NEAR EAST UNVERSITY

Institute of Social Sciences

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The Impact of Foreign Direct Investment on GDP: A Case Study of Turkey 1990–2011

In Accordance With the Regulations of the Graduate School of Social Sciences

MASTER THESIS

Lana Salar Dzaei
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DECLARATION

I declare that this dissertation is the product of my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

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Signature: .....

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DEDICATION

This work is dedicated to my parents Salar KH.Hussain and Ruaida Abd. Al Hady.

All I have and will accomplish are only possible due to their love and sacrifices

ABSTRACT

This study attempts to investigate the effect of FDI on GDP case study of Turkey. By using Cobb-Douglas production function as the basic model. The period of the study is from 1999 to 2011, so the study has 22 observations to analysis. The elements that included in the growth model where GDP as dependant variable, FDI, Capital, Labor force, and human capital as independent variables. After building up the model, the study detect for auto-correlation and Heteroskedasticity to make sure that the OLS (Ordinary Least Square) regression can be predicted in accurate way without having any consequences of auto-correlation or Heteroskedasticity. After running the OLS method regression it's found that FDI is significant, the coefficient of FDI which represent elasticity is 0.2671. The essential results for the study submit that Foreign Direct Investment has a positive but non-mentioned effect on growth rate in Turkish economy. It seems that Turkey is not benefiting from the foreign investors.

Keywords: Foreign Direct Investment, Economic Growth, Cobb-Douglas production function, Turkish Economy, Ordinary Least Square regression.

ÖZET

Bu çalışma türkiye'de doğrudan yabancı yatırımların ekonomi üzerindeki etkilerini incelemeyi amaçlamaktadır. Bu amaç doğrultusunda Cobb- Douglas üretim fonkison modeli temel model olarak kullanılmıştır. Çalışmanın yapıldığı zaman dilimi 1999 ve 2011 yılları arasını kapsamaktadır. Böylelikle, çalışmanın 22 adet gözlem analizi bulunmaktadır. Büyüme ve gelişim modelinde GDP bir bağlı değişken iken, FDI, ana para, iş gücü ve insan unsuru bağımsız elemanlar olarak algılanmaktadır. Model kuruldukan sonra gerilemeyi OLS cinsinden doğru şekilde tahmin edip öngerebilmek için gerekli formasyonun sağlanması için otomatik korelasyon ve varyanslılık bu çalışma tarafından ortaya çıkarılmaktadır. Çalışırken OLS yöntemi regresyon'bulundu. FDI önemli, katsayısı FDI temsil eden esneklik, 0.2671. Temel sonuçlar çalışma gönder Yabancı Doğrudan Yatırım, bir pozitif ama bahsedilen etkisi büyüme oranı, Türk ekonomisi. Öyle görünüyor ki Türkiye, yararlanmayan yabancı yatırımcılar.

Anahtar Kelimeler: doğrudan yabancı yatırım, ekonomik büyüme, Cobb- Douglas üretim fonksiyonu, Türk ekonomisi, olağan gerileme.

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CBO	Congressional Budget Office
CBRT	The Central Bank of Turkey
EBRD	European Bank for Reconstruction and Development
ED	Education Extendicare
EIM	Enterprise Information Management
EU	European Union
FDI	Foreign Direct Investment
GCF	Gross Capital Formation
GDP	Growth Domestic Product
GE	Government
GNI	Growth National Income
IMF	International Monetary Fund
L	Labor Force
MNCS	multinational corporation
MNES	multinational enterprises
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
SAARC	South Asian Association for Regional Cooperation
TFP	Total Factor Productivity
XM	Trade openness

CHAPTER ONE

1.1. Introduction:

Foreign direct investment (FDI) has an important role in developed country throw economic growth. It impact on most sectors in economy through bringing new technology, skills, trade…etc. Also it can be a source of investment finance and technology transfer. Due to the globalization's that has been happening it is easier for foreign investor to invest in other counters. Nair-Reichert & Weinhold, (2001) during their study about FDI they conclude that during the last decades FDI has increased by 17% in the developing countries, this globalisation supported the inflows of foreign investors in the world.

In fact FDI can be a key element or winner card for both "home country" as well as "host country", which can benefit from it. Both countries are straight involved in inviting FDI, because it benefits both sides in a way or other. For the 'Home' country it will open a new market which can invest in, it conceder an advantage point for home country. As for 'host' country it will get their benefit through bringing new technology, managerial skills, foreign exchange also opining new trade.

There are uncounted number of article, literature, thesis and researches showing the relation between FDI and economic growth. The researcher's has been using many different ways, analysis, beside different type of data and periods. Most of exist literatures have been used cross-country to show the impact of FDI on GDP; Tasi (2007) , Borensztein, Gregorio, Lee (1998) Chakrabarti (2001) and more. Also some other researchers prefer to make a comparison between two countries; Bajpaj & Dasgupta "India & China" (2004), dumludag "Turkey & Egypt" (2010), Agrawal & Khan "China & India" (2011), while other choice to show the impact in one specific country; Karimi & Yusop (2009) "Malaysia", Wafure & Nurudeen "Nigeria" (2010), Iqbal et al. (2014) "Pakistan" , Lartey et al. (2014). "Ghana"… etc.

There are some limitations in this study though, like the data that is used just for twenty-two years, this is due to un-availability of data for some variables in the model. In this study the impact of Foreign Direct investment on Growth in Turkey is focused on, and if the FDI has positive or negative effect on Turkish Economic.

The study will continue by giving a definition of FDI and some other subsections related to FDI and Turkish growth, following section gives an overview of the Theoretical Framework and Theories of Economic Growth. Furthermore, in section 3, it gives an overview of some empirical studies which shown the relation between FDI and Growth. Section 4 is described the Data, Methodology and Econometric Model in subsections. Section 5 specified for empirical findings and the results. Finally section 6 conclusion of the study and some suggestions for future studies.

1.2. Definition and FDI:

"FDI is conventionally defined as a form of international inter-firm co-operation that involves significant equity stake and effective management decision power in, or ownership control of, foreign enterprises. FDI is also considered to encompass other broader, heterogeneous non-equity forms of co-operation that involve the supply of tangible and intangible assets by a foreign enterprise to a domestic firm. Those broader collaborative associations include most types of quasi-investment arrangements, such as licensing, leasing, and franchising; start-up and international production sharing arrangements; joint ventures with limited foreign equity participation; and broad R&D co-operation [De Mello, 1997]."[1]

FDI is an investment by non-resident investees in a host country, the business that made by foreign direct investments are often called (MNCs) multinational corporations or (MNEs) multinational enterprises. These corporations play an important role in globalization. FDI can invest directly by creating a new enterprise or by acquisition of a foreign firm.

1 De Mello, L., 1997, —Foreign Direct Investment in Developing Countries and Growth: A Selective Survey,‖ *The Journal of Development Studies*, Vol.34, No.1, pp 1-34

1.3. Effect of Economy globalization on Turkish Economy:

Globalization concept is different from economic globalization, so first of all let us define what an Economy globalization? As Anne Kruger mentioned: "economic globalization is a phenomenon by which economic agents in any given part of the world are much more affected by events in any given part of the world than before" [2].

According to some studies, globalization has shown its effects on Turkey in 1980's, these effects can be seen in many sectors in economy, like: transition to free market economy, inspiring both foreign and local investments...etc. Due to Turkey's geographical location it was easy to access and participate in the global economy. Before Turkey didn't get fully benefit of globalization because of the financial crisis in the years of 1994, 2000 and 2001 but in the end of 2005 due to the Formal opening of accession negotiations with the European Union For Turkey's being a full membership in European Union, that makes Turkey more affected by economic globalization. If EU accepts Turkey's membership it will open new doors of economic globalization for Turkey more easily and benefit from it through attracting FDI.

Turkey has been doing a good job by trading liberalization since it started at 1980's, due to the Enterprise Information Management (EIM) companies from US provided 28% of FDI into Turkey from 2007 to 2012, also European countries has been investing in Turkey too, like; Germany by 64 projects, France by 30, the UK by 26 and Italy 24 projects, likewise Asian investors, with leading by Japan which is considered the sixth largest investor in Turkey by number of projects. When the countries that have invested in Turkey In 2011 are considered , it is seen that the major source countries for FDI inflows to Turkey were Austria 14%, Spain 14%, Netherlands10%, Belgium and the USA both 9% (figure 1). But in 2013 the source of FDI inflows to Turkey had a little change; Germany had a biggest share by 18.1%, Netherlands 10%, Russia 8.5%, Azerbaijan 7.6%, Austria 6.4%, and others49.2% (figure 2). All these due to the globalization effect on Turkey's economy by opening the door to all foreigners to invest in Turkey.

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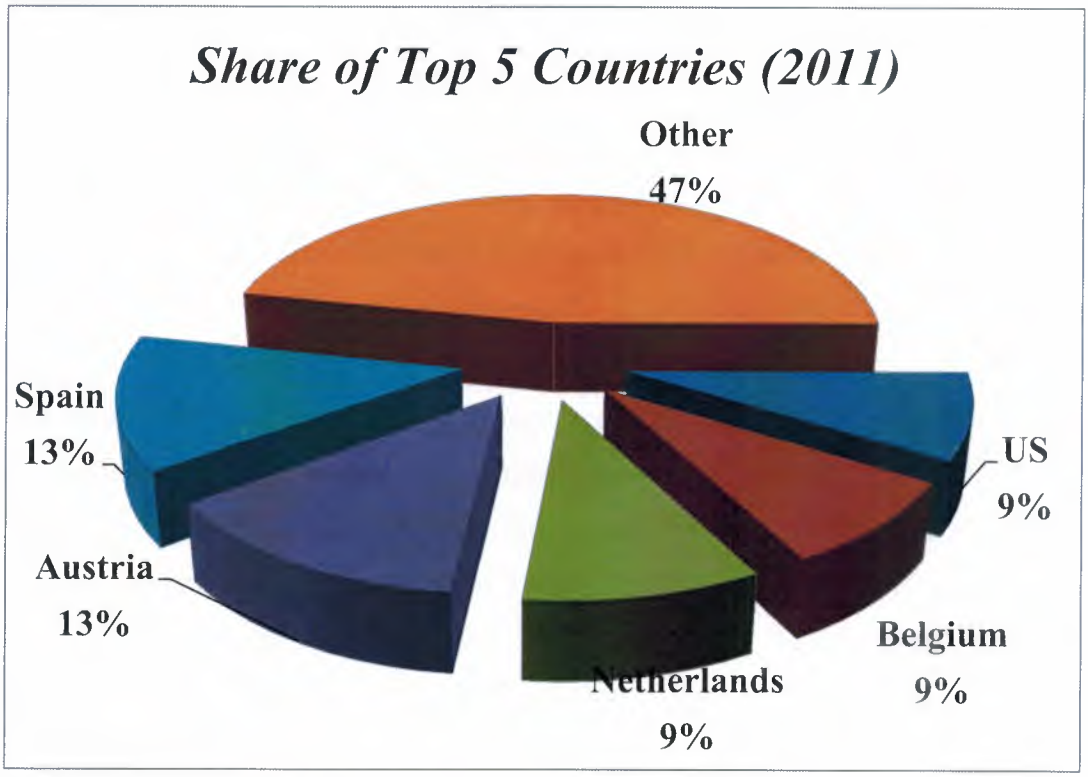
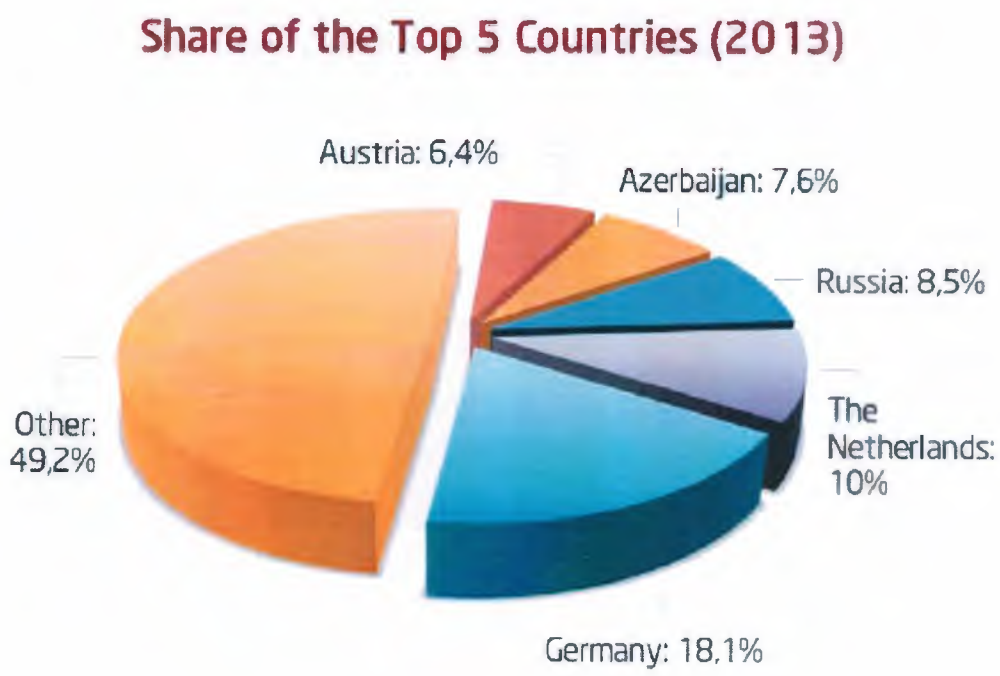
2 Anne Krueger, first managing director of the IMF, Trading Phobias: Governments, NGOs and the Multilateral System, John Bonython Lectures, 10 October 2000.

