THE IMPACT OF EXCHANGE RATE UNCERTAINTY ON FDI INWARDS INTO TURKEY

CEM PAYASLIOGLU
BURÇAK POLAT
Eastern Mediterranean University

This article examines the impact of the level and volatility of real exchange rate on FDI inwards into Turkey for the period between 2004-2012. We used both GARCH (1 1) and Markow Regime Switching models by using monthly data. Our results provide strong evidence that both real exchange rate level and its volatility, inflation, transportation and communication index and lagged value of montly FDI inflows do not have significant effect on montly FDI inflows into Turkey for examined period whereas policy interest rate Euro, confidence index for real sector and dummy variable for the new investment incentive system effectuated on 16 July of 2009 have very significant and positive effect on FDI inflows.

1.   INTRODUCTION

FDI investment simply refers to a movement of capital that involves ownership and control between countries. It is well accepted that along with FDI is the major driver for globalization of international economy and it is also stimulus and essential for economic developments of both host and home countries.As stated by Tataoğlu and Erdal (2002), ''Flows of FDI are contributing to build strong economic links between in industrialized countries and developing countries, and also among developing countries.'' Eventhough, some economists called attention to the possible costs of FDI inflows to the host countries, most of the literature have debated the probable benefits of them which may not occur in all cases nor do they occur in the same magnitude for both developing and developed economies. These debates generally put emphasis on advantages of FDI inflows to developing countries so that FDI inwards lead to economic development through creating new job opportunities, increasing exports, tax revenues, wages as well as GDP of host country. Furthermore, many economists judge that technical and managerial skills are scarce resources in developing countries. If so, a crucial bottleneck is broken when foreign capital brings in critical human capital skills in the form of managers and technicians. In addition, new technology invested in the host country can boost the recipient country's production posibilities and also may have spill over effect in the whole economy. In short, FDI is regarded as a vital source of inflows in many countries especially in emerging developing countries with regard to ensured contributions in the economic growth of a country. In this sense, given the economic consequences of FDI, it is not surprising that all countries in the world look for a way to attract it and to expose new policies that please more investors. However, while some countries were so successful to attract FDI inwards with a high rate, particullarly developed ones, the others, developing and LDCs (Least Developed Countries) have been suffering with low amount of them for years. Yet, when analysed the global trends in the world, it is clearly seen that the volume of FDI flows to developing countries rise remarkably in 1990s, particularly after 1995. This considerable recovery in FDI inwards to developing countries has been mainly on account of a rapid liberalization of national FDI laws in these countries as they also understood the necessity of FDI for growth of the economy. Untact, World Investment Report, (1995) remarks that '' Of the 140 changes in FDI laws in 1999, 131 liberalized conditions for foreign investors; over the period 1991-1999, 94 per cent of the 1,035 policy changes favoured investors''.

  Then, the appropriate question to be asked stands out as, what is the major reasons underlying the foreign investors seek a country to invest and why some countries enjoy high level of FDI while others not. Foreign investors come into a foreign market with the intention of return. But, they are exposed to many types of risks as well. These risks involve a kind of different factors such as exhange rate risk, political risk, legal risks etc. Most importantly, as long as the investors are optimistics about the conditions in a foreign market, they will invest their fund or reinvest of their eranings into that market. Therefore, along with economic and political factors such as market size, inflation, political and social risk, interest rate and so on, the effect of exchange rate and its volatility on FDIs become an important issue of literature as an main determinants of FDI inflows. Especially, the collapse of Bretton Woods in 1971 has initated many researchers to investigate the impact of exchange rate volatility on FDI inwards due to the fact that great fluctuations have been observed in the currency prices of different countries as the exchange rate

settled in the market through demand and supply mechanism after 1971. Depending upon these investigations, the effect of exchange rate volatility on FDI has been clarified theoretically in two broad ways. These are namely, Production Flexibility argument and Risk Aversion argument. The first argument suggest a direct relationship between volatility in exchange rate and FDI, second argument explains an inverse relationships between these variables respectively. On the other hand, when look at the other side of the coin, FDI flows to host country also may cause exchange rate appreciation with inflows or depreciation with outflows.

