

A Panel Data Study of Determinants of FDI in Turkey and Selected European Countries

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

Master of Science
in
Economics

Eastern Mediterranean University
February, 2014
Gazimağusa, North Cyprus

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ABSTRACT

Foreign direct investments are international investments which are performed by foreign investors in a country and depend on several factors. Some of these factors have been represented in the previous studies, such as: market size, growth prospect, macroeconomic stability, level of exchange rate and business environment. In line with those studies, the current study seeks to analyze the determinants of FDI in some selected European countries as well as Turkey. To do so, a panel data of 17 countries (including Turkey, 9 West European and 7 East European countries) across 11 years (from 2000 to 2010) has been used. Explanatory variables used in this study are: real GDP, GDP growth rate, inflation as a proxy for macroeconomic stability, real exchange rate, internet user and school life expectancy, where the last two are taken respectively as proxy for physical capital and human capital. The panel data estimation with random effects provided support for all six control variables with correct sign. Moreover, the results showed that all six variables were significant for selected countries. It seems that large market size, strong macroeconomic stability, growth prospects, depreciation of currency, and technology such as internet and school life expectancy, are important factors for absorbing foreign investors into these countries for a specified period.

Key Words: FDI, Panel data, Turkey, European countries, real change rate, macroeconomic stability, growth, physical capital and human capital.

ÖZ

Doğrudan yabancı yatırımlar uluslararası yatırımlardır. Bu yatırımlar yabancı yatırımcıların farklı sebeblere bağlı olarak başka bir ülkede yapmış oldukları yatırımlardır. Daha önceki çalışmalar bu yatırımların yapılmasında etkili olan faktörlerin bazılarını şöyle belirtmişlerdir; Pazar büyüklüğü , büyüme beklentisi , makroekonomik istikrar , döviz kurunun seviyesi ve iş ortaklığıdır.Bu çalışmanın amacı, daha önceden yapılmış olan çalışmalar doğrultusunda, seçmiş olduğumuz Avrupa ülkeleri ve Türkiye’ deki DYY (doğrudan yabancı yatırım) belirleyicilerini analiz etmektir. Bunu da belirleyebilmek için (Türkiye, 9 Batı ülkesi ve 7 Doğu Avrupa ülkesinin) bulunduğu 17 ülkenin (2000-2010) yılları arasındaki 11 yıllık panel verileri kullanılmıştır.Bu çalışmada kullanılan açıklayıcı değişkenler şunlardır; Reel Gayrisafi Yurt içi Hasıla (GSYİH). Gayri Safi Yurt İçi Hasıla büyüme oranı, reel döviz kuru, internet kullanıcıları, vekil degisken olarak enflasyon, ortaöğretim yılları ve son iki etken olarak da beseri ve fiziki sermaye. Rastgele seçmiş olduğumuz ülkelerin tahmini panel verileri bizim altı kontrol değişkenimizi desteklemektedir ve aynı zamanda elde edilen sonuçlarımıza göre altı değişkenimizde kabul edilebilir çıkmıştır. Görünen odur ki, seçmiş olduğumuz bu ülkelerdeki belirli zaman aralıklarında ki, Pazar büyüklüğü, makro ekonomik istikrar, büyüme beklentisi, paranın değer kaybı ve teknoloji (internet ve ortaöğretim) yabancı yatırımcının ilgisini çekmekte ve yatırım yapmalarında önemli etken teşkil etmektedir.

Anahtar Kelimeler : DYY , Panel veri , Türkiye , Avrupa Birliği , döviz kuru, makroekonomik istikrar , büyüme , teknik ve fiziki altyapı.

ACKNOWLEDGMENTS

I would like to express my deep sense of gratitude to my supervisor, Prof. Dr. Cağay Coşkuner for his support and patience which helped me to accomplish this study.

I would also like to thank Prof. Dr. Sevin Ugural for her generous advice.

And I am extremely thankful to my parents and my brother.

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LIST OF ABBREVIATIONS

FDI: Foreign Direct Investment

GDP: Gross Domestic Product

EU: European Union

CIS: Commonwealth of Independent State

FPI: Foreign Portfolio Investment

OLI: Ownership advantages, Location advantages, Internalization advantages.

FTZ: Free Trade Zone

Chapter 1

INTRODUCTION

1.1 Globalization and Forms of Capital Inflows

We live in an era where the challenges and benefits of globalization are felt in every corner of the world, but what is globalization exactly? Globalization is a process that leads to the world getting smaller, so that countries are getting closer and people, capital, goods and information are moving across the borders freely and easily. Globalization is a convenient way for people who are in a different location in the world and want to interact with each other for mutual benefit. (Larson, 2001).

Globalization is progressing in several dimensions such as labor migration, capital flows, trade and interdependent economic policies. Among these, rapidly evolving and one of the most important dimensions is the capital flows. Capital flows are important, as they contribute to world prosperity by moving to places where they are the most productive and where their rates of returns are maximized.

Capital flows are in different forms:

- 1) Commercial loans
- 2) Foreign Portfolio Investment (FPI)
- 3) Foreign Direct Investment (FDI)

The loans are offered by commercial banks as well as from international institutions such as the World Bank (WB) for short-term or long-term periods. The loans need to be paid back at the due date and with interests.

The second channel for the capital flows is Foreign Portfolio Investment (FPI). This is mainly capital flows through stock markets where the money is invested in the financial portfolio of funds, treasury-bills, bonds and stocks of companies. FPI implies no control of companies and thus it is relatively a short-term investment. Foreign portfolio investment, together with some positive impacts, may also have negative impacts on an economy as it may enter and leave a country in a sudden manner.

The third channel is foreign direct investment (FDI) which represents control of firms and thus the long-term investment in a country.

From the developing countries view all three forms of capital flows are significant sources for economic development. Developing countries and less developed countries usually suffer from the lack of capital and money needed to finance both private and public sector. As the capital are scarce in developing countries, influx of capital flows into developing countries allow these countries gain necessary cash needed for public infrastructure investment and private investment for equipment purchases and technological upgrades.

FDI is probably the most reliable way for financing such investments for developing countries, because the other two channels have some drawbacks. Commercial loans to private companies in the developing world are very restricted. In fact the loans to

developing countries are somewhat limited and usually with high interest rates. Thus, the developing world cannot access to international capital through commercial loans very easily. This situation is exasperated since the 1980s, as the international borrowing became costly due to debt crisis. As it was mentioned, FPI represents a short-term relation. (World Bank, 1999)

Therefore, for many developing countries the best form of attracting capital inflows is through FDI. FDI not only provides these countries with the necessary cash for financing public and private investment, but also brings about technological improvements, managerial skill, international marketing techniques and industrial employment opportunities which are all associated features of multinational corporations. Indeed, foreign direct investment (FDI) has economic advantages in form of bringing capital, technology, money such as foreign exchange into the host countries and also increasing competition which is a way to entering global market (World Bank, 1999).

1.2 Objective of Study

For the aforementioned reasons, in this study I attempt to investigate what attracts FDI into a country, especially into Turkey and selected European countries. To be more exact, in this study, first I will explore the determinants of FDI only in Turkey, and then I will apply the empirical part of this study on selected European countries.

Athukorala (2009) states that the problem associated with the determinants of FDI has different reasons, because investors have different motivation, for instance, some multinational corporations try to find large domestic markets and some others look for the availability of natural resources, and other multinational corporations want to relocate their factories for reducing the cost of their production and also joining the

global market. Therefore, investors who seek for these opportunities have different motivations, I will investigate these determinants.

The study of the identification of the determinants of FDI flows is important since it provides policy advice towards reforming economies to attract more FDI which is essential for multi-dimensional economic development.

1.3 Organization of the study

In Chapter 2 and Chapter 3 Theoretical and Empirical Literature Reviews of previous studies will be provided. In Chapter 4, trends of FDI inflows will be explained. Empirical specification and data analysis will be illustrated in Chapter 5. Estimation techniques and results will be presented in Chapter 6. Finally, in Chapter 7, the conclusion will be offered.