Figure 1: Share of Top 5 Countries (2011)



Source: Central Bank of Turkey

Figure 2: Share of Top 5 Countries (2013)

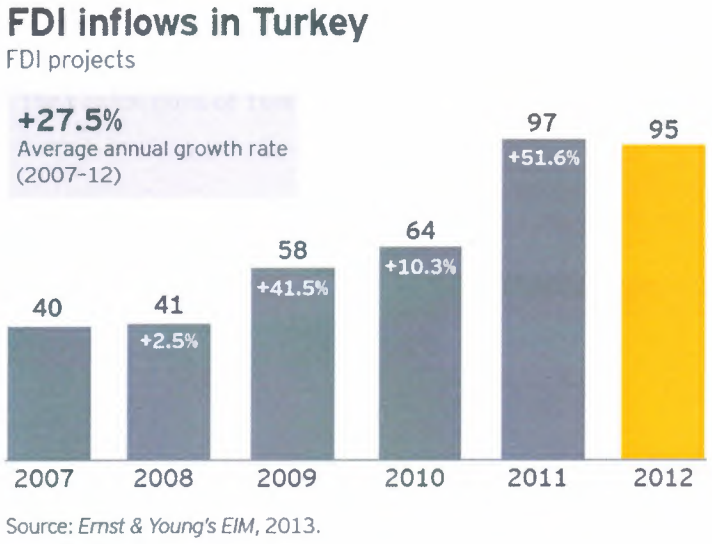


Source: The Central Bank of Turkey

1.4. An over view of FDI inflows into Turkey:

After effect of globalization turkey is more open to outside world, one of these effect we can notes is from the FDI inflows in to Turkey. According to Bildirici el at. (2010, 191–200), in 1924 the foreign companies in Turkey were 94 investing companies which are included: trading, manufacturing industry, banking, marine fields, and electricity. For 1929 the number of foreign companies increased to 114 in deferent sectors, and it continually increased. In early of 1980 Turkish government did some changes in the law to encouragement the FDI by eliminating trade restrictions also by liberalization of foreign exchange market these procedures helped to attract FDI to invest more in Turkey Ilgun et al., (2010). By 2003 Turkey announces a new low which has a most benefit for both Turkey and the foreign investors that was: in most sectors in Turkey foreign investors are no need to take authorized permission to invest. Aktar & Ozturk (2009). The EIM report of 2013 show that Turkey has been growing steadily since 2007; the number of projects has been more than doubled from 40 to 97, in 2007 till 2011, and the average annual growth rate is +27.5% for 2007-2012[3] (Figure 3).

Figure 3: FDI inflows of the project in Turkey:



Source: *Ernst & Young's EIM*, 2013.

3 Ernst & Young's attractiveness survey, Turkey 2013, The shift, the growth and the promise, Ernst & Young's attractiveness surveys. Pg. 14.

By the beginning of 2011 Turkey has been reached $15.9 billion of foreign investing, which is 75% rising compering with 2010 but as 2013 ends the foreign direct investment in turkey falls 12.7 billon$ a 4% decline (Figure 4). The FDI inflows by regions from 2007 till 2013 it is easy to notes that European countries has the biggest share of the inflows in Turkey by 74.79%, in the second place Asia/Near & Middle East by 13.20% then North America is coming by 5.34% then other Asia country 5.34% and other regions by 0.74% these numbers are from 2009 – 2013 period based on CBRT (Table 1).

Figure 4: FDI inflows to Turkey 1994-2013 (average)

Source: The Central Bank of Turkey (including real estate purchases by foreigners)

Table 1: the FDI Inflows to Turkey by Regions (2009-2013)

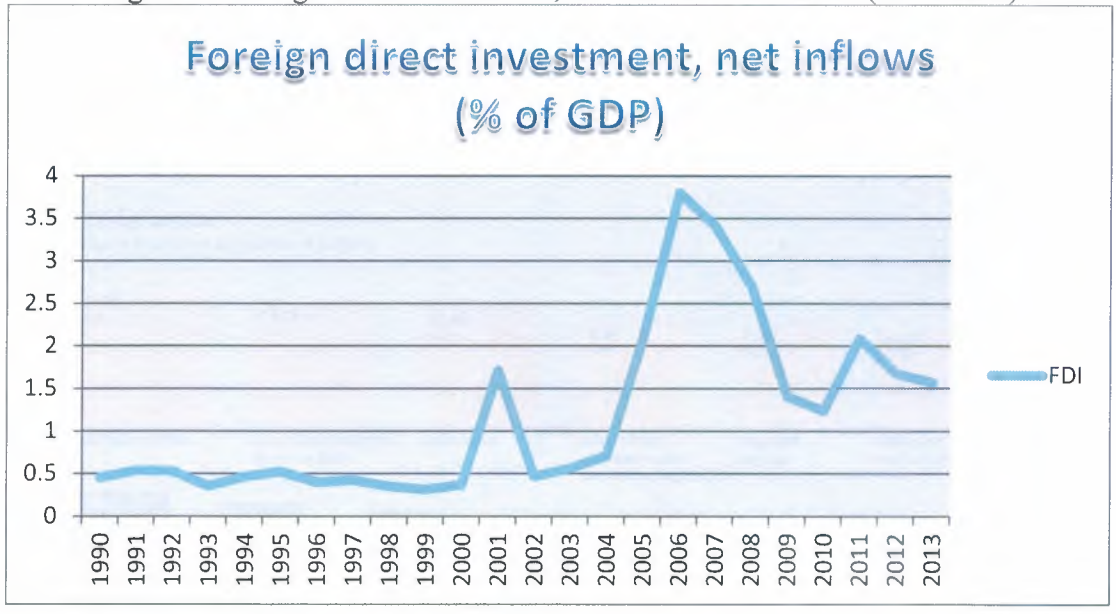
Breakdown of FDI Inflows By Region (2009-2013)

Million $	2009	2010	2011	2012	2013	2009-2013
Europe	5.248	4.939	12.587	7.925	6.402	37.101
Share (%)	*83,75*	*78,95*	*78,01*	*73,66*	*62,83*	*74,79*
North America	312	378	1.423	471	360	2.944
Share (%)	*4,98*	*6,04*	*8,82*	*4,38*	*3,53*	*5,93*
Asia/Near and Middle East	361	473	1.558	1.593	2.562	6.547
Share (%)	*5,76*	*7,56*	*9,66*	*14,81*	*25,14*	*13,20*
Asia / Other	312	455	497	744	640	2.648
Share (%)	*4,98*	*7,27*	*3,08*	*6,92*	*6,28*	*5,34*
Other Regions	33	11	71	26	225	366
Share (%)	*0,53*	*0,18*	*0,44*	*0,24*	*2,22*	*0,74*
TOTAL	**6.266**	**6.256**	**16.136**	**10.759**	**10.189**	**49.606**

Source: CBRT

Till the end of 2011 Turkey is doing a good job by attracting the foreign investors to invest in Turkey, in comparable to global FDI trends, this rising movement, however, did not last, FDI's declined to $13.2 billion in 2012 after that to $12.7 billion in 2013.

Figure 5: Foreign direct investment, net inflows 1990-2013 (% of GDP)



Source: The World Bank data base.

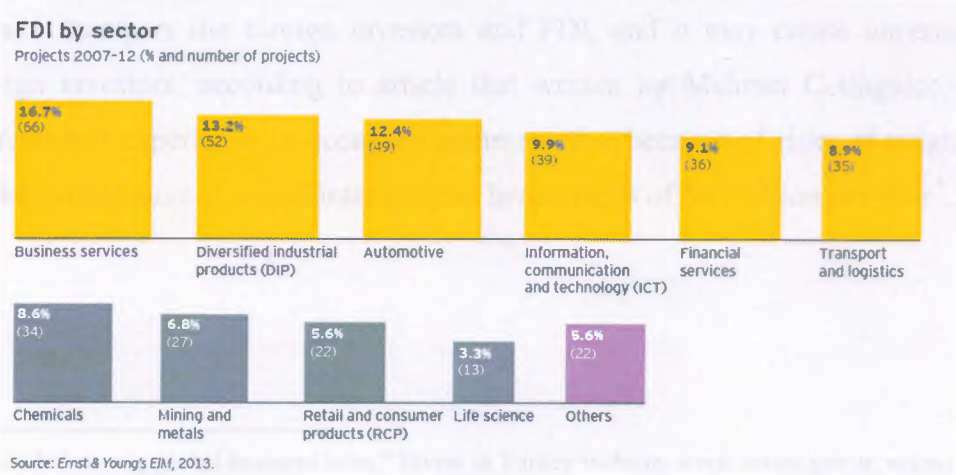
1.5. FDI in Turkey:

After the economic crisis of 2008, like any other country that affected by the crisis Turkey start to recovery from the crisis damage, by their strategy to accelerated inflow of foreign direct investment (FDI). In turkey foreign investors can freely invest in any field of business they want without even any restrictions or limitations. The factors behind attracting FDI to Turkey are geostrategic location, young and dynamic population, and also liberal legislation too. Also an important factor that makes growth of FDI in Turkey is bilateral agreements. According to statistics in 2012 turkey made 84 bilateral foreign investment agreements.

