lnINTit + \beta4 lnEXPORTit$$

$$+ \beta5 lnIMPORTit + \beta6 lnLABORit + \mu it$$

And second equation tries to capture the effect of effective exchange rate on FDI with the presences of effective exchange rate and exchange rate:

2) $lnfdi = \beta0 + \beta1 \, ln \, Effective \, Exchange \, Ratet + \beta2 \, ln \, Exchange \, ratet$

The return and changes in each variable is calculated in Excel by using the natural Logarithmic return. Overall, it is expected that this sets of equations will enable the study to determine how changes in macroeconomic factors affect the foreign direct investment.

Chapter 4

EMPIRICAL RESULTS

4.1 Introduction

As discussed in previous chapter, this study defines two different linear equations with nine different variables in total. In each equation FDI is considered as the dependent variable. Each equation tries to reflect the effect of independent variables individually on FDI. All results including the regression and formula are separately given in tables. Furthermore, the study implies other techniques such as the co-integration test, unit root test, descriptive statistics and vector error correction model to investigate the mentioned equations.

4.2 Descriptive Statistics

To have a prior understanding about the data at hand this study uses EVIEWS to calculate the descriptive statistics. Results to the tests are reported in the following table:

Table 1. The Descriptive Statistics

	EEXCH	EXCH	EXPO	FDI	GDP	IMPORT	INF	INT	LABOR
Mean	99.14	0.84	89.40	11.13	98.97	92.24	1.59	4.46	98.69
Median	100.00	0.81	84.58	11.47	98.83	87.34	1.62	4.30	99.40
Maximum	108.90	1.18	142.07	13.81	111.40	138.54	3.08	7.64	112.84
Minimum	83.10	0.63	43.66	7.58	86.19	49.05	-0.23	1.54	86.96
Std. Dev.	6.79	0.13	30.23	1.40	7.28	26.79	0.70	1.37	6.41

According to the data and chosen period, the mean for exchange rate is reported to be 0.841. It can be said that mean of changes from EURO to USD is 0.841, which is really close to the minimum exchange rate. On the other hand, the export of goods and services in Germany is calculated to have the mean of 89.39. The maximum amount of goods and services exported is reported to be as much as 142.0700 which is considered to be a high value for a quarter in a country. During the chosen period for the study, from 1984 to 2013, the results of descriptive statistics on inflation are outstanding. The average inflation for this 29 years period, is only 1.59. On the other hand, the maximum inflation is 3.08 which is also considered to be a good value since the period contains two different financial crises, namely; Asian Financial Crises of 1997 and 2007 Global Financial Crisis. Generally, it can be said that, Germany is considered to have a low inflation rate and this rate has been well managed so far in order not to increase to bigger values. The other factor, which is very interesting, is GDP. Germany ranks the fourth between more than 180 countries worldwide according to the Association of Southeast Asian Nations.

4.3 Correlation Analysis

If variables are highly correlated to each other in a multiple regression model, it is said they might suffer from multi colinearity problem. This leads a variables to falsely predict changes in other variables by a non-trivial degree in accuracy. When the data set has the multi-colinearity problem, the regression coefficients are not going to be calculated accurately. Different approaches are introduced to detect the problem. One of the most used ones is called Pearson's correlation Matrix.

To check the multicollinearity problem between the variables used in this study, the same approach is used in EVIEWS. Lewis (1993) argued that if the calculated

coefficients in the matrix are, lower than 0.8 the multicollinearity could not be an issue.

Table 2. Correlation matrix

	EXCH	EEXCH	FDI
EXCH	1		
EEXCH	-0.42838	1	
FDI	0.06781	-0.38258	1

	INF	FDI	EXPO	GDP	IMPORT	INT	LABOR
INF	1						
FDI	-0.30592	1					
EXPO	-0.27749	0.443318	1				
GDP	-0.33566	0.485157	0.098862	1			
IMPORT	-0.31119	0.462616	0.696736	0.412945	1		
INT	0.170388	-0.42045	-0.47034	-0.52814	-0.68499	1	
LABOR	-0.46066	0.439397	0.353764	0.61349	0.406228	-0.63522	1

4.4 Unit Root Test Methodology

These determinants are tested through the application of various econometric analyses. Based on the specific characteristics of the current study, two different methodologies are proposed. For both approaches, regression analysis and unit root tests are implemented to obtain the desired results.