Chapter 2

THEORETICAL LITERATURE REVIEW

2.1 Foreign Direct Investment: Definitions and Types

Rutherford (1992) explains foreign direct investment as doing business in another country, which often takes the form of (i) installing local production facilities or (ii) purchasing of available businesses. Also, FDI is explained as an investment which involves management control of the firm in another economy.

Similarly, OECD (1996) reported that FDI as international investment that shows the objectives of a resident entity in one economy for gaining lasting interest in an enterprise resident in another economy. The word lasting interest shows that FDI happens in the long term. It means that FDI is motivated largely by long-term profit prospects in production activities those investors directly control.

FDI has two major types: Horizontal and vertical, also vertical FDI is divided into two branches: backward and forward FDI. Horizontal FDI refers to building up the same sort of manufacturing product and services abroad which exist at home market. This means that the multinational company produces the same activities in different countries because of the high cost of servicing through exports, which may be due to several reasons, including high transportation costs or trade barriers.

Vertical FDI refers to multinational companies which break down the production procedure geographically, it means that each stage of production is located where that product can be produced at the least cost. The vertical FDI itself contains of two groups. The first one is backward vertical FDI. In the backward FDI multinational enterprise settles its own supplier of input goods which transfer inputs to the original company, and the second group is forward FDI which means that the firm builds up a foreign affiliate, which draws inputs from the original company for their own production (Protsenko, 2003).

FDI flows can be grouped according to service of operation, these are:

1. The primary sector: refers to resource extraction and agriculture sector.
2. The secondary sector: refers to manufacturing and it includes sectors such as food, beverage, textile, plastics, tobacco, chemical, automotive and so on.
3. Tertiary sector: refers to services which include trade, hotels, communication, financial services and so on (Wash and Yu, 2010).

Several studies show that FDI in the primary sector cannot create much employment with the exception of FDI in agriculture. On the other hand, FDI in secondary and tertiary sectors are considered to create jobs and employment opportunities. (Wash and Yu, 2010)

Thus, FDI is important for economic activities for several reasons: FDI can create jobs, upgrade skills, raise factor productivity, increase technology transfer and increase industrial performance. For these reasons, FDI has become a favorite topic for analysis, as factors which can pull more FDI into countries (OECD, 2000).

2.2 Theories and the Determinants of FDI

According to Dunning (1988, 1993) firms which want to enter FDI can get three separate types of advantage to producing outside of their countries, this eclectic FDI theory by John Dunning is:

- Ownership advantages.
- Location advantages.
- Internalization advantages.

So, the firm will participate in FDI, when one, two or all of these three advantages that I mentioned above are satisfied.

Ownership advantages (O): some firms have particular capitals which are recognized as knowledge capitals. These capitals can be repeated in various countries and can be easily transferred with no high transaction cost. These capitals are brand which can identify a product or manufacturer, skill in managing of business control or enterprise, fame of the company as a reputation, patents and scientific method (technology).

Location advantages (L): Sometimes a firm gains an advantage by moving into a foreign country more than home, so the localization advantages of a host country may include:

- a) Productions can be produced near final consumers.
- b) Avoiding to pay money for transport.
- c) To gain a relatively low price of inputs.
- d) To Skip from trade obstacles.

e) Low wages

Internalization advantages (I): Firm must gain benefits to operate its activities with FDI more than the advantages of selling abroad (export), licensing or by contracting to foreign parties (Joint venture).

OLI stands for ownership, location, internalization, and four forms of FDI come out from OLI, are as follows: (Dudas, 2008)

1. Resource seeking FDI

To seek natural resources such as unrefined or natural material, lower unit labor cost of unskilled and skilled labor force, physical infrastructure (road, power, airports, seaports and telecommunication) and the degree of technology.

2. Market seeking FDI

To identify new markets which depend on the conditions of the host country such as market size, the value of capital, income, and the quality of the market, access to regional and universal market, consumer preferences and forms of the domestic market.

3. Efficiency seeking FDI

To seek advantage from differences in goods, and factor prices.

4. Capabilities seeking FDI/ strategic assets

It is going to advance developed economies:

- To gain profit of local capacities such as R & D (Research and Development), knowledge and human capital.
- To use market information.

Economic Survey of Europe (ESE, 2001) indicates that FDI flows depend largely on economic fundamentals, such as the degree of macroeconomic and political stability and growth prospect. ESE states that FDI tends to move to countries which have good infrastructures and legal systems, skilled labor forces and liberalized foreign sectors.

Another source on the topic, (Sahoo, 2006), categorizes all determinants of FDI in following manner:

- A) Market condition(market size)
- B) Prospects for growth
- C) The rate of return on investment
- D) Labor cost and accessibility of skilled labor
- E) Physical infrastructure
- F) Macroeconomic fundamentals like inflation , tax regime and external debt
- G) Advancement of private ownership
- H) Effective financial market
- I) Trade policies
- J) FDI policies

The theoretical studies give out the main determinants of Foreign Direct Investment as:

2.2.1 Market size:

The size of the market is determined by GDP. Factors such as a large market size, favorable view for market development and high level of per capita GDP growth are important for investors who invest to locate in an outside of their homes. Wei and Liu (2001) stated that the market size of receiving countries is a variable for determinant of FDI inflow(Sahoo, 2006)and (Mottaleb and Kalirajan, 2010).

2.2.2 Growth prospect

The growth rate is a measurement for growth prospect. It has a positive effect on FDI inflows. Nations that have high and stable growth rates draw more FDI flow than changeable economies. The growth hypothesis which is prepared by Lim (1983) postulated that an economy with rapid growing movement has better chances (from the perspective of foreign investors) for profit maximization than those that are stagnant (Sahoo, 2006).

2.2.3 Unit labor cost

Unit labor cost is one of the statistical measures to specify the productivity of the labor force; it is determined by total labor cost over real output. Unit labor cost is between zero to one and the lower indicator shows the higher productivity.

Jun and Singh ((1996) stated that plentiful skilled and unskilled workers with lower wage rates or labor costs cause countries more competitive and appealing, so the lower wage induce efficiency-seeking FDI inflows. Dunning(1998), Navaretti and Venable(2004) Dunning and Lundan (2008) believed that when the host countries have lower labor costs in comparison to the home country, the lower wage makes the country more attractive for FDI to enter in production activities (Sahoo, 2006) and (Cuyvers, Plasmans, Soeng and Bulcke,2008).

2.2.4 Infrastructure facilities

Countries with better-developed transportation infrastructure can attract more FDI inflows.

Infrastructure can be categorized into groups.

- 1) Physical capital.
- 2) Human capital.

2.2.4.1 Physical Capital

It refers to physical facilities and/or installations needed to operate, manage and monitor system with the intention of the structure to be permanent. The main groups of Physical capital are:

1. A transportation system deals with roads, railways and airport.
2. Water management that includes sewers, drinking water and flood control.
3. Systems primarily include the processing and transmission of energy and energy sources such as electrical networks and oil and natural gas pipeline.
4. Communication systems include television stations, communication satellites, telephone networks and internet.
5. Solid waste management focuses on landfill, incinerators, and garbage and recycling collection.

2.2.4.2 Human Capital

It is more about institutions that maintain standard of a culture such as health, law enforcement, emergency services and education.

Casey (2005) stated that human capital is not having physical substance or internal productive value, it involves responses to both the need of communities, as long as at the same time building the capacity of local people and groups to react to present and future needs. Fung et al (2005) showed that “human capital” can refer to better business climate and it is more important to absorbing FDI than physical capital such as roads (Chambers, 2010).

2.2.5 Openness

Open economies encourage more foreign investment. Openness is measured mainly by the proportion of the sum of export and import to GDP. It is considered to gain the effect of host economy openness and connection with the universal

market. Jordaan (2004) claimed that the effect of openness depends on the sort of finance, in the case of market-seeking investment; less openness can have a positive impact on FDI.

“Tariff-Jumping” hypothesis argues that foreign factories or companies look to provide goods and services for the consumers of that selected host countries, thus the less open these countries are, the more would be the FDI inflows into these countries. On the other hand, several companies may consider FDI as export-oriented investments where the more open the host countries are, the larger is the export markets for FDI-based corporations, and thus the larger is FDI itself.