According to The Ministry of Economy, Turkey has currently 30,851 companies that are created by foreign investors in 1954 to 2013 periods, and 6,099 local companies in the same period have teamed up with foreign a partner, which makes the total of companies with foreign capital to 36,950 in turkey till 2013. A report that published by the Istanbul Chamber of Certified Public Accountants mentioned foreigners holds stakes in 37 bank of Turkey's 49 banks, Furthermore, as a report mentioned foreigners invested $20.5 billion in 21 banks from 2001 to 2014 and profited more than $17 billion in return. Round 25% of Turkey's banking system today is held by foreigners.

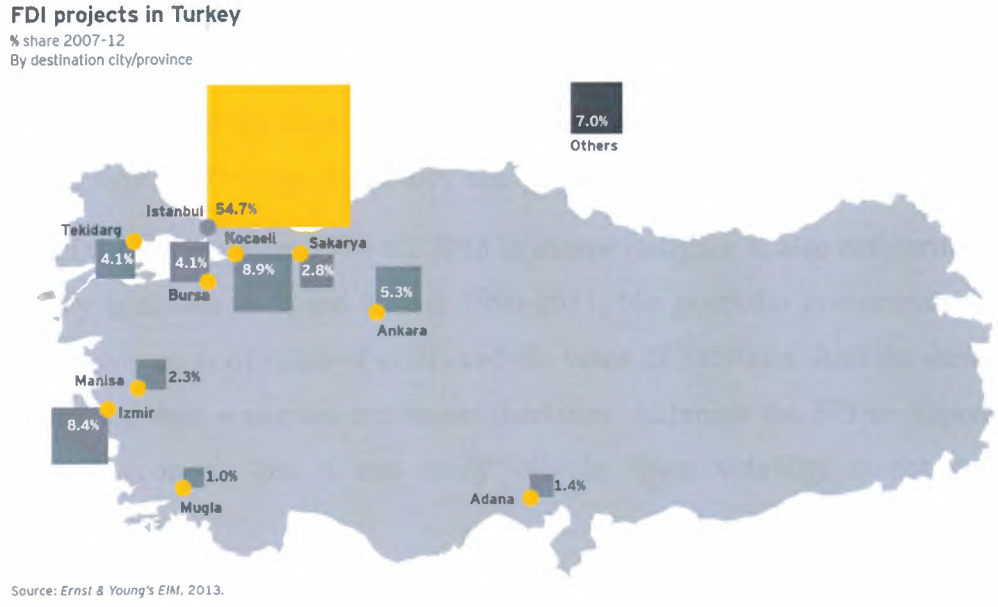
As in the Ernst & Young's attractiveness survey report for 2013 (Figure 6) the most sectors that FDI has been investing in is Business Services sectors since year 2007 till 2012 which is the highest flow of FDI.

Figure 6: FDI by sectors 2007-2012 (% and number of projects)



In the Regional development (figure 7), Istanbul has the biggest share of the FDI project by 54.7%, and other cities has a small share of FDI projects. It's obvious that Istanbul considered financial centre for turkey. Clearly it's the most favoured city for business and investment; numerous of global companies have a presence in the city, both in the form of headquarters and operating offices [4]. These percentages of sharing is from 2007-2012 period due to Ernst & Young's EIM, 2013

Figure 7: FDI projects in Turkey 2007-2012



Although Turkey is doing a good job by attracting the foreign investors but still Turkey may face some problems because of the neighbouring Syria and Iraq civil wars, it hampers the foreign investors and FDI, and it may create uncertainty for foreign investors, according to article that written by Mehmet Cetingulec, he is a professional experience in economy comment that because of risks of neighbouring Turkey could have attracted international investments of $40 billion per year[5].

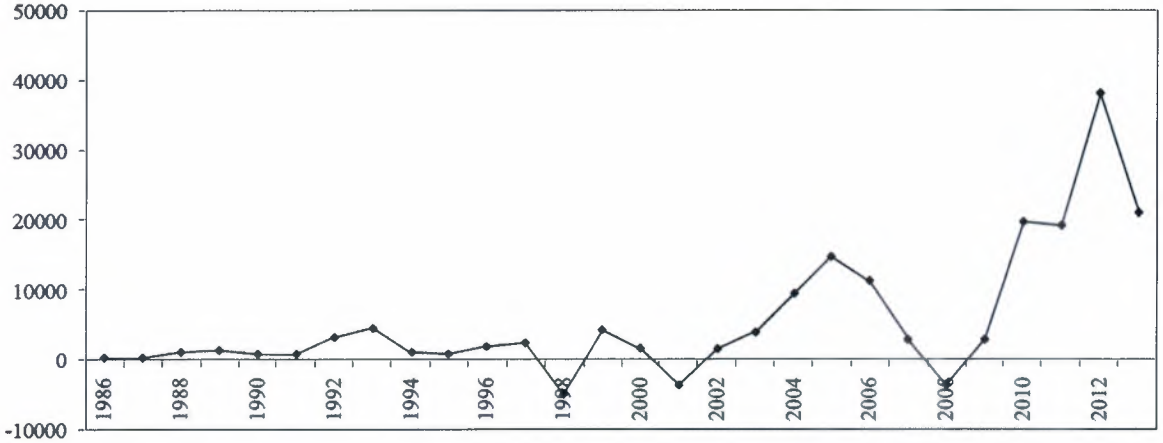
4 "Istanbul among global business hubs," Invest in Turkey website, www.invest.gov.tr, accessed 5 November 2012.
5 "Will foreign investment in Turkey return to pre-crisis levels?" article by: Mehmet Cetingulec. http://www.al-monitor.com/pulse/originals/2014/07/cetingulec-foreign-investments-pre-crisis-turkish-economy.html#ixzz3bK8YN8ow

1.6. Foreign Portfolio investment:

Foreign Portfolio investment is securities and other financial assets passively held by foreign investors. Foreign portfolio investment (FPI) does not provide the investor with direct ownership of financial assets, and thus no direct management of a company. This type of investment is relatively liquid, depending on the volatility of the market invested in. It is most commonly used by investors who do not want to manage a firm abroad.[6] Foreign portfolio just like FDI has impact on developing of growth. The different between FDI and FPI, is FPIs are really volatile, as they can be reversed easily. But FDI cannot be reversed easily. So FPI may contribute towards volatility in economy, which is not good. Furthermore FDI on other hand reflects better confidence in the economy, as it shows investors are ready to tie up resources for a long time, and on top of that they also generate employment.

A FPI for Turkey from 1986 till 2013 is shown in figure 8, also net portfolio flow of Turkey is shown in figure 9 from 1990-2011. Net portfolio investments value is equal to summation of value of assets and the value of liabilities. And the summation of equity and debt securities represents liabilities. Although the FPI in important to developing economy but it can easily volatile, these volatility is not good for economic health.

Figure 8: Foreign Portfolio Investment in Turkey



6 Read more: http://www.investopedia.com/terms/f/foreign-portfolio-investment-fpi.asp#ixzz3diwlu8H8

Figure 9: Portfolio Investments to Turkey (Million $)

YEAR	NET PI	ASSETS	LIABILITIES	EQUITY SEC.	DEBT SEC.
1990	547	-134	681	89	592
1991	623	-91	714	147	567
1992	2411	-754	3165	350	2815
1993	3917	-563	4480	570	3910
1994	1158	35	1123	989	134
1995	237	-466	703	195	508
1996	570	-1380	1950	191	1759
1997	1634	-710	2344	8	2336
1998	-6711	-1622	-5089	-518	-4571
1999	3429	-759	4188	428	3760
2000	1022	-593	1615	489	1126
2001	-4515	-788	-3727	-79	-3648
2002	-593	-2096	1503	-16	1519
2003	2465	-1386	3851	905	2946
2004	8023	-1388	9411	1427	7984
2005	13437	-1233	14670	5669	9001
2006	7415	-3987	11402	1939	9463
2007	833	-1947	2780	5138	-2358
2008	-5014	-1244	-3770	716	-4486
2009	227	-2711	2938	2827	111
2010	16093	-3524	19617	3468	16149
2011	22079	2552	19527	-986	20513

Source: CBT Electronic Data Delivery System.

CHAPTER TWO

2.1. Theoretical Framework:

In the literature it is defined by Solow and Swan(1990) that researches on two main streams regarded to the economic growth theory, the first one is; the neo-classical economic theory. In the neo-classical with a concern of FDI, by technological progress long-run growth can be achieved and considering technological as exogenous factor, also long-run growth is not explained as a function of capital and labor input. This theory is extension of the Harrod-Domar Growth model which is posited after that by Solow-Swan (1994) (1964). Second is Endogenous Growth Theory, mainly pioneered by Romer, P (1990) and Aghion & Howitt (1992), and expanded by (Barro, et al., 1995). Due to new growth theory labor and capital along with FDI will be inputs and it expected to help growth in the long run. With consider the technological progress endogenously on the right hand side of the production function too, and will assume that technology is a constant.

2.2. Theories of Economic Growth:

Economic growth is usually measured as the annual percentage rate of growth, Real Growth domestic product (GDP) or Gross National Product (GNP) are the tools that used for measuring Economic growth in the country's, GDP is a total value of goods and service produced in the economy. As it is mentioned above there are two basic growth theories; 1) Neo-classical economic growth theory, 2) Endogenous Growth Theory. These theories are explained below.

2.2.1. Neo-classical Growth Theory:

The Neo-Classical growth was developed independently by Robert Solow and Trevor Swan in (1956), it attempted to explain long-run economic growth which depends on two elements; Capital Stock, and Labor force. It is considered that a continually rise in capital investment increases the growth rate only in the short term: because the ratio of capital to labour goes up. However, the marginal product of other units of capital may drop, also thus an economy returns to a long-term growth path, with real GDP growing at the same rate as the growth of the labour force also a cause to reflect improving productivity. In the Neo-Classical growth it is needed to have a rise in the labor supply plus a higher level of productivity of both capital and labor

force to raise the trend rate. The FDI has a problem in the Solow model because capital cannot foster economic growth by itself in the long-run, thus it has to be with exogenous variables to have an effect on economic growth, most likely this variable will be technology progress. Therefore, according to neo-classical economic growth theory FDI cannot effect on economic growth for a long-run but his affecting can only show in a short-run. Only those exogenous factors will be able to let the capital accumulation be effective in the long-run economic growth.

2.2.2. Endogenous Growth Theory:

The endogenous growth theory was developed by Romer, P. (1986) during the 1980s. The new growth theory also referred as the Endogenous growth theory. This theory rejected the assumption of the neoclassical theory which considering a technological progress as exogenous reason of economic growth. It is a long run economic growth rate, which is determined by forces which are interior to the economic system, mainly these forces gives the chance to create a technological knowledge. In the endogenous growth model the production function the output will be representing as output per unit of capital, depends on the growth rate of total factor productivity (TFP), which is decisive in turn by the level of technological development. Moreover the theory discusses that long-run economic growth is also driven by build-up of knowledge. The key is that knowledge can also considered as kind of capital especially human capital, human capital is an important element in the production function besides it is an input of producing of goods and services in an economy. Endogenous growth theory allows FDI to apply an influence on long-run economic growth. Therefore, unlike the neoclassical growth theory, endogenous growth theory shows that policy action can effect long-run economic growth.