PP and ADF Unit Root Tests are applied to show the co-integration and the level of integration between variables (Dickey and Fuller, 1981; Phillips and Perron, 1988). PP and ADF tests are applied to evaluate if the series are stationary in this study.

4.4.1 Unit Root Test for Stationary

There are different tests used to estimate whether a set of data is stationary or non-stationary. This study, however, uses ADF and PP tests to evaluate the unit root. According to the results of the mentioned tests in EViews, it was revealed that all the data is stationary at their first difference level form. The following table shows the results of the tests.

Table 3. The unit root test

Statistics Level	Effective FX	FX	Export	GDP	Import	Inflation	Interest	Labor	FDI
$T\pi$ (ADF)	-2.314	-2.063	-3.043	-1.847	-2.386	-1.029	-1.424	-2.528	-2.533
$T\pi$ (PP)	-2.254	-2.095	-3.026	-3.022	-2.320	-1.453	-1.018	-2.764	-2.301

After testing the data in order to find out whether they are stationary or not, it is revealed that all the data could significantly reject the null hypotheses of both ADF and PP tests at first difference. The lag chosen for the test is automatically chosen according to Schwarz Info Criterion for ADF test and Newey-West Bandwidth for PP test. As it is mentioned, the study already uses EViews as the choice of software.

4.5 Regression Results

There are many theoretical and empirical studies that focus on the determinants of real income in the countries. These determinants are tested through the application of various econometric analyses. Therefore, the functional relationship in this study can be shown as follows:

FDI = f (GDP, EXPORT, IMPORT, LABOR, INFLATION, INT)

FDI= f (EEX, EX)

Both of the following equations are shown in the logarithmic forms of them to observe the influence of them on FDI.

$$lnFDIt = \beta 0 + \beta 1lnGDPit + \beta 2lnINFit + \beta 3lnINTit + \beta 4lnEXPORTit$$

$$+ \beta 5lnIMPORTit + \beta 6lnLABORit + \mu it$$

$$LNFDI = \beta 0 + \beta 1 \ln Effective\ Exchange\ Rate_t + \beta 2 \ln Exchange\ rate_t$$

As it is mentioned in the previous chapters, the study uses two different formulations in order to evaluate the FDI changes in Germany. Both equations have the FDI as the dependent variable and try to predict changes in it by using other independent variables such Gross Domestic Product Import, Export, Inflation and etc.

4.6 Co-Integration Analysis

The current study used Johansen Co-integration test. According to Johansen (1988), investigating the co-integration between variables is feasible when all the variables are non-stationary and are integrated of the same order (d). When variables are not in the same order, the results on Johansen Co-integration could be spurious Johansen (1988).

All variables chosen for the study are found as I (1). Hence Johansen co-integration could be implemented among all 9 variables. According to the chosen model, FDI is chosen as the dependent variable and GDP, export, import, interest rate, inflation, and labor are assumed to cause changes in FDI.

The results of the test are shown in the following table. According to this test, three different hypotheses are considered. The first hypothesis states that there is no co-integration between the variables. According to the test results, since the P-Value is statistically significant, the null hypothesis is rejected and the alternative hypothesis which states that there is co-integration among variables is accepted.

Table 4. The unrestricted Co-integration Rank Test (Trace)

Hypothesis		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.523896	160.5632	125.6154	0.0161
At most 1 *	0.316386	67.48309	65.75366	0.0378
At most 2	0.241936	55.15234	59.81889	0.1114
At most 3	0.199740	41.60840	47.85613	0.1700
At most 4	0.143334	22.66882	29.79707	0.2627
At most 5	0.091427	9.518730	15.49471	0.3196
At most 6	0.015976	1.368907	3.841466	0.2420
Trace test indicates 2 co-integrating eqn (s) at the 0.05 level				
* Denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

The second hypothesis states that numbers of co-integration vectors are less than or equal to one. As the results in the table above show, this alternative hypothesis is accepted. Hence there is at most one co-integration between the variables chosen for this study.

For the rest of the variables, it is shown that the alternative hypotheses are rejected.

4.7 Vector Error Correction Model

After Johansen co-integration test, vector error correction model is used to understand the long-run and short-run relationships between the variables. As it is discussed before, the study uses two different formulations. According to both Unit Root Test and Johansen Co-integration test, it is revealed that both equations have at least one long run co-integration. The study used EViews to run the Vector Error Correction Model. The results for both equations are represented in the following tables.