However, there is a huge body of literature concerning the effect of exchange rate fluctuations on FDI, there is no a exact result that all studies agree with such that some of them suggested a positive relation between these variables, some others argued a negative relation and still others found out no relation at all. Not only this, most of the studies in the literature considered FDI flowing into developed countries rather than developing countries. Hence, the real effect of exchange rate volatility on FDI inwards is ambiguous, complex and undetermined, it is found worthy to carry out this study for Turkey which is an outstanding developing country with an emerging market in international economy. Beside that,eventhough, Turkey is country with rich natural resources along with comparatively cheaper human and material resources, there are only a few studies (found out only 4 studies to our knowledge) examining the effect of the volatility in exchange rate upon FDI inwards into Turkey. Therefore, the main objective of this paper to investigate the effect of volatility or uncertainties in exchange rateupon FDI inwards into Turkey by employing montly data for the period between 2004:01-2012:08. To do so, the study aims to fill the gap in this field and to shed light on future works.

Overall, our results provide strong evidence that both real exchange rate level and its volatility, inflation, transportation and communication index and lagged value of montly FDI inflows do not have significant effect on montly FDI inflows into Turkey for examined period whereas policy interest rate Euro, confidence index for real sector and dummy variable for the new investment incentive system effectuated on 16 July of 2009 have very significant and positive effect on FDI inflows.

The rest of the paper is orginized so that, in second part, an overview of literature will be given, in third part, Turkeys' performance in attracting FDI inwards for years will be disscussed then following forth part in wihch data and methodolgy will be explained, empirical results of the medodology will be presented and lastly, concluding remarks and summary of the study will be given.

2-LİTERATURE REVİEW

2.1. Exchage Rate Level and FDI

Aliber (1970) was the first person who explored the relation between financial factors and FDI. He conributed the literature by introducing the foreign exchange rate concept in FDI. According to his logic, countries using hard currency attempt influencing inward FDI from countries using weak currency. The hypothesis know as Aliber hypothesis in the literature suggests that the existence of different types of cash flows causes the peresence of FDI. However, argument of Aliber was not sensational up untill 1990s. Modern literature with regard to concept of effect of exchange rate movements on FDI flows started with assumption of perfect capital mobility in the world after 1990s. Beyond that, there are also several hypothesis put forward to explain how FDI flows respond to variations in the level of the exchange rate. One of them is so-called wealth position hypothesis. With regard to this hypothesis, FDI is pertained to the foreign exchange market through the effect of changes in exchange rate level on the relative wealth of both home and host countries. In accordance with this hypothesis, Froot and Stein (1991) discovered the role of exchage rate level in the amount of FDI inflows into the host country. They investigated different types of FDI inwards to USA at sectoral level and then they claimed that depreciation of dollar in host country lead to augmentation in the volume of inward FDI due to decrease investment cost and increase in the wealth of investors. Especially, they found a strong negative relationship between exchange rate level and FDI inwards in manufacturing industry. Second hypothesis with regard to impact of changes in exchange rate level on FDI flows is known as the relative labor cost hypothesis in the literature. According to this hypothesis, depreciation of host currency encourages more FDI inflows due to lowering day to day production cost and attract more foreign investors. The study of Cushman (1985, 1988) is compliant with the second hypothesis such that he argued real depreciation of host currency lead to promote more FDI inflows because it lowers wages as well as production cost in the host country. On the contrary, Campa (1993) put forward a different idea and explained the other aspect of the corelation between exchange rate level and inward FDI. Logic behind his argument was that multinational firms seek profits in local market and if they are optimistic about the future profitability, they will increase their investment in that market. Therefore, Model claims at an appreaciation of the host countrys' currency will increase the inward FDI. However, on balance, existing literature seems to support the hypothesis that depreciation of host country' currency increases the volume of FDI inflows. Forexample, Kiyato and Urata (2002), Xing (2005), Renani and Mirfatah (2012), Takagi and Shi (2011) , Cushman (1985) et all come up with the similar conclusion. On the one hand some resarches

suggest the existing of negative relation between exchange rate level and FDI occured in host country. On the other hand, some studies, for-example, empirical Works by Dhakal, Nag, Pradhan and Upadhyaya (2010) and MacDermott (2008) argued that weak currency discourages the volume of FDI inflows into the host country. And still, a handful of empirical studies support no relation betwen these variables. (see, for-example, the study of Dorantes and Pozo (2010); Goldberg and Kolstad (1995), Vita and Abbott (2011)). In short, it can be easily argued that effect of exchange rate level on FDI inflows or outflows is ambiguous and empirical results are conflicting in a way some claming positive relationship, others negative relationship and still others, no relationship at all.