Thus the Cobb-Douglas productions function as the basic model of the study, which is expended according to the new theory of growth.

This function (Cobb-Douglas) has been used extensively in the studies, researches, literatures. Also, it has been used by many institutions like CBO and other institutions. CBO uses this function for forecasting potential output and the medium-term outlook for income shares. This production function is popular among the economists because it is easy to use and to predict, also it gives simple closed-form solutions to a lot of economic problems.

The production function approach is:

$$Y = F(x) \qquad (1)$$

Where Y is an output, and X is an input.

Cobb-Douglas function is used for both production and utility function, this study is just focusing on Cobb-Douglas production function. Starting from a general form for production function:

$$y = b_0 \; x_1^{b_1} \; x_2^{b_2} \ldots x_n^{b_n} \qquad (2)$$

Where b is a constant with $b_i > 0$, it can be written as the following formula:

$$\ln(y) = a_0 + b_1 \ln(x_1) + b_2 \ln(x_2) + \cdots + b_n \ln(x_n) \qquad (3)$$

Where $a_0 = \ln(b_0)$. This form is mainly convenient for empirical analysis as it is linear in the parameters. And it has been use in this study.

More over the Cobb-Douglas production function suggests that:

$$b_i = \frac{\partial \ln(y)}{\partial \ln(x)} \qquad (4)$$

Since

$$\partial \ln(y) \Big/ \partial \ln(x_i) = \left(\partial y \Big/ \partial x_i \right) \left(x_i / y \right) \qquad (5)$$

It implies that

$$\partial y / \partial x_i = b_i \; y / x_i \qquad (6)$$

In all above cases i = 1… n.

An explanation of Cobb-Douglas production function which is reasonable description of actual economies:

$$Y = AK^{\alpha}L^{1-\alpha} \quad (7)$$

Where A > 0 is the level of the technology and α is a constant with 0<α<1. The Cobb–Douglas function can be written in intensive form as:

$$Y = AK^{\alpha} \quad (8)$$

The $f'(k) = A\alpha K^{\alpha-1} > 0$, $f''(k) = -A\alpha(1-\alpha)K^{\alpha-2} < 0$, $\lim_{k\to\infty} f'(k) = 0$

"Barro & Sala-i-Martin, (1995, 29-30)."

Moreover human capital plays a chief role in growth too; likewise it has been included in the Cobb-Douglas production function. So we can add it in the model as an extra variable.

Chen (1992) commented that FDI's positive development role is well documented in general. Rodriguez et al. (2007) mentioned that; FDI inflows may leads to high economic growth by: increasing supply of financial funds, increased productive capacity by investments and the efficiency-productivity of foreign subsidiaries, finally technological-productivity which supported by foreign subsidiaries. In manufacturing sectors and key infrastructures FDI tends to be directed, in those sectors FDI will create economies of scale also linkage effects and raise productivity. Therefore, we added FDI also to the production function model in this study.

In this study the production function equation will be:

$$GDP = F\,(L, CGF, ED, FDI)$$

$$GDP = b_0\ L^{b_1} CGF^{b_2} ED^{b_3} FDI^{b_4}$$

$$\ln(\text{GDP}) = \text{B}_0 + \text{b}_1 \ln(\text{L}) + \text{b}_2 \ln(\text{CGF}) + \text{b}_3 \ln(\text{ED}) + \text{b}_4 \ln(\text{FDI})$$

Where:

B_0 is logarithmic form of (b_0) constant, In(GDP) is a logarithmic form of the growth domestic product, In(L) is a logarithmic form of labor Force, In(CGF) is a logarithmic form of Capital, In(ED) is a logarithmic form of Human capital (Education Expenditures), and In(FDI) is a logarithmic form of foreign direct investment.

CHAPTER THREE

3. Review of Empirical Studies:

In this chapter some of studies that analysis and discuss the relation between FDI and Growth are reviewed. The chapter's divided into three parts. The first is about the empirical studies on FDI and Growth in general, the second part is about the studies that show the effect of FDI on Growth especially on Turkey, and then the last part is about brief empirical studies about some researchers that used Cobb-Douglas production function as their basic model.

3.1. Empirical studies of FDI and Growth in general:

Most of the studies prefer cross-country to show the impact of FDI of Growth, and there is less number of studies that choose one specific country to research on. There is uncounted number of studies shown the impact of FDI on growth, some used time-series data analysis among others are Ekpo (1997); Lean (2008); Adams (2009); Azman-Saini (2010)...etc. And some used panel data analysis Hsiao and Hsiao (2006); Seetanah and Khadaroo (2007); Khan & Mehboob (2014) . In the most of the researches they use FDI inflow as there Independent variable Graham & Wada (2001), Demirhan & Masca (2008); Juma(2012). As a result some studies shown that there is a positive relation between FDI inflow and GDP like: Wai-Mun, Kai-Lin, Kar-Man (2008); Beatrice Farkas (2012). But still some studies found a negative relation between them Lensink & Morrissey (2006), Ang (2008), and in Alfaro (2003) research she found that the FDI inflow to primary sector tend have a negative effect on economy growth. Following empirical studies has been chosen to show a brief review of how the researcher's choose to show the relation between FDI and Growth.

Khan & Mehboob (2014), examine the effect of FDI on GDP by balanced panel data using production function theory applying on 59 countries in the period from 1992 to 2010. They build their model on the basic production function equation, due to production function that they choose. Their output was GDP representing dependant variable, and the input was capital, labor which represent the independent variables. Furthermore the FDI has an important role in manufacturing and the production process for host country so they add FDI to the production faction that

they use in there model, also they add several variables as inefficiency variables with a proxy level for infrastructure and corruption. By running some test on their data they conclude that in the present of high skill labor the FDI will have a positive impact on economic growth, even with having a new technology it would increase the GDP without having a good skill labor Force.

Also by using cross-country data Alfaro (2003) show the impact of FDI on Economic growth for the period 1981 to 1999, but the different was Alfaro chose some sectors to investigate in, the sectors that she choose was services sectors, primary and manufacturing. In her result there was a positive relation between FDI and growth in manufacturing sector, negative in primary sector but ambiguous in the service sector. So sectors is important element to know if FDI has impact on GDP or not.

Abbas et al. (2011), choose show the impact of FDI on GDP in SAARC Countries. SAARC countries included 7 Countries they are: Bangladesh, Bhutan, India, Pakistan, Sri Lanka Nepal, and Maldives. They build up the relation by using the multiple regression models and test it. As usually GDP was dependant variable, FDI, inflation rate was their independent variable. They apply there test in the period from 2001 to 2010. They detect a positive and significant relation between FDI and GDP but insignificant relationship between inflation and GDP.

Some other researchers focused on comparing two countries to indicate the impact of FDI on GDP, like (Sethi & Sucharita 2009) they did an empirical investigation on Bangladesh and India, by ordinary least squares (OLS) method estimates. The variables that they choose was: GDP as dependent variables, and net foreign direct investment inflows, trade openness, Government development expenditure, human capital, gross fixed capital formation, Gross domestic investment, and ratio of domestic credit provided as there independent variables. Like most of the researcher they apply Granger-causality (1969) in the period 1974-2009.However, they use time series data with multiple regression model. Their empirical showed that the FDI inflow is very low to Bangladesh. Also the estimated coefficient for FDI is positive but statistically insignificant, but for India the result shows a negatively correlated between FDI and economic growth, also the estimated coefficient was insignificant for India too.

3.2. Empirical studies of FDI and Growth in Turkey:

There are a limited number of studies that show the relation between FDI and GDP in Turkey, one of the studies was by Alıcı & Ucal (2003) they linked between exports, FDI and output by using procedure developed by Toda and Yamamoto (1995) , the period that they have choose was 1987-I to 2002-IV. And there variables was export, industrial production, foreign direct investment. By using VAR model they conclude that the export increased significantly, and for capital inflows through their positive effect on consumption it shows contributed to economic growth and investment, but after 1990's the economy shown a slowing down and continuity in growth during that period for Turkey. More over as they mention that they didn't found significant positive spill overs from FDI to output. But if foreign capital investments flowing more they may have a power full effect over output to Turkey FDI. Furthermore the main conclusion that they did was including FDI to Turkey's outward can be a development strategy.

Ilgun et al. (2010), investigate the impact of FDI on Growth in turkey too, by using Vector Autoregression (VAR) model in their analysis. The variables that they choose to apply there model was: Growth as dependant, FDI, Labor, Investment, and Balance of payment (BOP), by using annual data from 1980 to 2004, after testing their model by Augmented Dickey Fuller (ADF) and some other test they conclude that the relationship between Growth and FDI is positive

Aga (2014) researched on The Impact of Foreign Direct Investment on Economic Growth in Turkey he analyse the impact by using time series techniques, by choosing The gross domestic product as his dependant variable and foreign direct investment, domestic investment and trade liberalization as his independent variables. To estimate the link between FDI and GDP he use OLS and Vector Autoregression model (VAR), the annual data has been used for the period 1980 till 2012. He followed Athukorala (2003)'s study. His variables were tested by Augmented Dickey Fuller test (1976), Johansen test (1991), Trace test and Lmax test. As a result he conclude that there is no long run relationship between FDI and GDP, and by using Granger causality test (1969)[2] he found that there is no relationship between FDI and economic growth due to Granger test, and finally there are short run relationship between FDI and GDP by using the OLS regression in terms of level form of series variables.

More over Katircioglu (2009) investigates the level relationship of FDI and economic growth in Turkey, by using bounds test for co-integration and Granger causality (1969) tests. The data he used was annual data from 1970 to 2005 period; a variable of the study was (GDP) and net FDI inflows. To do his test of integration and possible co-integration among variables he applied The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Due to the bound test as he mentioned a VAR model and a VECM for Granger causality tests requirement, for VAR model: (Y/FDI) where real GDP is dependent variable, and for VECM: (FDI/y) where FDI is dependent variable. They concluded that when net FDI inflows are dependent variable in the ARDL model these is a co-integrated between the two variables. Thus, the results of their study shown growth in FDI will motivated by economic expansion in Turkey.

Temiz & Gokmen (2014) studied: the FDI inflow as an international business operation by MNCs and economic growth in turkey, in there study they use Quarterly data from 1992:Q1 to 2007:Q3. First they use Johansen, Granger cointegration test (1969), then they estimate the regression equation by least squares method (LSM). And by using augmented Dickey–Fuller test (ADF) they determined the stationarity and integration degrees too. Their model included the GDP growth as the dependent variable; the FDI growth as independent variables. Due to their study either in short or long term there is no significant correlation between the FDI entry and GDP growth in Turkey. Furthermore they comment that Turkey has not been able to gain the positive benefits from FDI inflows by financial capital, technology, managerial experience and updated knowledge, and reflected those entries on economic potential and growth.