For example, Basar and Tosunoglu (2005) claimed that a country can attract more FDI if the proportion of foreign trade to GDP increases. (Sahoo, 2006) and (Mottaleb and Kalirajan, 2010)

2.2.6 Political risk

Political risk can be defined as the risk faced by firms in respect to unexpected alterations by the government of host country who is pioneering FDI policy. The presence of political system hospitable to foreign capital in terms of property rights and civil liberties play a favorable role for attracting FDI. The main reason why MNCs (Multinational Companies) are sensitive to political risk is the fear of direct deprivation of possession such as nationalization of foreign investment project. Henisz (2000) shows that multinationals are faced with an increasing fear of expropriation if political risk is going up in the host country. (Vadlamannati, 2012)

2.2.7 Tax motivation

Tax incentive can be explained as motivations that decrease the tax charge of business firms with the purpose to encourage them to invest in special projects or

sectors. Tax motivation can include reduced tax on profits, tax holidays, and setting up rules that permit fast depreciation, decreased tariffs on imported goods, ingredients and raw materials or increased the protective tariffs for the domestic market for import substituting investment projects. (United Nations, 2000)

2.2.8 Exchange rate

Exchange rate uncertainty can effect on FDI flows. In the case of decreasing the value of currency of the host country, FDI flows are increased.

2.2.9 Borrowing Costs

Cost of borrowing capital is measured by interest rate, and also it can be used as determinant factor in foreign investment. It means that lower interest rate in the investor's home country encourages investor to enter into international investment process through FDI in host country; therefore foreign investors will increase the required funds in the home country.

In addition, Wei and Liu (2001), Aliber (1993) stated that there are two types of economic linkage between FDI and charge of borrowing. On the condition that the charge of borrowing in the home country is lower than in the host country, home country firms have a cost advantage over competitors in host economy. Unlike, the higher borrowing cost of foreign investors in host countries in comparison to home countries, the foreign firms are capable with the higher cost of borrowing compete with domestic firms in the host country, so this due to higher inflows into the FDI-receiving country. (Cuyvers, Plasmans, Soeng and Bulcke, 2008)

Chapter3

EMPERICAL LITERATURE REVIEW

3.1 Literature Review of Empirical Studies

In 2004, Own. C.H. HO organized economic data from 1997 to 2002 for 21 sectors which are located in China and Guangdong province. He examined the effect of wage rate, ownership level with regard to personnel and workers, innovation level and GDP by sector on FDI inward to the Chinese economy. The outcome showed in China, the market size, innovation, the degree of economic correction and wage rate are important and also in Guangdong except for innovation. So according to result, in both China and Guangdong province, market size is significant and has positive effect on flowing of FDI, but labor cost (wage rate) has a negative effect on FDI inward and is statistically significant, the level innovation activities has a positive effect on FDI, and ownership has negative effect and is statically significant. (Ho, 2004)

Schneider, H.K. and Matei, L (2010) used two panel models for 33 developing and transition countries from 1996 to 2008 to investigate the effect of political risk and business climate on FDI inward. They use FDI as dependent variable and market size, inflation, trade, public expenditure, population, and unit labor cost as independent variables with two assumptions for their investigation: FDI with respect to business climate and FDI with respect to political risk.

Also, business climate is affected by political risk, in other word; the low degree of political risk showed a good business situation for investing.

The results on the first way, FDI with respect to the business climate showed all independent variables are significant except unit labor cost. As for, FDI with respect to political risk, all variable has the expected sign, whereas the growth rate and all independent variables are significant, except the unit labor cost.

The results on the second model (by using Arellla-Bond (1991)GMM¹ estimator), FDI with respect to the business climate showed, growth rate, hard infrastructure, growth rate and political risk are not significant, whereas others are significant. Finally, FDI with respect to political climate discourages investors because of a negative sign.

Another researcher, Hailu (2010) studied the case of the factors which attract FDI into African countries. Data are collected for 45 countries from 1980 to 2007 from the World Bank and World Development Indicator. The results showed the natural property of the country has a positive influence in attracting FDI, and it is significant at 1%. Moreover, labor quality, openness; domestic private finance and condition of the host country (stable political) are positively associated to FDI inward, and also the market of the host country is statically significant and has a positive impact, but government

1. Generalized Method of Moment

expenditure and private domestic investment has a negative impact on FDI.

Dutta and Roy (2009) investigated causes that attract FDI. They gathered data for 97 countries from UNCTAD for 20 years (1984-2002) and aimed to find which country brings more benefit for FDI. They use FDI as dependent variables and GDP growth, exchange rate, trade, openness, inflation and population, and also the regard to conditions of trade market rules, credit market rules and labor market rules for finding more profitable country to invest.

They found that there is a positive connection between the amount of FDI inwards over GDP share and these three rules. It means that conditions such as less restriction, tax incentives, and decrease labor work rules make countries desirable for foreign investors. The results are strongly significant for rules except for the labor market which has concave relationship with FDI, it means that less rules on the labor market can absorb more FDI and vice versa.

In 2004, Nonnemberg and deMendonca for seeking important factors for absorbing FDI in developing countries used panel data for 33 developing and transition countries from 1975 to 2000. They put GDP, school, G5GDP (the average growth of product for 5 years), openness, inflation, risk and enerco (estimate using of energy by per person) as the independent variables and FDI as a dependent variable in their regression, therefore they noticed that school, inflation, risk, G5GDP were significant by using panel data.

Other researchers Botric and Skulic (2005) investigated the main factors for attracting FDI in Eastern European countries. They used data for seven

countries which are located in South Eastern Europe from 1996 to 2002 with generalized least squares method and they derived three separate equations which have different explanatory variables, because information on balance of payment are edited regularly and financial system is not informed the exact rate of capital movement into the mentioned area. In all equations, the level of GDP, GDP per capita, GDP growth showed different estimation, they can't find the linkage between unemployment and FDI and the only significant variable is openness in all of them. They suggested to these countries to make more desirable business situation and decrease administrative process and increase transparency.

Loewendahl, H and Ertugal-Loewendahl, E (2001) argued about the action of Turkey in absorbing FDI. They found that FDI is necessary for Turkish economy, but Turkey is less successful in attracting FDI inward as compared to main competitors such Hungary, Poland and the Czech Republic which are located in East European. This is despite the size of its economy and population of Turkey. This may be due to the minimum degree of privatization available in Turkey. Turkey has a good position for market seeking and efficiency seeking, especially for American and European countries. Turkey in spite of having the highest ratio of science and engineering student amongst these countries has the low share in patent application and R&D expenditure. Moreover, Turkey has one of the world's most liberal foreign investment laws and attractive encouragement regimes. Turkish performance in providing a favorable environment for FDI is much better than Czech Republic, Poland and Russia; on the other hand it is weak in enabling environment for privatization and infrastructure-related for foreign investors. Furthermore, Turkey has extremely poor institutional environment, because of lack of stability in its policy, so this has considerable impact on macro-microeconomic instability, and also

severe inflation and has no fixed exchange rate, as a result of the lack of improvement in the economic structure of Turkey. This current reason is an obstacle for Turkey to join the EU. They concluded that Turkey should remove obstacles that prevent Turkey to join EU since joining EU leads to EU market, economic growth stability, and policy convergence.

Cuyvers et al (2008) considered about 32 countries that have financial investment in Cambodia as host country, during 1995–to 2005. Data is provided by CIB (Cambodian Investment Board) and estimated data from NBC (National Bank of Cambodia) and the data were organized. They used explanatory variables, such as real market size, real GDP growth, the real exchange rate, real external trade to and from the home country, the real interest rate, the inflation rate, political risk, labor productivity used as a proxy for wage rate, geographical distance between Cambodia and the home country. The results showed that GDP growth rate, trade freedom of home countries with the host country, and the exchange rate have positive influence on inward FDI flows into Cambodia. Geographic distance has a negative impact on the level of FDI inflows in Cambodia; on the other hand, with respect to the policy implications for Cambodia, international trade has a significant influence on FDI inflow. To conclude, the government of Cambodia should put extreme effort to obtain and attract factors for the country.