2.2. Exchange *Rate volatility and FDI*

2.2.1 The Inverse Relationship Between Variables

With respect to effect of exchange rate uncertainity on FDI, there are two kinds of hypothesis debated in the literature so far. These are namely, Production Flexibility argument and Risk Aversion argument. Second one suggest that there is a possible negative relation between exchange rate volatility and FDI inflows due to uncertainty of foreign investors about cost and benefit of irreversible investments into the host country. As Ruiz and Pozo (2008) stated in their study that if the purpose of FDI were either to serve other market or bring production back to the home country, a negative relationship between FDI and exchange rate uncertainty would like to arise.

There are a huge body of studies which are compliant with this argument, for-example, Kiyota and Urata (2002) invetigated the relationships between exchangerate volatility and FDI coming from USA and Japan to their partner countries and finally, they found out that volatility observed in exchange rate effect the FDI from both countries negatively. Moreover, the empirical study of Dorantes and Pozo (2010), was distinctive than previous works in a sense that they considered the nonstationary of series and took advantage of conditional variance rather than unconditional variance. But, they still drawn same conlusion with Kiyota and Urata (2002) in the way of effect of exchange rate uncertainity on FDI inflows for USA. An other study which is newsworthy here is carried out by Ruiz and Pozo (2008) in order to analyze the impact of exchange rate uncertainty on US foreign direct investment into seven Latin American countries. They alsodecomposed uncertainty into temporary (short-run) and permanent (long-run) components by employing CGARCH estimation. Finally, they concluded that exchange rate uncertainty effects FDI inflows to Latin Amerca from USA negativelly. They also touch the timing aspect of uncertainty in exchange rate such that they argued the persistency in exchange rate volatility deter FDI inflows more than transitionary uncertainty. Aditionally, Xing (2005) conducted the first study in China that considers the industry level data rather than aggregate data to investigate the realalationship between exchange rate fuctuations and FDI inflows from main trade partner. He also found that the movements in exchange rate have negative effect on FDI inwards from Japan. Similarly, Renani and Mirfatah (2012) figured out the same results for their study for Iran covering the period 1980Q2-2006Q3. They come up with the conclusion that exchange rate volitility and world crude oil price have negative impact on FDI inflows. Moreover, Ogunleye (2008) exposed a different result unlike investigation of Tokunbo S. and L.loyd A. (2009) for his investiagtion for Nigeria and South Africa. He used two-stage Least Squares method to capture the endogenitiy of exchange rate volitility and considered conditional volitility instead of unconditional volitility as a better measure of uncertainity and then he concluded that fluctuations in exchage rate influence FDI negatively in Nigeria and FDI inflows increase the exchage rate volitility at the same time.Cavallari and Addona (2012), also examined the role of both real and nominal volitility on the volmume of FDI by using firm level data for OECD economies over the period 1985-2007. They showed that there is a significat negative corelation between volitility in macroeconomic indicators arising from host country such as exchange rate, interest rate and FDI inflows. Furthermore, MacDermott (2008) expanded the previos works by utilizing OECD data that include 1,485 bilateral pairings over nineteen years of both developed and developing countries. He explained the impact of volitility of exchange rate on the volume of FDI inwards compliant with the existing literature which claims the negative relations between these variable. Again, Vita and Abbott (2011) used manufacturing data to examine the impact of both exchange rate level and its volatility on UK FDI inflows from seven major countries over the period 1975-2001. They also utilized from fixed effects and dynamic generalized methods of moments (GMM) panel estimation technique and sperated manufacturuing data as high and low based on R&D content. Finally, they cocnluded that variability in exchange rate effect FDI inwards to UK negatively for examined period.

2.2.2.The Direct Relationship Between Variables

On the other hand, Production Flexibility argument alternatively suggests a possible positive relation between FDI inflows and exchange rate uncertainty. If the purpose of foreign investors is not to export abroad or bring production back to home country rather to create diversification of production location and to have the option of production

flexibiliy, a direct relationship between exchange rate volatility and FDI inwards can be expected. The main assumption in production flexibility argument is that producers have the flexibility to adjust variable factors following the price variability as a result of movements in exchange rate so that they are encouraged to invest more in host country as the volatility in exchange rate of host country rise.