3.3. Empirical studies Showing FDI effect on Growth by Cobb-Douglas production function:

This part is about reviewing some studies about Cobb-Douglas production function because the production functions is the basic model of our study. There are number of researchers that show the relation between FDI and growth by using this function so it is important for us to review some of them. The following part includes some empirical studies that link between FDI and Growth by Cobb-Douglas production function.

By using the augmented Cobb-Douglas production function, Khaliq & Noy (2007) show the relation between FDI and Economic Growth in Indonesia. By using detailed sector data from 1997 to 2006. The annual data has been use for 12 different sectors in Indonesia, like most of previous literature they found a positive relation between them, but no in all times, they mentioned that FDI has a different impact on economic growth according to the vary across sectors, also due to their conclusion in some sectors have a negative impact. It's important to investigate the effect of FDI on economic growth according to sectors so we can improve the sectors that have negative and try to make it better.

To show the impact of FDI on economic growth Fan & Dickie (2000) exam the five ASEAN economies by using Cobb-Douglas regression models, the ASEAN country was; Philippines, Thailand, Singapore, Malaysia and Indonesia for the period 1987 to 1997. Their test shows that the FDI has a positive and significant relation with economic growth in these countries.

Also by using Cobb-Douglas production function, Seetanah & Khadaroo (2007) detect the impact of FDI on economic growth for 39 Sub-Saharan African countries in the period of 1980-2000. Panel data has been used in their analysis. More over the result shows that there is a positive link between FDI and growth by using GMM panel estimation.

Melnyk et al. (2014) investigate the impact of FDI on economic development; they use a basic augmented production function for regression analysis. There variables was GDP growth as dependent variable, human capital, physical capital, foreign capital as FDI, vector of policy and infrastructure, also the value of the GDP per capita in year before, all these used as independent variables in there regression

model, all variables was in logarithmic value. Their data covers 1998 till 2010 period of post Comecon transition economy countries. After they did their analysis and show their result they conclude that: FDI has a positively correlated with growth rate, also institutional sector is important for both GDP and FDI inflows.

Likewise a study which is on Pakistan by Iqbal et al. (2014), they use the cobb-Douglas Production function beside regression equation to test the relation between FDI and GDP. The period 1983 to 2012 has been chosen to apply there tests on. In their multiple regression equation they choose GDP as dependant variable and Gross Capital Formation, Health Expenditure, Labor, FDI and openness to trade in export oriented economy. Due to their tests; person correlation, descriptive statistics, and regression model they conclude that FDI has a positive impact on GDP in Pakistan.

Last part of this chapter is the summary of all selected empirical studies that were reviewed in this chapter.

Table 2: Summary of Previous Empirical Studies in general:

Study	Method	Data	period	Model Specification		Findings
				Dependent Variables	Independent Variables	
(Khan & Mehboob 2014), Impact of FDI on GDP: An Analysis of Global Economy on Production Function	Basic Production Function.	Balanced panel data.	1992-2010	GDP	GCF, L, FDI	positive impact when they have high skill of labor
(Alfaro 2003) Foreign Direct Investment and Growth: Does the Sector Matter	Robustness , Endogeneity.	cross-section data	1981-1999	GDP	FDI, Schooling, Inflation, Gov. Spending, Investment,	positive relation between FDI and growth in manufacturing , negative in primary, ambiguous in the service sector
(Abbas et al. 2011) , Impact of Foreign Direct Investment on Gross Domestic Product	Multiple regression models.	annual data	2001-2010	GDP	FDI, inflation	Positive and significant.
(Sethi & Sucharita 2009) Effect of FDI on Economic Growth in Bangladesh and India: An Empirical Investigation	Bi-Variate Regression.	time series data	1974-2009	GDP	FDI, XM, GE, HC, GFCF, DI, CR.	Positive for Bangladesh, but negative for India.

Table 3: Summary of Previous Empirical Studies on Turkey

Study	Method	Data	Period	Model Specification		Findings
				Dependent Variables	Independent Variables	
(Alıcı & Ucal 2003) Meltem Şengün Ucal. FOREIGN DIRECT INVESTMENT, EXPORTS and OUTPUT GROWTH of TURKEY: CAUSALITY ANALYSIS	The VAR model,	Quarterly data	1987.I-2002.IV.	industrial production index, export price index, foreign direct investment flows		didn't found significant positive spill overs from FDI to output
(Ilgun et al. 2010), How Do Foreign Direct Investment and Growth Interact in Turkey?	VAR model	annual data	1980-2004	Growth	FDI, L, Investment, BOP.	Positive
(Aga 2014), The Impact of Foreign Direct Investment on Economic Growth: A Case Study of Turkey	Time series techniques & ordinary least square (OLS).	annual data	1980–2012	GDP	FDI, DIN, TL.	No relationship between FDI and economic growth by Granger test. short run relationship by OLS regression & insignificant.
(Katircioglu 2009), FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN TURKEY: AN EMPIRICAL INVESTIGATION	Bounds test for co-integration and Granger causality tests.	annual data	1970–2005	GDP	FDI inflow	FDI will motivated by economic expansion
(Temiz & Gokmen 2014) FDI inflow as an international business operation by MNCs and economic growth: An empirical study on Turkey	Johansen cointegration test and Granger causality analysis.	Quarterly data	1992:Q1 2007:Q3	GDP	FDI	no significant correlation and not been able to gain the positive benefits

Table 4: Summary of Previous Empirical Studies used Cobb-Douglas production function

Study	Method,	Data	Period	Model Specification		Findings
				Dependent Variables	Independent Variables	
(Khaliq & Noy 2007) Foreign Direct Investment and Economic Growth: Empirical Evidence from Sectoral Data in Indonesia	Cobb-Douglas production function	annual data	1997-2006	GDP	FDI, domestic investment	positive relation and depend on sectors
(Fan & Dickie 2000) The Contribution of Foreign Direct Investment to Growth and Stability: A Post-Crisis	regression , Cobb-Douglas production function	Panel data	1987-1997	GDP	FDI, L, Capital	positive and significant
(Seetanah & Khadaroo 2007) Foreign Direct Investment and Growth: New Evidences from Sub-Saharan African Countries	Cobb-Douglas production function	panel data	1980-2000	economy's output	FDI, domestic private investment, public investment, L	Positive
(Melnyk et al. 2014) The impact of foreign direct investment on economic growth: case of post communism transition economies	Cobb-Douglas production function	Annual data	1998-2010	GDP	GDP per capita in year before, human capital, physical capital, FDI, vector of policy & infrastructure	Significant influence
(Iqbal et al. 2014) Impact of foreign direct investment (FDI) on GDP: A Case study from Pakistan	Multiple regression equation. Cobb-Douglas production function	Annual data	1983-2012	GDP	Gross Capital Formation, Health Expenditure, Labor, FDI and openness to trade	positive

CHAPTER FOUR:

4. Data, Methodology and Econometric Model:

This chapter included; methodology, econometric model, and the basic variables that have been chosen for the model to show the effect of FDI on GDP, along with clarifying source of data that study, also explain the applied econometric techniques that have been used in the analysis.

4.1. Data:

The data is from two basic sources: The World Bank database and Index Mundi webpage which is originally calculated by World Bank staff estimates using data from the United Nations Statistics Division's Statistical Yearbook, and the UNESCO Institute for Statistics online database. Due to missing some data, the analysis started in 1990 till 2011. So the data that study is between (1990-2011) periods.

4.2. Methodology:

There are wide ranges of econometric techniques in the literatures; the suitable one for data of the study was basic production function. This production function is expanded according to the new growth theory following by Barro, et al. (1995). This production function is Cobb-Douglas production function as following:

$$Y = F(K, L)$$

Where Y is the level of output in this case it is GDP, K is amount of capita, and L is labor. Assume that technology is constant. Any increase in the input which is (K, L) will increase the output which is GDP. Next is explanation about the econometric model, analysis tool, applied test and the variables.

4.3. Econometric Model:

The study will continue by showing the econometrics model, using the Ordinary least squares (OLS) to create a like between FDI and GDP. So, the impact of the hypothesis can be shown and therefore a clear result can be obtained.

4.3.1. Multiple Regression Analysis:

After collecting all necessary data for the study, it is decided to use multiple linear ordinary least squares (OLS) regression to analysis relation between the dependent variables and the independent variable. The regression model will be as it follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_t$$

Where

Y = GDP (Growth Domestic Product)

X1 = Foreign Direct Investment (FDI)

X2 = Labour Force (L)

X3 = Capital as {Gross Capital Formation (GCF)}

X4 = Human capital as {Education Expenditures (ED)}

β_i = Slopes of the independent variables

β_0= constant

ε_t= Error Term

To analysis the data E-Views version 8 has been used. Measured the relation between variables with R^2, which represents how well dependent variables will be explained by independent variables in the equation, and the *t* statistics test use to measure the strength of the relationship between an independent variables and the dependant variables. (Petersen & Lewis 1998, Pg. 117).

4.3.2. Descriptive Statistics:

The basic statistics that used for describe the data in the study; they offer simple reviews about the sample and the measures of the data. Descriptive statistics provide two types of measures: 1- Measures of central tendency which include the mean, median and 2- Measures of variability which include the standard deviation (or variance), the minimum and maximum variables, kurtosis and skewness. (Mann. 1995)

4.3.3. Correlation Analysis:

It's a type of correlation coefficient that signifies the relationship between quantitative variables in the linear regression equations. The following mathematical equation is representing formula of correlation:

$$r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{n}(X_i - \bar{X})^2}\sqrt{\sum_{i=1}^{n}(Y_i - \bar{Y})^2}}$$

As it can be seen from the formula (r) represents correlation symbol for a sample and Greek letter rho (ρ) for a population. The outcome of correlation analysis as (Hirschey 2008) explained the result expected to be ranging from (-1) to (+1), it is very rarely that the result shown 0, -1 or 1, most of the time it's in between. If there is a positive correlation interprets will be the both variables increase and decrease at the same time. Conversely if the result is negative correlation interpret will be an increase in one variable will decrease in the other variable. The significance will be tested by regression analysis so the significance of the correlation test will not be considering.

4.3.4. Auto-correlation (Serial-correlation) test:

The term autocorrelation may be defined as "correlation between members of series of observations ordered in time [as in time series data] or space [as in cross-sectional data].[7] Normally Auto-correlation occurs in regression analysis using time-series data. Auto-correlation or serial-correlation is when the Error term in the relating to any observation estimated model is influenced or subjective by the Error term relating to any other observation in the same model.

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7 Maurice G. Kendall and William R. Buckland, A Dictionary of Statistical Terms, Hafner Publishing Company, New York, 1971, p. 8.

Linear regression model assumes that such autocorrelation does not exist in the disturbances u_i.

$$E(u_i u_j) = 0 \quad i \neq j$$

When autocorrelation exists

$$E(u_i u_j) \neq 0$$

First order autocorrelation which can be written as:

$$u_t = pu_{t-1} + \varepsilon_t$$

The Breusch–Godfrey LM-test is one of the testes that can detect autocorrelation, due to excluded this test from some restrictions that other tests have, its preferred to use the Breusch–Godfrey LM-test to detect for autocorrelation.

Assuming that our model is: $Y_t = B_0 + B_1X_1 + \varepsilon$

The test process is; Run OLS and obtain the residuals u_t, after the linear model estimated the residual have been compute as μ_t we estimate the following equation:

$$\mu_t = \alpha_0 + \alpha_1 X_{t,1} + \alpha_2 X_{t,2} + \rho_1 \mu_{t-1} + \rho_2 \mu_{t-2} + \cdots \rho_\rho \mu_{t-\rho} + \epsilon_t$$

Then compute the BG-statistic, which is (n-p)R^2.