Chapter 4

FDI TRENDS IN THE WORLD

Trade is engine for development, so cross-border trade is necessary for economic growth worldwide, and FDI can be one kind of trade which can help this process. (Tabbada and Bano, 2012)

FDI is a tool for sending capital, knowledge, and special skills which are generally scarce in host countries from developed countries to developing and also developed countries. (Tabbada and Bano, 2012)

According to the World Bank(1999), It is extremely identified that FDI brings economic advantages to the host countries by making an availability of capital, knowledge, the transaction of international monetary between countries and by increasing competition and entering to market. So, for better analysis, countries are divided into main groups, according to categorization, economists investigated why FDI goes to these countries. (Mottaleb and Kalirajan, 2010)

4.1 FDI Trends in Developed Countries

According to Britannica(2013) the greatest amount of trade happens between industrial leaders which are in developed, capital-rich countries such as Australia, Belgium, Canada, France, Japan, Italy, Germany, Spain, Sweden, the Netherland, the United State and United Kingdom.

Moreover, Western Europe shows that the majority of its investment from within its own region; almost 53% of total projects located in Western Europe originated there. Further 31% of projects originated in North America, largely from the US. Similarly, in North America over 54% of the project located in the region originated in Western Europe, 22% of projects are in Asia, and about 18%, projects in North America. (OCO, 2010)

Western European investment is linked with services which included financial services, Information and Communication Technology (ICT) and Hotel & Tourism. Also North America showed a similar trend. It is a strong location to operate for services such as ICT and business & financial services and also it is strong in consumer goods, as well as more industrial application such as automotive component, industrial machinery and metal. Moreover, Western Europe is a strong destination for a project in consumer goods, textiles and food and beverage. (OCO, 2010)

4.2 FDI Trends in Developing Countries

Developing countries are growing resources for FDI, some reasons can be:

1. FDI can develop gradually from natural resources, infrastructure and manufacturing, to engage in the logistic services (for exchange, for issuing loan or credit), the sale of goods directly to the consumer in small quantities, building, tourism and beach services.
2. FDI in developing countries can offer opportunities to countries which have a good market size, want to open their markets or integrate with their neighbors.
3. Foreign investors can invest in a hard and distant (rural) market to expand its products and services which are better adapted by the consumer of the

developing country, such as Chinese electronic producers such as The Creative Life (TCL) produce color televisions In India and Vietnam and so on.(Palmade and Anayiotas,2004)

Although, developing countries are late comers in this phenomenon, the data for last decade show that developing countries are starting to play an important role both in FDI flows both in the inward and outward direction. Indeed, foreign direct investment has become a household phenomenon in the world over, the start of 1990s was marked by increased inflow of international capital to developing nations which has necessitated a look into these areas in terms of causes and possible consequences of these flows on macroeconomic variables of the host nations. According to the chart below, developing countries which are placed in Asia are more successful in absorbing FDI in comparison to developing countries which are located in Africa and Latin America.

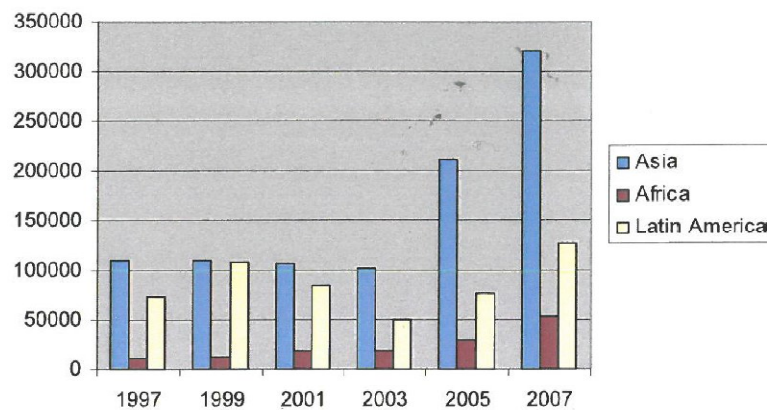


Figure 1 Trends of FDI Inward in Asia, Latin America and Africa (Source: UNCTAD. World Investment Reports, 2003, 2005, 2009)

4.3 FDI Trends in CIS (Common Wealth of Independent State) with Transition Economies

FDI plays an important role in economic problems of CIS countries. FDI provides outside financing in the form of mortgage, claims, liens and so on instead of debt, especially in export and import competing sectors which help to have a better external position of the country.

In 1996, 1997 Lankes and Venable stated that primary motivation for the foreign firm to invest in CIS countries is market seeking, whereas FDI inflows to more advanced countries with transition economy, such as Russia and Ukraine have been more often efficiency seeking which focused on product export based on low labor cost and the large domestic market.

Azizov (2007), stated that Russia, Kazakhstan, Ukraine and Azerbaijan were the main receivers of FDI in the period of transition, because most of them are rich in oil, but amongst them Kazakhstan has the highest FDI inwards, because of its size of the economy. Meanwhile, oil pipeline construction project or energy sector privatization in Georgia and Armenia are the main reason for attracting FDI into these countries. In Tajikistan and Kyrgyz Republic FDI limited to one large gold mine project. So, natural resources endowment can be of the main factors that attract FDI in CIS countries.

4.4 Reverse FDI

Reverse FDI (flows of FDI from the developing country into the developed country) is a new event that changes the world's investment view. Reverse FDI begun with Japan, during 1946-1950s when Japan was grouped as developing country. It was the

first Asian country which experiences modern industrialization, speedy and also strong economic growth.

Japanese investment influence on its neighbors, this spread goes through Hong Kong, South Korea, Taiwan and Singapore (Asian tigers), and then go to other Southeast Asian economics :Malaysia, Indonesia and Thailandwhich has rapid industrialization. So, Asian Tiger, China and India repeated Japan's overseas expansion. (Bano and Tabbada, 2012)

4.5 FDI flows across the world in 2006 and 2011

The table below gives some basic comparison between the developed and developing Countries.

Inward and outward foreign direct investment (FDI) stocks and flows to go together across countries and overtime. (Lispey, 2000)

Table 4.1 FDI flows across the world (\$ bn)

Region	2006 inflows	2011 inflows	2006 Out flows	2011 Out flows
World	1,463	1,524	1,415	1,694
Developed countries	981	747	1,152	1,237
Europe	640	425	794	651
France	72	40	111	90
Germany	55	40	118	54
UK	156	54	102	89
USA	237	226	224	396
Japan	-6.5	-1.7	74	114
Developing countries	427	685	239	384
China	73	124	21	65
Hong Kong	45	83	45	82
Singapore	37	64	18	25
India	20	32	14	15
Brazil	19	67	28	-1.0
Russia	29	53	23	67

(Source: UNCTAD, World Investment Report, 2012)

This table compares outward and inward investment between developing and developed countries in years of 2006 and 2011. In developed countries such as Europe, France, Germany, UK, USA and Japan inward investment decreased from 981 USD billion in 2006 to 747 USD billion in 2011. Simultaneously, outward FDI in developed countries increased from 1.152 USD billion in 2006 to 1.237 USD billion in 2011. In the same period, in developing countries inward investment have increased from 427 USD billion to 685 USD billion and similarly, outward investment have increased from 239 USD billion to 384 USD billion.

As a consequence, the world inwards and outwards investment have increased in years of 2006 and 2011. In year 2006, amongst developed countries most inward investment is in 2006 and 2011; on the other hand, Japan has least inward investment in these years.

In addition, in the USA the amount of inward investment in 2006 is roughly the same in 2011.

Overall, the table shows that more FDI goes to developed countries rather than developing countries.

4.6 FDI Trends in Turkey

According to data gathered from TUIK (Turkish Statistics Office) and EIU (Economist Intelligence Unit) Turkey currently has a population of about 76 million of which 27 million are in the labor force. Turkish GDP is estimated to be around \$1.3 trillion, which makes Turkey have a GDP per capita of around \$ 17000 (based on PPP). OECD estimates GDP growth rate to average 6.7% for 2011-17 period.

Turkey in the past was not successful in attracting FDI but in the past in ten years also it has changed, Turkey became an increasingly important actor both for FDI inward and FDI outward.