There are also some works supporting this argument in the literature. For-example, Lahiri and Mesa (2004) conducted a study that investigates the impact of both host and home country's exchange rate volatility on local content requirement on FDI inflows for a oligopolistic market for a third contry. They found out that if foreign firms are endogenous, in other words, if foreign investors do not invest in host country with the intention of export, host country's exchange rate volatility effect FDI inflows positively and creates competition in the host market. Furthermore, Ellahi (2011), figured out in his study for Pakistan for the period between 1980 and 2010, exchange rate volitility has a negative impact on FDI inflow in shortrun but a positive impact on FDI inflows in the long run. Ellahi, also looked at the timing aspect of FDI inward and found a different result than literature. His result is compliant with study of Itagaki (1981) and Cushman (1985) who argued that higher excangerate uncertainty may lead FDI as a substitude for export. An other sonorous study supporting the idea of Cushman (1985) was carried out by Chowthury&Wheeler (2008). They investigated the effect of shocks to macroeconomic varaibles such as price level, interest rate, real GDP and exchage rate on FDI inwards in four developed countries namely, USA, Canada, Japan and United Kingdom. But, the primiary objective of the study was to figure out the impact of volitile exchange level on FDI by employing VAR model.Moreover, an other study which supports the positiveness of exchange rate volitility on FDI is carried out by Dhakal, Nag, Pradhan and Upadhyaya (2010). They examined the effect of exchange rate uncertanitiy on the amount of FDI in China, Indonesia, Malaysia, the Philippines, South Korea and Thailand which experienced quite volitile exchange rates. They found that volitility observed in exchange rates of host country positivelly effect the FDI.

2.2.3 No Relationship Betwen Variables

Empirical and theoritical Works with an other point of view in the literature that examined the realtionship between these two variables suggested that there is no realtionship at all. For-example, Chaudhary, Shah and Bagram (2012) carried out their investigation for these two variables for main regions of Asia and found out that in almost half of the countries in their study, the relationship between variables is not found. Furthermore, Gorg and Wakelin (2001) conributed considerably to literature by taking account of the both inward and outward FDI. They investigated the effect of exchange rate and its' volitility on the outward FDI from USA to 12 developed countries and inward FDI from these countries to USA for the period 1983 to 1995. They proved that there is no corelation between fluctuations in exchange rate and invetsment inward to USA or investment outward from USA to those countries. Beside this, Tokunbo S., Lloyd A. (2009) also conducted a study that examines the impact of exchange rate level and its' volitility on FDI inflows to Nigeria for the period between 1970 and 2004. They argued that exchange rate volitility does not have a significant effect on FDI inward while exchange rate level has a positive effect on FDI inward to Nigeria. An other study is carried out by Furceri and Borelli (2008) that examines the relationship between volitility of exchange rate and FDI by using a panel data set for 35 EMU countries from 1995 to 2004. They come up with a sollution that claims openness of these countries is the main reason behind the effectiveness of fluctuations in exchange rate on FDI. According to their study, FDI in closed economies are effected exchange rate fluctuations negligibly while FDI in open economies are effected seriously from these movements in exchange rate. The study of Crowley and Lee (2010), was different than existing literature in terms of considering bilateral data on FDI flows and FDI between USA and other 18 OECD countries for the period 1980 and 1998. They have also taken consideration of conditional volitility rather than unconditional volitility like the study of Ogunleye (2008) and Dorantes and Pozo (2010) in order to better understand the uncertainty in the exchange rate. Finally, they posed a mixed result in the light of relation between FDI and movements in exchange rate. They claimed that, the negative corelation between exchagerate volatility and FDI may be weak or not exist if the movements in exchage rate is realtivelly small but this realation may be very strong if movements in exchange rate become excessively volite.

Eventhoug, there are a lot of studies concerned the issue of relationships between exchange rate as well as its' volitility and outward/inward FDI, there is still controversy about the real impact of excange rate level and its volitility on inward FDI. When comparared the previous studies, it is obvious that there is no exact outcome associated with the relations among these variables.