For the first equation, FDI, gross domestic product, inflation, interest rate, labor cost, export and import are chosen to test the long run relation among them. The model is as following:

FDI=f (GDP, Inflation, Export, Import, Interest rate, Labor)

Table 5. The Vector Error Correction result1

Co integrating Eq	Coefficient	Standard deviation	t-statistic
FDI(-1)			
LNINF(-1)	0.546293	0.66225	0.82491
LNEXPO(-1)	- 0.679587	0.26449	-2.56941
LNGDP(-1)	0.028550	0.00983	2.90577
LNIMP(-1)	0.086718	0.41853	2.07196
LNINT(-1)	- 0.273694	0.05136	-5.32876
LNLABOR(-1)	-0.057367	0.007782	-7.36960
C			

Error Correction	Coefficient	Standard deviation	t-statistic
CointEq1	- 0.115137	0.04185	-3.22070
Δ (FDI(-1))	0.322535	0.11628	2.77385
Δ (FDI(-2))	0.023126	0.12416	0.18626
Δ (LNINF(-1))	-1.723867	1.07371	-1.60552
Δ (LNINF(-2))	0.391558	1.03974	0.37659
Δ (LNEXPO(-1))	0.282912	0.23116	1.22386
Δ (LNEXPO(-2))	0.064813	0.23631	0.27627
Δ (LNGDP(-1))	0.001563	0.00761	0.20530
Δ (LNGDP(-2))	0.001777	0.00776	0.22911
Δ (LNIMP(-1))	- 0.161309	0.32105	-0.50245
Δ (LNIMP(-2))	- 0.361131	0.31150	-1.15932
Δ (LNINT(-1))	0.042109	0.06307	0.66762
Δ (LNINT(-2))	0.022810	0.064810	0.35164
Δ (LNLABOR(-1))	-1.409393	1.15808	-1.21701
Δ (LNLABOR(-2))	-0.319446	1.14251	-0.27960
C	0.022489	0.01296	1.73569

R-squared	0.238861
Adj. R-squared	0.073396
Sum sq. resids	0.179531
S.E. equation	0.051009
F-statistic	1.443577
Log likelihood	141.1927
Akaike AIC	-2.945710
Schwarz SC	-2.485917
Mean dependent	0.008798
S.D. dependent	0.052991

The table above shows the level equation results of the test for both ECM (short term) and also error correction terms.

As it is shown, short term coefficient of inflation is not statistically significant. It can be said that inflation may not cause or predict changes in FDI in Germany.

The same situation is true for GDP, import, export, interest rate and labor cost. These variables are reported as insignificant and it can be said that they do not have any short run associations to FDI. The lag chosen for this part is according to the lag length structure in EViews. According to tests such as Schwarz and Hanna Queen, it is revealed that the optimum lag for the model is only one lag. Although, others such as Pindyck, & Rubinfeld (1991), suggest that the best lag for a vector error correction model which includes GDP and FDI is 7 lags, since the current study uses other variables such as export and import, interest rate, inflation and labor, the other criteria is chosen to select the best lag.

Now, the other part, which needs to be interpreted, is the Error Correction term. The coefficient is reported to be negative and statistically significant at α=0.05 with the coefficient of β= -0.115137. This result can be interpreted as short run values of FDI converge to its long run equilibrium level by 11.5137% speed of adjustment annually by the contribution of GDP, Inflation, Import, Export, Interest Rate and labor.

Now, for the level equation table, when export increases by 1%, FDI decreases by 26% in long run.

On the other hand, GDP is also reported to be positive and statistically significant at α=0.05. It can be interpreted as, by 1% increase in GDP, FDI in Germany is likely to increase by 0.029 %.

Import is also reported to be statistically significant with a positive coefficient. It can be said that by 1% increase in import, FDI inward in Germany might increase by 0.08% in long run.

Interest rate is also reported to be statistically significant with a negative coefficient. It can be said that by 1% increase in interest rate in Germany, FDI inward is most likely to decrease by 0.27% in long run.

Last but not least, labor is reported to be statistically significant with a negative coefficient. By 1% increase in cost of labor in Germany, the FDI inward is likely to decrease by 0.057% in long run.

Now, for the second model, the vector error correction model result is as following in next page.