Before 1980 FDI in turkey was unimportant; but in 1980 Turkey's radical economic liberalization program predicted the necessity of attracting private foreign investment and gave a crucial role to FDI for making strong economic development and improving the balance of payment substitution. (Tatoghlu and Glaister, 1996)

The free zone trade (FTZ) law was issued in 1985; this law has given more liberalization to FDI condition in Turkey. It can remove some restriction on foreign equity participation, so these FTZs became the foreign investor attraction center of Turkey; because it has brought incentives to foreign investors. (Tatoghlu and Glaister, 1996)

In January 1996, Turkey entered to custom unions with Europe which enabled the free movement of industrial goods with zero tariffs between European Customs Area and Turkey. (Tatoghlu and Glaister, 1996)

The Custom Union causes that Turkey can enter to the European market and also it brings most of the laws which are available on trade among European countries to Turkey, especially in industrial products, and it is anticipated to be expanded into the services and agriculture sectors in the future.

Joining of Turkey to the European Customs Union brings some advantages for Turkish economy since then, especially about stability and competitiveness.

Another important development in the Turkish economy is Turkey's membership to World Trade Organization (WTO) which helps Turkey to increase its export and to integrate into the global economy (Tatoghlu and Glaister, 1996).

Some of other main reasons for increase in FDI in Turkey are the following factors:

4.6.1 Population

Turkey has a relatively great size of the youth population in comparison with the EU. Turkey has a population of 76 million of which more than 27 million is young, dynamic, well-educated and multi-cultural. According to student selection and placement center—OSYM (2012), a large number of students (600,000) graduate annually from over 170 universities and according to the ministry of national education plenty of students are graduated from vocational and technical high schools (2012).

4.6.2 Large domestic market

The domestic market in Turkey is composed mainly in urban areas especially in important cities such as Istanbul, Ankara and Izmir. The important features of Turkey's domestic market is improvement in consumption patterns and purchasing power.

4.6.3 Infrastructure

Turkey's infrastructures are the following:

Turkey is equipped to new infrastructures especially in transportation system, technology of communication, energy well-developed and cheap sea transport facilities, and well- organized highways, direct caring and turning over of goods to most EU countries and railway advantage to Central and Eastern Europe.

4.6.4 Low tax and Incentives

Low taxes and incentives tax are:

1. Goods and services in free zones are excluded from value added tax (VAT).
2. Support laws on creating new device or method as a result of research.
3. Incentive for strategic investment to reduce import, for large size-investment in addition to for regional investment.
4. Tax benefit and motivation in special zones.

4.6.5 The progressive investment climate

Turkey has the business-friendly environment, highly competitive investment condition, strong industrial and service culture, behaves equally to all investors and also, Turkey tries to reform most restrictions on FDI.

4.6.6 Custom Union with the EU since 1996

Joining to the EU makes Turkey more attractive for FDI in comparison to other countries, because, Custom Union brings some benefits for Turkey such as:

better interaction with the group of countries which are in the past known as the common market, it ensures free movement of industrial goods and processed agricultural crops.

Moreover, money collected under the tariff has been removed and trade obstacles are forbidden, so goods can move freely between the EU and Turkey.

4.6.7 Openness to Global Trade and Investment

Turkey declares that beside trade contract with countries which are bordering the Black Sea and the EU, it has highly free trade and investment structure with all countries, in correspondence to agreement with its total number of members of global institutions.

These agreements just bring additional economic and legal trust to investors.

Chapter 5

EMPIRICAL SPECIFICATION AND DATA

The interest of this study is to find the determinant factors which attract FDI into Turkey and selected European countries during the period 2000 - 2010.

5.1 Econometric Model and Hypothesis

The variables that I have chosen to explain the inward foreign direct investment into named countries are: real GDP, growth rate, inflation, real exchange rate, school life expectancy, internet user.

FDI= (Market size, economic stability, growth prospect, real exchange rate, physical capital, human capital) equation 5.1

Equation 5.1 can be converted into mathematical form (using logarithms)

$$\text{LFDI}_{it} = \alpha_i + \beta_1 \text{LRGDP}_{it} + \beta_2 \text{LINF}_{it} + \beta_3 \text{Growth}_{it} + \beta_4 \text{RER}_{it} + \beta_5 \text{Lint}_{it} + \beta_6 \text{LSEL}_{it} + \beta_{ik} \text{D}_k + U_{it} \quad \text{equation 5.2}$$

Where: i =country (1, 2...17) and t =year (2000,2001...2010)

LFDI_{it} : Log form of FDI inward (USD in millions) for country i at year t .

LRGDP_{it} : Log form of real Gross Domestic Product (USD 2005 in millions) for country i at year t .

Growth_{it} : GDP growth rate (%) for country i at year t .

LINF_{it} : Log form of inflation for country i = $\log(\text{CPI}_t) - \log(\text{CPI}_{t+1})$.

RER: Real Exchange Rate (calculated from nominal exchange rate and CPI) for country i at year t .

Lint: Log form of Internet user (per 100 people) for country i at year t .

LSLE: Log form of School Life Expectancy of people of country i at year t .

D_k : dummy for specific periods. (2000 to 2010)

α_i : unknown intercept for each country ($i=1,2,\dots,17$).

$\beta_1, \beta_2, \dots, \beta_6$ are unknown elasticity parameters.

U_{it} : is the random disturbance error term over period of t .

The dependent variable in this equation is foreign direct investment inward which relies on independent variables such as real GDP, inflation, growth, real exchange rate, school life expectancy and internet user in each country.

The first independent variable is real GDP which shows the market size of country, most of the studies showed that there is positive relationship between FDI inward and real GDP, and the hypothesis is that countries with high real GDP can absorb more FDI inward.

The second independent variable is inflation which indicates that economic instability of country, it is a very important factor for foreign investors, because most investors would like to invest in country that have stable economies than in countries that have high inflation, and the hypothesis for inflation is high inflation discourages investors to come into a country in order to invest. So it should show negative reaction on FDI inward.

The third independent variable is growth, the impact of growth rate on FDI inward is positive; beside it is an important factor for prospective foreign investors that countries with higher GDP growth rate are to be more successful in absorbing FDI.

The fourth variable is real exchange rate, the effect of it on FDI should be positive when currency of foreign country is depreciated so more foreign investors are motivated to invest in that country.

The fifth variable is school life expectancy as proxy for human capital, education is a key for attracting FDI especially for some sectors such as metal, plastic, IT services and etc. Also it is predicted that has positive impact on FDI, so it seems countries with better education can attract more FDI.

The sixth, the variable is internet users as a proxy for physical capital, which must have positive effect on FDI, when a country is equipped with excellent infrastructures, so foreign investors would like to invest in that country.

Finally, dummy variables for years which pick up the effect of time for specific time

And also, I have expressed independent variable and dependent variable except growth and real exchange rate in form of natural logarithms in order to linearize the relationship.

The reason for not using log form for growth rate and real exchange rate is these variables are small number and also growth rate is negative in some years.

But using log form has some advantages such as:

1. I can interpret coefficient of variables more easily.

2. It can reduce the problem of outliers.

Based on the theories, these are the signs that I expect for each explanatory variable.

Table 5.1 the expected sign for regressors

Regressor	Effect
Real GDP	+
Growth rate of GDP	+
Inflation	-
Real exchange rate	+
School Life expectancy	+
Internet users(per 100 people)	+

5.2 Data

The data is annual data from 2000 to 2010 for 17 countries for investigating the main determining factors which attract FDI into Turkey and selected European countries.

The countries which are chosen for this econometric analysis are:

9 Western European countries: Austria, Belgium, Cyprus, France, Greece, Norway, Portugal, Spain and United Kingdom.

7 Eastern European countries: Bulgaria, Czech Republic, Hungary, Latvia, Romania, Poland and Ukraine.

And a country from Southeastern Europe and west of Asia: Turkey.

The following data is obtained from United Nations Conference on Trade and Development (UNCTAD, 2012 database): FDI inward, Inflation (The inflation measure is based on CPI), Real GDP and GDP growth rate. Also, the data for Internet user (per 100 people) are given from World Bank (2014). Besides, data for real exchange rate is gathered by Shane (2013) who is working in United States Development Agency. School life expectancy data is taken from United Nations Educational, Scientific and Cultural Organization (UNESCO).