2.3. A Brief Review Of Literature In Turkey

When investigate the empirical stuies concerning the impact of exchange rate level and its volitility on FDI inwards in Turkey, it is found that the works regarding FDI inwards generally stress the impact of FDI inwards to exports,

economic growth and employment in Turkey. There are a few studies try to figure out exchange rate level and its uncertainty on FDI inwards. Beside that, there is no certain complement that all resarches agree about.most of the studies handled for Turkey suggest a negative relation between FDI inwards into Turkey and exchange rate level; See the study of Kaya&Yılmaz (2003), Vergil&Çeştepe (2005), Kar&Tatlısöz (2007), Eryiğit&Eryiğit (2007), there are also other works suggest no corelation between these variables at all; see the study of Hancıoglu (2001), Karagöz (2007), Koyuncu (2010). With regard to effect of exchange rate volaitility on FDI inwards into Turkey, there are also conflicting results that some of them suggesting negative corelation between these variables, for-example, the study of Tataoğlu&Erdal (2002), and others suggesting a positive relation, for-example the study of Eşiyok (2011) and still others suggesting no corelation at all, for-expample the study of Sekmen (2007), Vergil&Çeştepe (2005).

3-   Foreign Direct Investments Inwards In Turkey

International trade and FDI flows stand out as the fasted growing economic activities in the Global environment of the world in last two decades. While the importance of multinational firms and FDI flows become more of an issue since 1990s, Turkey could not achive in attracting FDI inflows to the country. Turkey's stock of FDI was just USD 300 millonin 1971 and it received annual FDI inlows which was about USD 90 millontill 1980. When compared Turkey's performance attracting FDI inflows with other comparable countries that have simillar GDP growth, it is obvious that Turkey was unsuccessful in receiveing FDI inflows to the country. However, fallowing the implementation of export-oriented policies in mid-1980s, Tukish economy shifted from a protectionist trade regime to export-oriented economic liberalisation, and then FDI inflows started to increase rapidly in this period. Yet, in 1990s, when the global FDI flows exceeding the growth in world trade, FDI inflows did not increase much and remained stragnant in Turkey. The main reason behind of failure was economic and political uncertainities that started latter half 1980s and ended up untill 2001 economic crises. Especially for the years between 1987 and 2002 are seen as down the drain period for Turkish economy. Later on, FDI inflows started to increase gradually at the end of 2001 due to achivments of macroeconomic policies based on the agreements with IMF and World Bank after 2001 crisis. Moreover, efforts of new goverment, AK Party to improve the investment environment since 2002 via legalization of new FDI, Law 4875 on June,5 2003, in replacement of the old FDI law, called Law 6224 which run deep to year of 1954 and also approval of Turkey as an candidate by memebers of EU in 1999 and thestartof negotiations for seeing Turkey as member state in 2005, at the end of 2004 accelerated FDI inflows to Turkey since 2005. According to this new FDI law 4875, FDI is not restricted in any sectors and new law extinguishs the old minimum capital limit, allows foreigners to own any property without putting any barrier and doesnt require any performance limit to invest in Turkey and takes into account foreign investors right to international arbitration, provides foreign investors full convertibility in their taransfers of capital and earnings.

Figure 1: FDI Inflows in Turkey Between 1995 and 2012

Inflows to Turkey

Source: Central Bank of Turkey   -including real estate purchases-

From Figure 1, it is obeserved that especially in 2005, FDI inwards jumps up from 1.4 billion USD to 10. 0 billion USD. This jump in 2005 was on account of the start of negotiations with EU to see the Turkey as full candiate in the integration and election process at the end of 2004. Because, the expectations of foreign investors with regard to the membership of Turkey to EU increased, they shifted their investments into Turkey as the form of acquisitions and mergers. Not just expectations of Turkey being a memeber of EU accelerated FDI inflows to Turkey in 2005, it is also assumed that legalization of new FDI, Law 4875 in June 2003, showed its effect on FDI inwards in 2005, 2006 and 2007. Overall, FDI inwards continued to increase and reached to about20.2 billon USD in 2006 and about 22 billion USD in 2007. Afterwards, Global economic world crisis showed up in the year of 2008, especially it is felt mostly by all countries in September of that year. As a result, FDI inwrads started to decrease in Turkey and reached to about 19.5 billon USD in 2008 and falled down much in 2009 and reached to about 8.4 billon USD.In parallel with world economic crisis, the new investment incentive system was effectuated by The Council of Ministers in 16th of July of 2009. With this new incentive system, foreign investors were encouraged to invest in Turkey with comprehensive regional and sectoral support provided by Goverment. In other words, this new investment incentive system gave favorable tax and admisitrative treatment to foreign companies based on regional and sectoral level.As Figure 1 shows, İt is obvious that FDI inwards are leaning to increase and reach to 9 billon USD in 2010 from 8.4 billon USD in 2009 and it continues to increase in 2011 gradually, according to Centeral Bank of Turkey data, FDI inflows in 2011 is about 15.9 billion USD in Turkey.Undersecretariat of Treasury, (2010) satated this success as that the Global economic and financial crisis which started in 2008 and showed its' effect globally in 2009, turned into a different phase in 2010. As seen from figure 1, FDI inflows reached to about 8.2 billon USD at half of 2012 and Turkey is planning to attract FDI inwards between 16-20 billon USD at the end of 2012 by depending the developments and crisis experienced in the world.