Table 6. The Vector Error Correction 2

Co integrating Eq	Coefficient	Standard deviation	t-statistic
LNFDI(-1)	1.000000		
LNEEXCH(-1)	2.0674	0.428	4.830
LNEXCH(-1)	0.3564	0.213	1.676
C	-11.819		

Error Correction	Coefficient			Standard deviation			t-statistic		
	Δ LNFDI	Δ LNEEXCH	Δ LNEXCH	Δ LNFDI	Δ LNEEXCH	Δ LNEXCH	Δ LNFDI	Δ LNEEXCH	Δ LNEXCH
CointEq1	-0.536	-0.032	-0.101	0.125	0.017	0.038	-4.286	-1.854	-2.648
Δ LNFDI(-1)	-0.104	0.011	0.046	0.113	0.015	0.034	-0.922	0.715	1.324
Δ LNEEXCH(-1)	-0.055	0.321	0.080	0.801	0.110	0.245	-0.069	2.904	0.327
Δ LNEXCH(-1)	-0.871	-0.086	-0.075	0.364	0.050	0.111	-2.389	-1.722	-0.677
C	0.003	-0.001	0.001	0.019	0.003	0.006	0.152	-0.323	0.106

R-squared	0.341726	0.132011	0.086703
Adj. R-squared	0.307080	0.086327	0.038635
Sum sq. resids	2.183643	0.041498	0.203896
S.E. equation	0.169506	0.023367	0.051796
F-statistic	9.863340	2.889673	1.803756
Log likelihood	31.41088	191.9164	127.4420
Akaike AIC	-0.652121	-4.615220	-3.023259
Schwarz SC	-0.504315	-4.467415	-2.875454
Mean dependent	0.002319	-0.001511	0.000454
S.D. dependent	0.203630	0.024446	0.052827

(dof adj.)	
Determinant resid covariance	3.97E-08
Log likelihood	3.28E-08
Akaike information criterion	353.1231
Schwarz criterion	-8.274644
	-7.742544

Again, the same criteria is used to determine the correct lag and lag one is calculated to be the optimum lag. According to the results, Short term coefficients can be seen in table above. Short term coefficients of FDI are not statistically significant at all α levels.

Short term coefficients can be seen in table above. Short term coefficients of FDI are not statistically significant at all α levels.

As can be seen from level equation table, when EEXCH increases by 1%, FDI increases by 2.06 in long term and it is statistically significant at α=0.1. On the other hand, when there is an increase in FX by 1%, FDI decreases by 0.35% in the long term but it is not statistically significant.

Chapter 5

CONCLUSION

5.1 Introduction

The current section focuses on the conclusion. In previous sections, the applied methodologies were discussed. Variables which are selected for the specific case of Germany were introduced and discussed.

5.2 Summary of Findings

As it was discussed in previous chapter, this study applies the linear regression with 9 different variables. Two different equations are defined accordingly. In each equation foreign direct investment is considered as the dependent variable. Each equation tries to reflect the effect of independent variables individually and in a group on foreign direct investment.

Different common statistics were run. Results on descriptive statistics showed that during the chosen period for the study, from 1984 to 2013, the results of descriptive statistics on inflation are outstanding in Germany. The average inflation for this 29 years period, is only 1.59.

The mean for exchange rate is reported to be 0.841.On the other hand, export of goods and services in Germany is calculated to have the mean of 89.39. The maximum amount of goods and services exported are reported to be as much as 142.0700, which is considered to be a high value for a quarter in a country.

Correlation analysis between variables showed that there is no multicollinearity between the variables. The results of unit root tests revealed that the data is stationary at first level. After this test, regression analysis showed that variables are chosen for study are insignificant in short run and it can be said that they do not have any short run associations to foreign direct investment.

On the other hand, in long run, all variables except inflation could not significantly affect the amount of FDI in Germany. This result was somehow expected. As it was discussed, inflation did not fluctuate a lot during the period chosen for the study. Hence inflation did not somehow affect the investors' decision on investing in Germany.

5.3 Limitations

The current study focused on 8 control variables where other macro and micro economic factors were not considered. The period chosen for the study is 29 years. Although the data is chosen quarterly, for those macroeconomic factors which reported to have long run relation in previous studies, longer period could be resulted in better results. The current study applied time series regression analysis which is common economy related studies. To have more accurate results, the period chosen for the study could be divided to two sub periods, before and after financial crisis.

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