5.3 Descriptive Tables

The descriptive statistics for the FDI inward, inflation, GDP growth rate, school life expectancy are listed in table 5.2 to 5.5 respectively.

Table 5.2 Descriptive Statistics for FDI inward

FDI inward	Norway	Spain	Portugal	Cyprus	France	U.K
Mean	7311.818	36831.36	4697.000	1425.455	53897.73	94128.09
Median	7090.000	30802.00	3930.000	1084.000	49035.00	76301.00
Maximum	16824.00	76993.00	10908.00	3472.000	96221.00	200039.0
Minimum	791.0000	10407.00	1799.000	766.0000	24219.00	25152.00
Std.Dev	5746.700	18973.75	2795.618	813.6255	22824.18	61078.10
Skewness	0.560617	0.943942	0.952782	1.614516	0.578724	0.555304
Kurtosis	2.007482	3.155174	3.085877	4.633267	2.203509	1.906434

FDI inward	Belgium	Austria	Greece	Ukraine	Latvia	Hungry
Mean	72500.73	8234.455	1952.545	4613.273	742.3636	4096.182
Median	60963.00	6858.000	1589.000	4816.000	413.0000	3936.000
Maximum	193950.0	31154.00	5355.000	10913.00	2322.000	7709.000
Minimum	16251.00	138.0000	50.00000	595.0000	94.00000	1995.000
Std.Dev	48133.81	8314.929	1663.334	3834.050	713.3375	2012.064
Skewness	1.401139	2.000656	0.946997	0.371359	1.177585	0.652351
Kurtosis	4.776987	6.535236	2.874377	1.706699	3.167479	2.031906

FDI inward	Czech	Bulgaria	Poland	Romania	Turkey
Mean	6296.818	4282.818	11985.00	5586.545	9056.818
Median	5642.000	3385.000	12874.00	4844.000	8663.000
Maximum	11653.00	12389.00	23561.00	13909.00	22047.00
Minimum	2103.000	808.0000	4123.000	1057.000	982.0000
Std.Dev	2902.575	3966.705	6089.136	4493.692	8142.594
Skewness	0.505933	1.010890	0.401751	0.608868	0.569836
Kurtosis	2.458873	2.623722	2.386766	2.062504	1.770721

Table 5.2 shows that the highest average of FDI Inward is 94128.09 million dollar annual in U.K and the lowest average is 742.3636 million dollar annual in Latvia. After the U.K, the highest average is respectively in Belgium, France and Spain. Cyprus and Greece attract the lowest average FDI inward after Latvia. The average of FDI inward is 9056.818 million dollar annual for Turkey. The standard deviation for the data ranges from the lowest of 713.3375 for Latvia to the highest of 61078.10 the UK.

Table 5.3 Descriptive Statistics for GDP Growth rate

Growth	Norway	Spain	Portugal	Cyprus	France	U.K
Mean	1.674545	-0.539091	0.943636	3.036364	1.355455	2.012727
Median	1.990000	3.260000	1.400000	3.860000	1.830000	2.770000
Maximum	3.960000	5.050000	3.920000	5.090000	3.680000	4.240000
Minimum	-1.670000	-32.00000	-2.910000	-1.850000	-3.170000	-3.970000
Std.Dev	1.598608	10.69414	1.790186	2.043249	1.801152	2.412646
Skewness	-0.643412	-2.619815	-0.615457	-1.267198	-1.419487	-1.624289
Kurtosis	2.844803	8.263718	3.396787	3.909604	4.780614	4.557777

Growth	Belgium	Austria	Greece	Ukraine	Latvia	Hungry
Mean	1.622727	1.742727	2.392727	4.710909	4.154545	2.228182
Median	1.750000	2.050000	3.440000	5.890000	7.350000	3.850000
Maximum	3.670000	3.710000	5.940000	12.15000	11.15000	4.800000
Minimum	-2.780000	-3.780000	-3.520000	-14.76000	-17.73000	-6.770000
Std.Dev	1.772248	2.113741	3.298733	7.126064	8.546941	3.384050
Skewness	-1.318778	-1.632234	-0.885616	-1.950497	-1.696239	-1.859021
Kurtosis	4.525032	5.371343	2.397890	6.312604	4.915813	5.615750

Growth	Czech	Bulgaria	Poland	Romania	Turkey
Mean	3.503636	4.291818	2.900000	-10.81727	4.255455
Median	3.770000	5.730000	3.800000	5.240000	6.160000
Maximum	7.020000	6.750000	7.000000	8.490000	9.360000
Minimum	-4.510000	-5.480000	-7.800000	-165.0000	-5.700000
Std.Dev	3.120571	3.713685	3.861088	51.30077	5.291165
Skewness	-1.474319	-1.917052	-2.055929	-2.813777	-1.004500
Kurtosis	5.127177	5.476749	6.672160	8.986895	2.590557

The descriptive statistic for GDP growth rate can be seen in Table 5.3. The highest average GDP growth rate is in Ukraine with approximately 4.17%. The lowest average growth rate is in Romania with -10.81%. The average GDP growth rate for Greece, Bulgaria and Turkey are in the region of 2.39% to 4.71%, while the average rate for Norway, Belgium, Austria and France are in the range of 1.35% to 1.67% about 150 percent. The Standard deviation ranges from a low of 1.598608 for Norway to high of 51.30077 for Romania.

Table 5.4 Descriptive Statistic for inflation rate

Inflation	Norway	Spain	Portugal	Cyprus	France	U.K
Mean	2.189091	2.889000	2.489909	2.643909	1.861455	1.982273
Median	2.330000	3.102000	2.651000	2.253000	1.898000	2.041000
Maximum	3.900000	4.130000	4.410000	4.864000	3.161000	3.629000
Minimum	0.470000	-0.238000	-0.903000	0.180000	0.102000	0.867000
Std.Dev	1.122786	1.168478	1.377649	1.324841	0.721243	0.893582
Skewness	0.026433	-1.858956	-1.244595	0.111262	-0.875708	0.631070
Kurtosis	2.036397	5.849432	4.582061	2.645948	5.081317	2.293148

Inflation	Belgium	Austria	Greece	Ukraine	Latvia	Hungry
Mean	2.140282	1.865000	3.300000	12.82455	5.189455	6.015455
Median	2.332000	1.950000	3.370000	11.95900	3.260000	5.270000
Maximum	4.492000	3.223000	4.710000	28.20300	15.25200	9.800000
Minimum	-0.000900	0.401000	1.210000	0.757000	-1.224000	3.560000
Std.Dev	1.079405	0.690938	0.875237	8.027111	4.527860	2.135136
Skewness	0.244772	-0.222234	-0.904208	0.651769	0.895876	0.622072
Kurtosis	4.215327	1.865000	4.428595	2.771309	3.342768	2.031660

inflation	Czech	Bulgaria	Poland	Romania	Turkey
Mean	2.693636	6.385455	3.430000	15.43364	21.46182
Median	2.550000	6.350000	2.580000	8.990000	9.600000
Maximum	6.340000	12.35000	9.900000	45.67000	54.92000
Minimum	0.110000	2.160000	0.660000	4.840000	6.250000
Std.Dev	1.775051	3.249764	2.533701	13.46707	19.76455
Skewness	0.638819	0.291345	1.555345	1.309694	0.955347
Kurtosis	2.796824	2.231293	4.954837	3.379851	2.095528

The descriptive statistics for the inflation rate are reported in table 5.4. The highest average rate is 21.46182 percent for Turkey. The lowest averages are 1.861455, 1.865000 and 1.982273 for France, Austria and UK. For all Western European countries, inflation rates are under 2.9 percent, except for Greece is 3.300000 percent. And the average inflation rate for Romania is also very high with 15.43 percent. The standard deviation of data ranges from a low of 0.690938 for Austria and high of 19.76455 for Turkey.