4-Data and Methodology

4.1 Data: Eventhough, the major aim of this study is to test the impact of real exchange rate volatility or uncertainty on FDI inwards into Turkey with a specific focus on montl data to capture the effect of the legistlation of law 4875 in 2003 for the period between 2004 and 2012, there are also other explanatory variables except real exchange rate volatility to explain dependent variable. Dependent varaible is determined as montly realized FDI inflows derived from Central Bank of Republic of Turkey (http://www.tcmb.gov.tr). One of the explanatory variables, policy interest rate Euro is also montly data derived from Eropen Centeral Bank (http://www.ecb.int). Other explanatory variables are montly data derieved from Centeral Bank of Republic of Turkey namely real exchange rate, real exchange rate volatility which will be calculated by utilizing the GARCH (1,1) model, inflation, confidence index for real section, transportation and communucation expenditures index by households, lag value of FDI inflows and a dummy variable for new incentive system started to be effectuated in 16 th of July in 2009 in order to improve FDI

environment in Turkey as an response to Global economic crisis started at the end of 2007 and has been felt its effect by all countries especially developed countries in 2008 an latter on by develoing countries in 2009.

Expected sign of coefficients on montly FDI inwards for the examined period are summurized in Table 1.

Table 1: Expected Signs of Coefficients

Variable	Markow Switching Model
Real Exchange Rate	Undetermined
Real Exchange Rate Volatility	Undetermined
Policy Interest Rate Euro	Undetermined
Inflation	Negative
Confidence Index	Positive
Transportation Communication Index	Positive
Lag Value of FDI Inwards	Positive
Dummy Variable for 2009	Positive

4.2 Methodology: This study aims to find the impact of real exchange rate volatility on inflows of foreign direct investments with a specific focus on montly datafollowing the legistlation of FDI law 4875 in 2003 for the period between 2004-2012. As seen from the figure 1,FDI inflows to Turkey was stator for years before the law 4875 but, FDI inwards jump up in 2005 and show a fluctuating pattern down and up till 2012. Since, the series exhibit a nonliner pattern, this paper utilizes the Markow Regime Switching model which allows some part of the model to depend on the state of the economy (the'regime').

Figure 1: FDI Inflows to Turkey Between 2004-2012
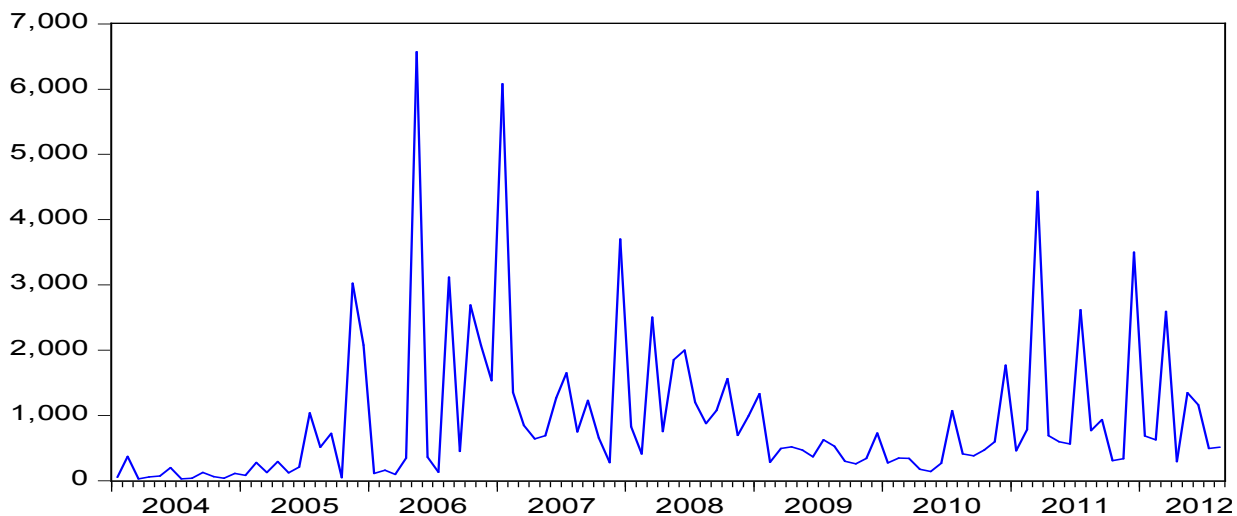
There are multiple steps to constitute the methodology. Firstly, all variables are tested for existing of a unit root. Secondly, a unit root test with one structural break based on Zivot and Andrews (1992) and two-structural breaks based on Lee-Strazicich (2003) will be carried out to determine if unit roots found in series due to the structural break or not.Thirdly, exchange rate volatility will be estimated by employing GARCH (1,1) model and inculuded into model as an estimated value. Later on, study will go one step further and measure the effect of exchange rate volatiliy on monly FDI inflows by utilizing Markow Switching model.