If BG > X_p^2, reject Ho, It means there is a higher-order autocorrelation

If BG < X_p^2, not reject Ho, it means there is a no higher-order autocorrelation.

The null hypothesis of this test is that there is no serial correlation of any order up to p. p is number of degree-order.

4.3.5. Heteroskedasticity Test:

Hetroskedastisity can be cause by a relation between the distribution variables and one or more variables, or can be caused by the data. A general linear regression model with the assumption of heteroscedasticity can be expressed as follows:

$$Y_t = B_1 + B_2X_{t2} + \cdots + B_kX_{t2} + \mu_t$$

$Var(\mu_t) = E(\mu_t^2) = \sigma_t^2$ For $t = 1, 2, \ldots n$

Heteroskedasticity can be detected by: White test, The Breusch-Pagen test, the park test… etc. The Breusch-Pagen test has been used to detect the heteroskadasticity in this study by using E-Views version 8.

The Breusch-Pagen test procedures will be as following:

First we run OLS on regression:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + + \cdots \beta_q X_{qi} + \varepsilon_i$$

And obtain the residuals, $\hat{\varepsilon}_i$

Then run the auxiliary regression the squares of these residuals:

$$\widehat{\varepsilon_i^2} = \delta_0 + \delta_1 X_{1i} + \delta_2 X_{2i} + \cdots + \delta_q X_{qi} + v_i$$

The Breusch-Pagen test is *LM*-test too, $LM = nR^2$ statistic. Then compering LM with X^2_{DF}.

If $LM > X^2_{DF}$, reject Ho, It means there is a heteroskedasticity.

If $LM < X^2_{DF}$, not reject Ho, it means there is a no heteroskedasticity.

The hull hypothesis is that there is no heteroskedasticity, also the number of degree of freedom is equal to the number of parameters in the null hypothesis.

4.4. Consequences of using OLS in a present of Autocorrelation or Heteroskedasticity:

In the case of having a serial correlation or heteroskedasticity, the model of OLS estimators will face some consequences in both situations. a brief explanation is shown in both cases.

4.4.1. Auto-correlation:

In the case of having auto-correlation consequences on OLS regression model is:

1. OLS is not the best estimation method when we have auto-correlation but the estimated coefficients are still unbiased and liner.
2. The variances of the $\widehat{\beta_k}$ is no longer the minimum variance property.
3. The *t* and F test distribution will be no longer reliable which lead to making wrong conclusion on the hypothesis.
4. Other…..

4.4.2. Heteroskedasticity:

In the case of heteoskedasticity will face these consequences:

1. The OLS estimator will still be unbiased and linear.
2. The estimated variances and covariance of the OLS estimates will be inconsistent.
3. The conclusion of hypothesis test will be wrong due to unreliability of *t* and F statistics.

In case of having serial correlation or heteroskedasticity before interpreting the results, the serial correlation and heteroskedasticity must be removed in the OLS regression model. There is some technics for that. These technics are not mentioned in this study, because there is no serial correlation or heteroskedasticity in the data.

4.5. Programs:

The E-Views 8 program has been used to analysis and test the model, and Microsoft Excel for drawing some charts.

4.6. Selection of the Studied Variables:

The select variables according to the basic Cobb-Douglas production function equation are:

$$\mathbf{Y} = f(L, GCF, L, ED, FDI)$$

4.6.1. Independent Variables:

4.6.1.1. Capital (GCF):

In this study capital means Gross Capital Formation. It's a term that uses for describe net capital accumulation in an accounting period. Usually it used with labour as a combination to produce and product good and service. The higher capital formation the faster economy will grow.

4.6.1.2. Labor Force (L):

Labor force is collected from the people who are self-employ or having employees and paying them. But it's not including housewives or voluntary workers.

According to Barro, et al., (1995) labor force depending on: I. size of population. II. Age structure of population. III. Sex structure. IV. Law and customs concerning the employment of women. V. Laws concerning education and retirement age. VI. Further education. VII. The economic Climate. VIII. Working hours. Wijeweera et al.

(2010) when he studies the FDI inflows on economic growth he found out that there is a positive relation between them but only if there is high skilled labor. Others like Hansen et al. (2006) analysis the impact of FDI on growth in development counters and they conclude that if country depends on trade policies, labour force skills and absorptive capability they will benefit of FDI in their countries.

4.6.1.3. Foreign Direct Investment (FDI):

The Foreign direct investment (FDI) is an important element for the countries that are still in the process to develop their economic growth and developing their country. As defined by OECD, a foreign direct investment must own 10% or more of the voting stock. Foreign direct investment can affect the growth in many ways; by setting up a subsidiary factory or build up a new one. Due to these affect it can be part production function. The FDI inflow is the value of investment that foreign (non-resident) investees in the hosted country. The FDI net inflow data based on the 6^{Th} edition of the Balance of Payments Manual report that published by IMF.

4.6.1.4. Human capital (ED):

Due to Cobb-Dougles production faction that we based this study on it, human capital is added to the equation. Some studies take the average years of the high school education for male population over 25 years as their measure to human capital like Borensztein et al. (1998). Other studies Agrawal, Khan (2011) has taken Human Development Index as their measure. In economic growth human capital have an important role. Due to Ehrlich (2007) education expenditures can act as a proxy for quality of Human capital Formation too. Because of some missing data for Turkey education expenditures has been chosen as proxy for human capital as a percentage of GNI in this model. So by having human capital with FDI it will produce a strong positive effect on growth for development countries.

4.6.2. Dependent variables:

4.6.2.1. Growth Domestic Product:

GDP is considered as an indicator that shows the economic health of a country. It's monitoring the value of all finished goods and services that produce in the country.

$$GDP = C + G + I + NX$$

Where:

GDP is growth domestic product; "C" is all private consumption, or consumer spending, in a nation's economy; "G" is the sum of government spending; "I" is the sum of all the country's businesses spending on capital; "NX" is the nation's total net exports, calculated as total exports minus total imports. (NX = Exports - Imports).

Table 5: Definitions and abbreviations of the variables

	Variables	**Symbol**
Dependent Variable	Growth Domestic Product	GDP
Independent Variable	Capital	GCF
	Labor Force	L
	Foreign Direct Investment	FDI
	Human Capital	ED

Table 6: Expected Correlation signs with Dependent variables

Independent Variable	**Expected Sign**
Capital	(+)
Labor Force	(+)
Foreign Direct Investment	(+/-)
Human Capital	(+/-)

(+) positive relation, (-) negative relation, (+/-) positive or negative relation.

It is expected that the relation between GDP and capital will be positive; capital is an important source for economy to growth in all development counties. It also expected that Labor Force has a positive relation with GDP too, with having skilled, trained labor Force it will help the production sectors also other sectors that help economy to growth. For FDI, and human capital it's expected to be positive or negative relation with GDP. This study aimed to investigate the relation between FDI and GDP; expected sign will be based on the data of the study and the period. For human capital it depend on which proxy the study will use in the analysis some proxy will have negative impact other will have positive.

CHAPTER FIVE:

5. Hypothesis, Empirical Analysis and Findings:

The following is a general multiple regression equation:

$$GDP = \beta_0 + \beta_1 FDI + \beta_2 L + \beta_3 GCF + \beta_4 ED + \varepsilon_t$$

Where:

GDP = Growth Domestic Product.

FDI = Foreign Direct Investment.

L = Labour Force.

GCF = Capital.

ED = Human Capital.

β_i = Slopes of the independent variables

β_0= constant

ε_t= Error Term.

After collecting all necessary data and build-up the model, the EViews8 program has been used for test the model and analysis the data. In this chapter the result of the test's and the analysis has been shown in table.

Table 7: Dependent and independent variables:

Variable	Measuring	Source	Form	
GDP	Growth Domestic Product per capita (current US$) Dependent Variable	World Bank	**logGDP**	LOG
FDI	Net inflows of Foreign Direct Investment as % of GDP	World Bank	**LogFDI**	LOG
LB	Total Labour Force	World Bank	**logLB**	LOG
GCF	Capital is Gross Capital Formation as % of GDP	World Bank	**logGCF**	LOG
ED	Human Capital is a proxy of Education Expenditures % of GNI	Index Mundi webpage	**logEDGIN**	LOG

5.1. HYPOTHESIS:

In this study detect if there is a relation between FDI and GDP for Turkey, so the hypothesis will be:

- Dose FDI inflows has effect on GDP, and cause economic growth in Turkey or not?

5.2. Descriptive Statistics:

Table below show results of the Descriptive statistics for the model:

Table 8: Descriptive statistics for the variables:

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
LogGDP$	26.40752	26.27631	27.37581	25.5961	0.601454	0.386439	1.664133
LogFDI	-0.230254	-0.628519	1.335536	-1.159919	0.822745	0.667614	1.927742
LogLB	16.90321	16.89777	17.09771	16.76662	0.083449	0.627388	3.074927
LogGCF	3.046605	3.070373	3.281498	2.703891	0.157683	-0.676878	2.83125
LogEDGIN	0.968468	0.974553	1.156881	0.647103	0.11204	-1.166125	4.98423

The mean which means the average of each variable in the model independently, it calculated by summing up all the given data and dividing by the number of data entries. The Mean of lGDP is 26.40752, for logFID is -0.230254, LogLB is 16.90321, logGCF is 3.046605, and for logEDGIN is 0.968468. Median means the middle number; it can be detected by arranging the data from the lowest to highest, and then find the middle number for logGDP middle number is 26.27631, -0.628519 for FDI, 16.89777 is logLB middle number, 3.070373 is for logGCF, and 0.9745 is for logEDGIN. However the Maximum value of logGDP is 27.37581, minimum value is 25.5961, logFDI minimum value is -1.159919, maximum value is 1.335536, for logLB the minimum value is 16.76662, maximum value is 17.09771, minimum logGCF in the data is 2.703891, but the maximum is 3.281498, and for logEDGIN minimum value is 0.647103, maximum value is 1.1568. Standard deviation (Std. Dev.) used to quantify how tightly all the variations are gathered around the mean in set of data values. A smaller Std. Dev. means that the values of data are close to the mean of the data set, and vice versa. logGDP Std. Dev. is 0.601454, for logFDI its 0.822745, for logLB is 0.083449, for logGCF 0.157683, and for logEDGIN 0.11204. Skewness is indicator that used in distribution analysis as a sign of asymmetry and

deviation from a normal distribution. LogGDP$ (0.386439), LogFDI (0.667614), LogLB (0.627388), has a positive skewnwess so it's Right skewed means that most of their value is in the left of the mean. For others they are negatively skewed or left skewed by, DlogGCF (-0.67365), logEDGIN (-1.1661), meaning that the most values are in the right of the mean. Kurtosis indicator used in distribution analysis as a sign of flattening of a distribution. Kurtosis for all variables is relatively peaked distribution by logGDP, (1.664133), logFDI (1.927742), logGCF (2.8312), logLB (3.0749), logEDGIN (4.9842).