5.5 Table for Descriptive Statistics for School Life Expectancy

SLE	Norway	Spain	Portugal	Cyprus	France	U.K
Mean	17.41818	16.08182	15.70000	13.51818	15.64545	16.30000
Median	17.50000	16.00000	15.70000	13.60000	15.80000	16.10000
Maximum	17.70000	16.80000	16.30000	14.70000	16.00000	16.90000
Minimum	17.10000	15.80000	15.20000	12.40000	15.30000	16.00000
Std.Dev	0.194001	0.306001	0.340588	0.689664	0.273363	0.337639
Skewness	-0.525663	1.277997	0.095568	-0.157149	-0.256373	0.735704
Kurtosis	2.214276	3.695204	2.213734	2.400770	1.423580	1.955217

SLE	Belgium	Austria	Greece	Ukraine	Latvia	Hungry
Mean	16.86364	15.08182	15.71250	14.07273	15.69091	15.08182
Median	15.90000	15.10000	15.70000	14.20000	15.90000	15.20000
Maximum	18.90000	15.60000	17.00000	14.70000	16.40000	15.50000
Minimum	15.80000	14.60000	14.20000	12.60000	14.20000	14.30000
Std.Dev	1.427776	0.321926	1.032940	0.654356	0.700649	0.357262
Skewness	0.602796	-0.167884	-0.194983	-1.105188	-0.982200	-1.100140
Kurtosis	1.419682	2.061219	1.714962	3.307146	2.823187	3.164615

SLE	Czech	Bulgaria	Poland	Romania	Turkey
Mean	15.03636	13.47273	15.16364	13.19091	12.36000
Median	14.90000	13.50000	15.10000	13.30000	12.15000
Maximum	16.30000	14.20000	15.60000	14.50000	13.90000
Minimum	13.90000	12.90000	14.80000	11.70000	11.50000
Std.Dev	0.708904	0.440661	0.229228	0.864239	0.689928
Skewness	0.339510	-0.044004	0.364420	-0.295595	1.072306
Kurtosis	2.344659	1.924552	2.585607	2.230085	3.523263

Table 5.5 demonstrates Descriptive Statistics for school life expectancy. The highest average school life expectancy is 17.41818, it is for Norway and the lowest average school life expectancy is 12.36000 for Turkey. After Turkey, Romania and Bulgaria have the lowest average school life. The standard deviation for data ranges from a low of 0.194001 for Norway, to a high of 1.427776 for Belgium.

Chapter 6

ESTIMATION TECHNIQUES AND RESULT

Whenever we deal with panel data, we can implement stationary, unit root, and cointegration tests, but before proceeding these tests we should find out which model (fixed or random effect model) is appropriate for our regression.

6.1 Panel Data Estimation Technique

Panel data consists of same entities such as firms, country, cities, and persons which are observed at several points in time such as dates, months, seasons and years. This time can happen at two time periods ($T = 2$) or more time periods ($T = N$). The key feature of panel data is that we can observe the same entities in more than one condition.

Panel data regression model is:

$$Y_{it} = \alpha_i + \beta_i X_{it} + \dots + U_{it} \quad \text{equation 6.1}$$

Here, i and t represent sections and period respectively. Y_{it} is a matrix with NT rows and 1 column.

U_{it} : have three assumptions: 1) zero mean, 2) the errors of t and s for i^{th} unit are uncorrelated ($\text{Corr}(U_{it}, U_{is}) = 0$, t and s are time periods) and $\text{Var}(U_{it}) = \sigma^2$

Also break down dummies can be added to the panel data regression model to estimate the time effects (special events, crisis, etc.) which results in an improved model. Panel data can be estimated by either, random effects or fixed effects.

The fix effects model is efficient, when we consider total group, whereas when we choose random sample from large group, so we use the random effect model.

6.1.1 Framework of Fixed Effects

In fixed effects method, it is assumed that the differences between cross-sections can be found in differences in intercepts, so in equation 6.2 each α_i is an unknown parameter that has to be estimated. In this model, the entity-specific is a random variable which is allowed to be correlated with an explanatory variable.

The model with fixed effects can be shown as:

$$Y_{it} = \alpha_i + \beta X_{it} + \epsilon_{it} \quad \text{equation 6.2}$$

Y_{it} and X_{it} are dependent and independent variables accordingly which include T number of observation for the i^{th} unit in t period, respectively.

ϵ_{it} is the random disturbance error term.

6.1.2 Framework random effect

In random effect model, the entity-specific is a random variable which is uncorrelated with explanatory variables and individual differences are shown by error term. (Green, 2001)

The model can be represented as:

$$Y_{it} = \alpha + \beta X_{it} + U_i + \epsilon_{it} \quad \text{equation 6.3}$$

In random effect assume that $\text{COV}(U_i, X_{it}) = 0$, so random effect is the type of feasible generalized least squares (FGLS).

U_i is the determinant of random component of the i^{th} unit and it is constant over time. In the applied studies, U_i is those specific features of each section which are not considered in the model.

The variances related to different sections are not same, and this is because the model has heteroskedasticity problem, Generalized Least Squares (GLS) is then chosen method instead of Ordinary Least Squares (OLS) method.

6.1.3 Decision Making between Fixed and Random Effects Model

Some ways exist for making decision between fixed effects model estimation and random effect model estimation such as:

- Hausman test (Hausman, 1978)
- Breusch and Pagan

In this study, the Hausman test was conducted. The test statistic for H has chi square distribution with k degrees of freedom (the number of explanatory variables) and in general its hypothesis is:

$H_0: COV(\alpha_i, X_{it}) = 0$ (it means that random effect is more efficient than fixed effect)

$H_1: COV(\alpha_i, X_{it}) \neq 0$ (otherwise fixed effect is chosen)

H_0 means that both estimated parameters in fixed effect and random effect are consistent and standard error of estimated parameters in random effect is lower than the fixed effect. On the other hand, H_1 means that some covariance between α_i and X_{it} are not equal zero.

6.2 Panel Data Estimation Result

We are estimating the following equation:

$$LFDI_{it} = \alpha_i + \beta_1 LRGDP_{it} + \beta_2 LINF_{it} + \beta_3 Growth_{it} + \beta_4 RER_{it} + \beta_5 Lint_{it} + \beta_6$$

$$LSLE_{it} + \beta_{ik} D_k + U_{it} \text{ equation 6.4}$$

Where: i =country (1, 2...17) and t =year (2000,2001...2010)

In equation 6.4:

$LFDI_{it}$: Log form of Foreign Direct Investment.

$LRGDP_{it}$: Log form of Real Gross Domestic Product.

$LINF_{it}$: Log form of inflation for country $i = \log(CPI_i) - \log(CPI_{t+1})$.

$Growth_{it}$: GDP growth rate (%).

RER: Real Exchange rate is calculated as: $RER = (S * P^F) / P$ where:

P^F is the consumer price index in foreign country USA.

P is the consumer price index in home country.

S is the spot exchange rate, which is defined as home price for a foreign currency which is the US dollar.

$Lint$: Log form of Internet users (per 100 people).

$LSLE$: Log form of School Life Expectancy.

D_k : dummy for years.

α_i : unknown intercept for each country ($i=1,2,\dots,17$).

$\beta_1, \beta_2, \dots, \beta_6$ are unknown parameter that to be estimated.

U_{it} : is random disturbance term over the year t .

i : country indicator.

t : time period indicator.

Stata software for panel data estimation has been used to investigate the relationship between FDI inward and factors which attract FDI such as RGDP, inflation rate, growth, real exchange rate, number of internet user, School life expectancy. For the regression estimation Stata software produces two estimation outputs: fixed effects and random effects. For decision making process between these two effects, Hausman test has been implemented.

Under null hypothesis, Hausman test indicates that difference in coefficients obtained from two estimations in nonsystematic and random effects estimation is efficient.

According to results the Hausman distribution equalsto 8.85 ($\chi^2(16) = 8.82$) and probability value¹ of chi 2 is equal to 0.9205(in Appendix 2) which indicates that there is no correlation betweenexplanatory variables and error term which means that alternative hypothesis is rejected (presence of fixed effects). Consequently, the regression was run with random effect model.

Another way is thatif there are no omitted variablesor if anyomitted variables are uncorrelated with control variables the random effect model may be the best chosen. Resultsare tabulated in table 6.1.

1. H_0 can be accepted with the probability value more than 0.05, so random effect model should be used.

Table 6.1: Panel Data Model Estimation Result for FDI

Dependent Variable	Log Foreign Direct Investment (LFDI)
Independent Variable	Random Effect
LRGDP	0.4730837*** (0.1708967) [2.768243623]
LINF	-0.4855305*** (0.0899985) [5.394873248]
Growth	0.0014533** (0.0006873) [2.114506038]
RER	0.0014407*** (0.0004389) [3.282524493]
Lint	0.4652048** (0.223465) [2.08177925]
LSLE	1.956512* (1.106311) [1.768500901]
Constant	-1.938759* (1.167211) [1.661018445]
D2000	0.3865792* (0.2169389) [1.781972712]
D2001	0.258789 (0.217982) [1.187203531]
D2002	-0.1136122 (0.2020309) [0.562350611]
D2003	0.0722568 (0.1678348) [0.430523348]
D2004	0.154918 (0.1472758) [1.051890399]
D2005	0.2908812* (0.1638755) [1.775013349]
D2006	0.4685202*** (0.1275783) [3.672412942]

(Continued)

D2007	0.4609881*** (0.1265384) [3.643068823]
D2008	0.3984979*** (0.0882234) [4.516918414]
D2009	0.0340455* (0.1116631) [0.304894813]
Number of Observation	186
Within R-Squared	0.5049
Between R-Squared	0.6060
Overall R-squared	0.5742
Wald chi 2 (16)	506.68
Prob>chi2	0.0000
rho (ϕ^4)	0.68945499
(sigma-u)	0.41620856
(sigma-e)	0.27933176

Note:

1. Standard errors are presented in parentheses.
2. t-statistics are given in squared brackets.
3. The coefficients are marked: ***, **, * respectively significant at 1%, 5% and 10%.
4. ϕ is the correlation coefficient between sections.
5. σ_u and σ_e are estimated error.
6. L refers to value in Logarithms.

Table 6.1 tabulates the result for regression where the foreign direct investment inward regressed on real GDP, inflation, growth rate, real exchange rate, number of internet users and school life expectancy. The coefficient estimates for all control variables turn out to be of the correct coefficient signs as expected and significant. The estimates for the real GDP and real exchange rate are of correct coefficients sign (+) and significant at 1% (highly significant), for inflation is correct sign (-) and significant at 1% (highly significant), and also the estimates for growth rate and number of internet users are significant at 5% with correct sign (+) and also school life expectancy shows correct sign (+) and significant at 10%.

Besides, dummy variables increases foreign direct investment inward except in year 2002 when many European countries began using a common currency (ERUO).

Furthermore, year 2000 and 2005 are also found to be significant at 10%, and where years 2006, 2007, and 2008 are found to be significant at 1%, whereas other year dummies are insignificant.

Wald chi square is found 506.68 with the degree of freedom 16. The asymptotic distribution of the Wald statistic is chi –square with degree of freedom equal to the number of parameter estimated.

Chapter 7

CONCLUSION

The aim of this study is to investigate the determinant factors that can influence FDI inwards into Turkey and other selected European countries. Previous studies in this field have mostly focused on real GDP, openness of the economy, labor productivity as a proxy for wage rate, inflation, infrastructure, exchange rate and so on. Some empirical findings have concluded that some explanatory variables supported theories related to FDI, because they turned out to be with correct confident signs and significant. Whereas, other empirical results showed that some explanatory variables have failed to come up with significant and correct coefficient signs and sometimes they indicate that some control variables have no effect on FDI inwards. Moreover, some empirical findings indicated that large volume of foreign direct investment goes to countries with large market size, high GDP growth rate, more open to international trade, stable economies and countries with high facilities and so on. However, some of empirical studies showed that FDI comes into a country, because of its low labor cost, its natural resources or other favorable conditions.

For this topic, real GDP, inflation, growth, real exchange rate, school life expectancy and number of internet users as the determinant factors that may have an impact on FDI inwards for Turkey and other selected European countries for 11 years (from 2000 to 2010). An empirical model was developed according to these explanatory variables to obtain their effects on dependent variable, FDI inwards.

The results revealed that real GDP, growth rate and depreciation of real exchange rate led to an increase in FDI inwards, as expected they have positive association with FDI inwards. Also, similar results are obtained for the number of internet users and school life expectancy as proxies for physical and human capital. Whereas, inflation led to decrease in FDI inwards, so it has a negative impact on FDI inwards. Moreover, all of these factors have shown significant impacts on FDI inwards for those countries (Turkey and selected European countries) during 2000 to 2010 in the estimated model.

Overall, this study provided evidence that real GDP (market size), inflation (macroeconomic stability), growth prospect, real exchange rate (financial sector), number of internet users (technology) and school life expectancy have positive and significant impact on FDI inwards into these selected countries from 2000 to 2010.

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APPENDICES

Appendix1: Random effect result

```
. xtreg logfdi logrgdp logsl e dlnfl growth rer logint d2000 d2001 d2002 d2003 d2004 d2005 d2006 d2007 d2008 d2009, re vce(robust)
```

```
Random-effects GLS regression           Number of obs   =    186
Group variable: country                 Number of groups =    17

R-sq:  within = 0.5049                   Obs per group:  min =    10
      between = 0.6060                       avg   =   10.9
      overall  = 0.5742                       max   =    11

Random effects u_i ~ Gaussian           Wald chi2(16)   =   506.68
corr(u_i, X)      = 0 (assumed)         Prob > chi2     =    0.0000
```

(Std. Err. adjusted for 17 clusters in country)

logfdi	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
logrgdp	.4730837	.1708967	2.77	0.006	.1381323	.8080352
logsl e	1.956512	1.106311	1.77	0.077	-.2118183	4.124842
dlnfl	-.4855305	.0899985	-5.39	0.000	-.6619242	-.3091368
growth	.0014533	.0006873	2.11	0.034	.0001062	.0028004
rer	.0014407	.0004389	3.28	0.001	.0005806	.0023009
logint	.4652048	.223465	2.08	0.037	.0272214	.9031882
d2000	.3865792	.2169389	1.78	0.075	-.0386132	.8117716
d2001	.258789	.217982	1.19	0.235	-.1684478	.6860259
d2002	-.1136122	.2020309	-0.56	0.574	-.5095855	.2823612
d2003	.0722568	.1678348	0.43	0.667	-.2566933	.4012069
d2004	.154918	.1472758	1.05	0.293	-.1337374	.4435733
d2005	.2908812	.1638755	1.78	0.076	-.0303088	.6120712
d2006	.4685202	.1275783	3.67	0.000	.2184713	.718569
d2007	.4609881	.1265384	3.64	0.000	.2129773	.7089988
d2008	.3984979	.0882234	4.52	0.000	.2255833	.5714126
d2009	.0340455	.1116631	0.30	0.760	-.1848102	.2529012
_cons	-1.938759	1.167211	-1.66	0.097	-4.22645	.3489312
sigma_u	.41620856					
sigma_e	.27933176					
rho	.68945499	(fraction of variance due to u_i)				

Appendix2: Hausman Result

. hausman

You used the old syntax of hausman. Click [here](#) to learn about the new syntax.

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S. E.
	(b) Consistent	(B) Efficient		
logrgdp	.0638302	.4730837	-.4092536	.1660442
logsl e	2.266417	1.956512	.3099051	.5780129
dlnfl	-.4914665	-.4855305	-.005936	.
growth	.0016988	.0014533	.0002455	.
rer	.0028662	.0014407	.0014254	.000987
logint	.575925	.4652048	.1107202	.0880935
d2000	.4179247	.3865792	.0313455	.0607394
d2001	.2805461	.258789	.0217571	.0503087
d2002	-.125111	-.1136122	-.0114989	.0417485
d2003	.0806646	.0722568	.0084078	.0282024
d2004	.1681674	.154918	.0132495	.0213463
d2005	.304665	.2908812	.0137838	.0161629
d2006	.4592388	.4685202	-.0092814	.0142527
d2007	.4798179	.4609881	.0188299	.
d2008	.4158653	.3984979	.0173673	.
d2009	.0347361	.0340455	.0006906	.

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \chi^2(16) &= (b-B)' [(V_b-V_B)^{-1}] (b-B) \\ &= 8.82 \\ \text{Prob} > \chi^2 &= 0.9205 \\ & (V_b-V_B \text{ is not positive definite}) \end{aligned}$$