5.3. Multiple Regression Analysis Result:

The Ordinary Least Squares regression analysis cannot be estimated because the equation is not liner so first we take a Logarithm form for all variables. Then we interpret the result. The result will be as the following:

$$\ln(GDP) = B_0 + b_1 \ln(FDI) + b_2 \ln(CGF) + b_3 \ln(LB) + b_4 \ln(EDGIN)$$

$$GDP = -57.657 + FDI^{0.267} + GCF^{0.3486} + LB^{4.886} + EDGIN^{0.477}$$

Table 9: OLS regression in the first difference form

Variables	Coefficients			T Statistic	Prob. (P-Value)
LOG(FDI)	0.267143			3.216978	0.0051*
LOG(GCF)	0.348632			0.950608	0.3551
LOG(LB)	4.886733			5.621469	0.0000*
LOG(EDGIN)	0.477841			0.993387	0.3345
C	-57.65737			-3.840431	0.0013
F- test	29.40636	**R^2**	0.8737	**Adjusted R^2**	0.8440

*, **, ***, Denotes significant at a 1%, 5%, 10%.

Since it is in a log form the coefficient of the variables represent the elasticity for the output. The model output respect to FDI, the elasticity is 0.2671; it's a positive value so the relation between the variable which is FDI and output which is GDP is positive, if FDI increases the GDP will increases too, but it cannot be said that FDI has much impact on GDP due to small value of the coefficients, moreover elasticity estimation is significant for FDI, *t*-statistic value is 3.2169 with P-value of 0.0051. Likewise the output (GDP) respect to LB, the elasticity is 4.8867; there is a good positive relation between LB and GDP due to the coefficient, the *t*-statistic value 5.6214 and P-value 0.000, thus the coefficient of LB is significant. In the other hand

GCF is non-significant; the *t*-statistic value is 0.9506 with P-value of 0.3551.The output respect to GCF, the elasticity is 0.3486; due to small value effect is small too. ED which represents human capital has a positive relation with GDP too; the output respect to ED, the elasticity is 0.4778; the coefficient is referred to as non-significant due to the *t*-statistic value 0.9933 and P-value 0.3345. R^2 0.873 (87.3%) and adjusted R^2 0.844 (84.4%), reported that the independent variables (explanatory variables) has been explains the changes in dependent variable value very well.

5.4. Correlation Analysis Result (Multicollinearity):

By using E-view program version 8, correlation test have been applied on the data to detect is the data have Multicollinearity or not. This test detects correlation among the variables to identify if there is any relation between them. The liner regression model assumed that there is no multicollinearity among the variables; because in present of correction in the data the statistical inferences made about the data may not be reliable.

Table 10: Correlation Result

	LEDGIN	LFDI	LGCF	LGDP$	LLB
LEDGIN	1.000000	-0.005257	-0.213289	0.181607	0.168152
LFDI	-0.005257	1.000000	-0.270194	0.774816	0.640911
LGCF	-0.213289	-0.270194	1.000000	-0.309853	-0.418177
LGDP$	0.181607	0.774816	-0.309853	1.000000	0.888971
LLB	0.168152	0.640911	-0.418177	0.888971	1.000000

The table shows that most of the variables have a positive relation between each other. Except GCF, it has a negative sign with all other variables. LB has a negative relation with GCF and positive relation with other variables. The correlation coefficient of FDI and GDP is 0.774816 a positive sing and good relation between them. FDI and GCF has a negative. For ED and FDI relation it's negative and very weak -0.005257. 0.640911 is the correlation confection between FDI and LB. Moreover GDP have a negative relation with GCF -0.309853 so the two variables move in the opposite direction from each other. Conversely, GDP has positive and good relation with LB by 0.8889.

5.5. Auto-correlation (Serial-correlation) test result:

The hypothesis for Auto-correlation will be as following:

- Null Hypothesis Ho: There is no serial correlation.
- Alternative Hypothesis H1: There is serial correlation.

The table below displays results for Breusch-Godfrey LM-test:

Table 11: Breusch-Godfrey Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.079953	Prob. F(2,15)	0.9236
Obs*R-squared	0.232056	Prob. Chi-Square(2)	0.8905

By taking 2 lags in the test, the result show's that Observed R^2 is 0.2320 prob. is 0.8905. So there is no serial correlation up to lag order 2 at the 95% confidence level.

It means that the value of u in any observation is independent of its value in the previous one, the value of any variables that hidden in u is uncorrelated with its value at the time of previous observation.

5.6. Heteroskedasticity Test result:

The hypothesis for heteroskedasticity will be as following:

- Null Hypothesis H0 : No heteroscedasticity exists (homoscedasticity)
- Alternative Hypothesis H1: Yes, heteroscedasticity exists.

Table 12: Heteroskedasticity Test Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.365361	Prob. F(4,17)	0.2873
Obs*R-squared	5.349246	Prob. Chi-Square(4)	0.2533
Scaled explained SS	2.674072	Prob. Chi-Square(4)	0.6138

A probability greater than the chosen level (0.05) means we cannot reject the null, we have reason to believe the data is Homoskedastic as we desired.

5.7. Comparison of the results:

A study by Aga (2014) which was on Turkey, The empirical result shown that there is no significant but positive relation between FDI and GDP in Turkey by OLS regression also by using Vector Auto-regression (VAR) model the result demonstrates that there is no causality linkage between GDP with FDI.

The empirical study which has the same variables was by (Agrawal & Khan 2011); compere china and India's Impact of FDI on GDP. In the result for China the FDI is significant at 10% level of significance but all other variables are significant at 1%, likewise for India Human capital and labor are significant at 1%, capital formation at 5% and FDI is significant at 10% level of significance. But in this study FDI and Labour are significant, for other variables are non-significant. For China 1% increase in FDI would result in 0.07% increase in GDP, on the other hand for India 1% increase in FDI would result in 0.02% increase in GDP. For Turkey FDI effect could not be visible due to a small value of the coefficient that this study result have, but still it's a positive relation and significant. There is a big deferent between Turkey results and results for China & India but it should be taking as consideration that this study use education expenditure as proxy for human capital and Agrawal & Khan (2011) use Human Development Index in the study; also the deference in data period, this study data is from 1990 till 2011 and their data is from 1993 till 2009.

Mexico's FID on GDP has been examine by Geijer (2008), using dynamic adjustment model to show the relation between FDI and GDP, whit comparing Mexico's result to the Turkey's result; FDI effect on Mexico's GDP do not indicate on any statistical significance, but seem to produce positive spill over effects on the domestic economy. The study mentioned that most of other empirical studies on Mexico have the same result, which does not indicate on any statistical significance. This result is opposite to the result of this study which FDI has significant positive relation with GDP for Turkey.

But effect of FDI on GDP for Cambodia by Heang & Moolio (2013), using Ordinary Least Square (OLS) regression found that there is long run relationship also it is significantly positive between FDI growth rate and GDP growth rate. It indicates that when FDI growth rate increases by 1%, GDP will be increased by 7% (0.079888). using a currency US, also means if FDI flows in 1 million US dollar,

GDP might be increased by 79, 880 US dollar (0.079888* 1 million), it's must be taken in consider that the study have just GDI and FDI in the model and they measured FDI flows and GDP in US dollar.

In the case of Malaysia by Karimi & Yusop (2009) there is no strong evidence of a bi-directional causality and long-run relationship also according to bounds tests there is not long-run relationship between FDI and economic growth. This suggests that FDI has indirect effect on economic growth in Malaysia between FDI and GDP.

The empirical studies has deferent conclusion some country has a positive some has negative and other have no relation, the conclusions based on data, methodology and analysis.. Etc.

CHAPTER SIX

Discussion:

The aim of this study is to answer the question dose FDI inflows has effect on GDP, and cause economic growth in Turkey or not?

According to the endogenous growth model FDI should have a positive effect on economic growth, Since FDI is supposedly more effective when the economic growth is high, and a positive correlation can be compatible with causality running from growth to FDI. A problem is that the relationship between FDI and GDP is restricted to growth rates or first differences which also can bias the result. A level relationship would be required in order to get correct results (Herzer et al, 2008)

The relation between FDI and GDP although its positive but it seems that FDI effect could not be seen in the economy of Turkey, for the labour, capita, and human capital the result of the study it's proper with the theories, because when labour fours, capital, and human capital increases it should increases the GDP too, by increasing GDI it will help the economy to growth.

We can comment that this study is has been indicate a weak relation between FDI and GDP in Turkey, most of empirical studies that have been investigate the relation between FDI and GDP either didn't found a relation or found a short-run relation. However we can comment that our study is compatible with other empirical studies which investigate Turkey.

It is important to remember that other important variables can be used and possibly gives another result and of course other methodology can be use too, plus it might give another outcome like having a negative or even no relation.

Conclusion:

In this thesis the relation between foreign direct investment and growth domestic product in Turkey has been investigated by multiple regressions, based on Cobb-Douglas production function. Annual data for 1990 till 2011 is used, so there is 12 year of available data for Turkey so data used 22 observation, it is the most recent data available due to the variables. By building up a growth model which include; GDP as dependent variable, besides Capital, Labor Force, Human capital, and FDI as independent variables. After running OLS (Ordinary Least Square) method of regression analysis, it found that there is a positive significant relation between FDI and Growth in Turkey, farther the coefficient of FDI is 0.2671 which represent the elasticity, due to the small coefficient that FDI have it concluded that FDI effect on GDP cannot be notes in the economy growth of Turkey that is the result of the variable, period, and the analysis which has been use to show the effect. Moreover the correlation coefficient of FDI and GDP is 0.774 has a positive sing it means that both variables increase and decrease at the same time.

Although FDI has a significant, and positive impact on GDP but and it cannot considered that Economic will growth with FDI inflows due to the little effect that have on GDP. So the answer of the study hypothesis is that FDI effect on Growth but by a small percentage it cannot be notice in Economy of Turkey. Still according to OECD forecasting they believe that it will grow 5.2% annual till 2017.

Turkey applying for European Union, and accession negotiations with the EU for Turkey's being a full membership in EU it will helps Turkey to get benefit of it by attracting more foreign investors to invest and will be more global economy.

Future Studies:

- For clearer result it's good to investigate the impact of FDI on growth by sectors. In sectors it will be more clear how the FDI could affect the growt, like Alfaro (2003) mentioned in here study some sector has a positive impact but some has a negative impact.
- In this study the data used from 1990 till 2011, for farther studies it's better to increase it so it will be more up to date data.
- It is suggested that studies may use deferent proxy for human capital instead of Education Expenditure like Khan (2011) has taken Human Development as a proxy of human capital or find a suitable proxy due to their data or the country that they choose.
- It will be good for next student to camper Turkey with a neighbour country or any other country.

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APPENDIX

Table 13: Estimation output

Dependent Variable: LOG(GDP$)
Method: Least Squares
Date: 06/22/15 Time: 17:36
Sample: 1990 2011
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FDI)	0.267143	0.083042	3.216978	0.0051
LOG(GCF)	0.348632	0.366746	0.950608	0.3551
LOG(LB)	4.886733	0.869298	5.621469	0.0000
LOG(EDGIN)	0.477841	0.481022	0.993387	0.3345
C	-57.65737	15.01326	-3.840431	0.0013

R-squared	0.873724	Mean dependent var	26.40752
Adjusted R-squared	0.844012	S.D. dependent var	0.601454
S.E. of regression	0.237546	Akaike info criterion	0.159810
Sum squared resid	0.959282	Schwarz criterion	0.407774
Log likelihood	3.242094	Hannan-Quinn criter.	0.218223
F-statistic	29.40636	Durbin-Watson stat	1.734234
Prob(F-statistic)	0.000000		

Table 14: E-Views output for Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.365361	Prob. F(4,17)	0.2873
Obs*R-squared	5.349246	Prob. Chi-Square(4)	0.2533
Scaled explained SS	2.674072	Prob. Chi-Square(4)	0.6138

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/22/15 Time: 17:28
Sample: 1990 2011
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.921647	3.529159	1.394566	0.1811
LOG(FDI)	0.016420	0.019521	0.841177	0.4119
LOG(GCF)	-0.094728	0.086211	-1.098789	0.2872
LOG(LB)	-0.282499	0.204346	-1.382456	0.1847
LOG(EDGIN)	0.195641	0.113074	1.730206	0.1017

R-squared	0.243148	Mean dependent var	0.043604
Adjusted R-squared	0.065065	S.D. dependent var	0.057750
S.E. of regression	0.055840	Akaike info criterion	-2.735938
Sum squared resid	0.053008	Schwarz criterion	-2.487974
Log likelihood	35.09532	Hannan-Quinn criter.	-2.677525
F-statistic	1.365361	Durbin-Watson stat	1.860023
Prob(F-statistic)	0.287259		

Table 15: E-Views output for Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.079953	Prob. F(2,15)	0.9236
Obs*R-squared	0.232056	Prob. Chi-Square(2)	0.8905

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/22/15 Time: 17:27
Sample: 1990 2011
Included observations: 22
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FDI)	-0.018032	0.110166	-0.163684	0.8722
LOG(GCF)	0.045517	0.404996	0.112388	0.9120
LOG(LB)	0.074647	0.941585	0.079278	0.9379
LOG(EDGIN)	-0.030860	0.524030	-0.058889	0.9538
C	-1.376406	16.31595	-0.084359	0.9339
RESID(-1)	0.129875	0.327498	0.396568	0.6973
RESID(-2)	0.003469	0.323192	0.010733	0.9916

R-squared	0.010548	Mean dependent var	5.18E-15
Adjusted R-squared	-0.385233	S.D. dependent var	0.213729
S.E. of regression	0.251550	Akaike info criterion	0.331024
Sum squared resid	0.949163	Schwarz criterion	0.678174
Log likelihood	3.358738	Hannan-Quinn criter.	0.412802
F-statistic	0.026651	Durbin-Watson stat	1.851126
Prob(F-statistic)	0.999887		

Figure 10: Turkey GDP 1990-2011 (current US$)

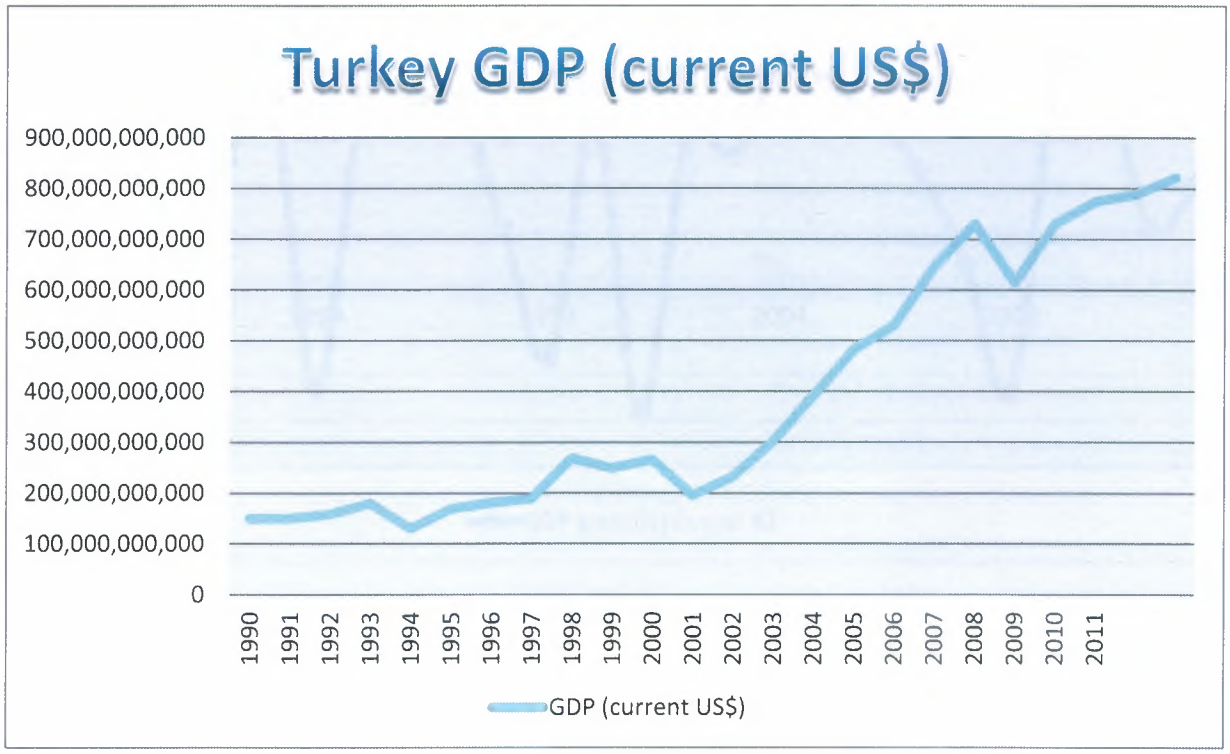

Figure 11: foreign Direct Investment, inflow 1990-2011 (current US$)

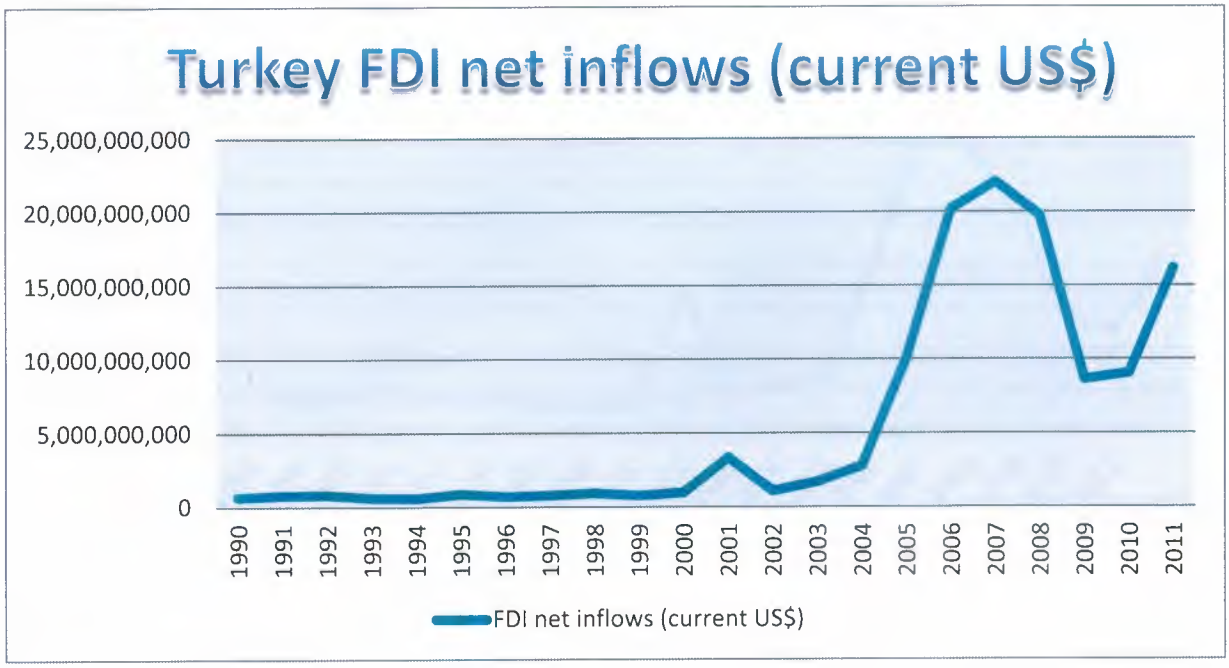

Figure 12: Turkey GDP growth 1990-2011 (annual %)

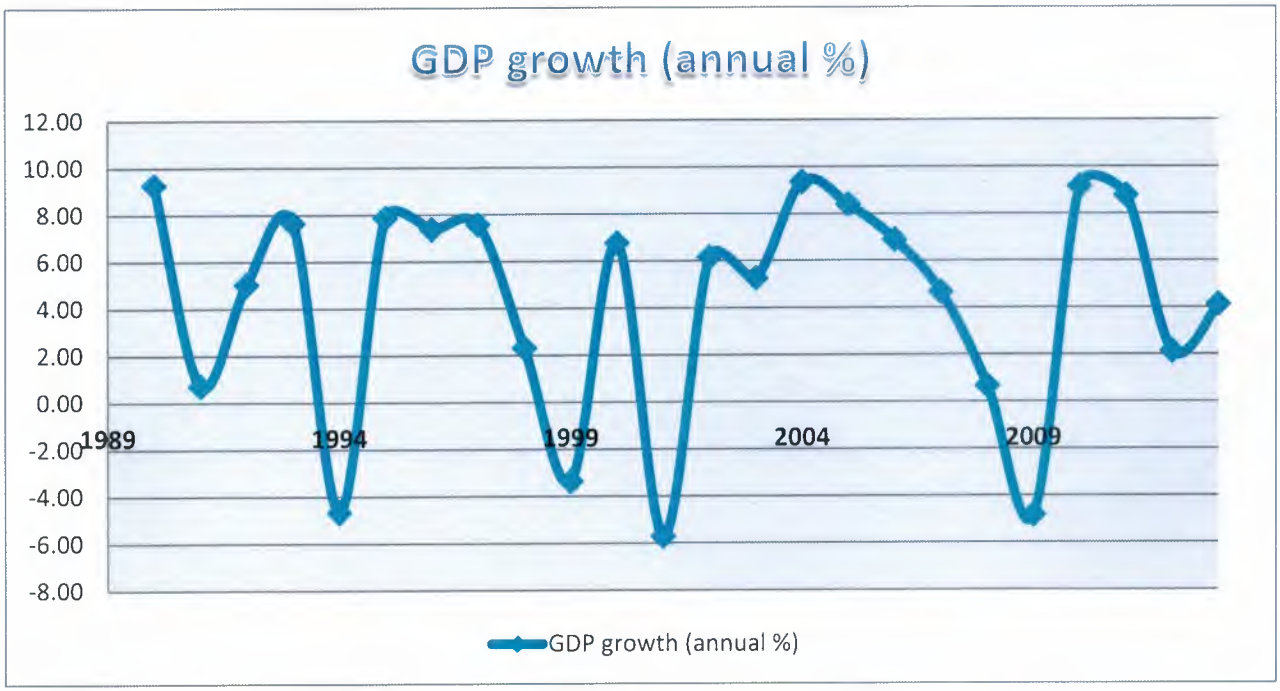

Figure 13: Foreign direct investment, net inflows 1990-2011 (% of GDP)