A wide variety of unit roots test are developed and implemented that require the use of special critical values. But here,compliant with the literature, the ADF (Augmented Dickey –Fuller, 1979-1081) test statistic will be used to test if the series are stationary or not. The results of ADF test statistics are given as follows,

Table 2: Results of The Augmented Dickey Fuller Test with Constant and Liner Trend

Variable	Test Statistic	Probability

Confidence Index	-2.97	0.1436
Foreign Direct Investment	-2.51	0.3228
Transportation and Commun. Index	-2.33	0.4135
Policy Interest Rate Euro	-1.91	0.6391

The 1%, 5% and %10 critical values are -4.04, -3.45 and -3.15 respectively.

Table 3: Results of The Augmented Dickey Fuller Test with Constant

Variable	Test Statistic	Probability
Inflation	-6.57	0
Real Exchange Rate	-3.1	0.0291

The 1%, 5% and %10 critical values are -3.49, -2.89 and -2.58 respectively

As seen from the table 3, there is no unit root in the inflation variable at %1, %5 and %10 critical levels. Beside that, real exchange rate is stationary at %5 and %10 level eventhough it is not statinoray at %1 level. Since, %5 critical value will be considered in our study, it may be concluded that both iflation and real exchange rate variables are stationary. But, as seen from table 2, all other variables seem to have unit root and to be nonstationary.

UNIVARİATE LM UNİT ROOT TESTS WİTH TWO STRUCTURAL BREAKS:

The LM unit root test can be can be explained using the following data generating process (DGP): $Y_t = \delta' Z_t + e_t$, $e_t = \beta e_{t-1} + \varepsilon_t$. Here, Z_t consists of exogenous variables and e_t is an error term with classical properties. Lee and Strazichich (2004) developed two versions of the LM unit root test with one structural break. Using the nomenclature of Perron (1989), Model A is known as the 'crash' model, and allows for a one-time change in the intercept under the alternative hypothesis. Model A can be described by $Z_t = [1, t, D_t]'$, where $D_t = 1$ for $t \geq T_B + 1$, and zero otherwise, T_B is the date of the structural break, and $\delta' = (\delta_1, \delta_2, \delta_3)$. Model C, the 'crash-cum-growth' model, allows for a shift in the intercept and a change in the trend slope under the alternative hypothesis and can be described by $Z_t = [1, t, D_t, DT_t]'$, where $DT_t = t - T_B$ for $t \geq T_B + 1$, and zero otherwise. Lee and Strazicich (2003) developed a version of LM unit root test to accommodate two structural breaks. The endogenous two-break LM unit root test can be considered as follows. model AA, as an extention of Model A, allows for two shifts in the intercept and is described by $Z_t = [1, t, D_{1t}, D_{2t}]'$ where $D_{jt} = 1$ for $t \geq T_{Bj} + 1$, $j = 1$, 2 and 0 otherwise. T_{Bj} denotes the date when the breaks occur. Note that the DGP includes breaks under the null $(\beta = 1)$ and alternative $(\beta < 1)$ hypothesis in a consistent manner. In model AA, depending on the value of β , we have following null and alternative hypotheses:

$H_0 : y_t = \mu_0 + d_1 B_{1t} + d_2 B_{2t} + y_{t-1} + v_{1t}$,

$H_A : y_t = \mu_1 + \gamma t + d_1 D_{1t} + d_2 D_{2t} + v_{2t}$,

Where v_{1t} and v_{2t} are stationary error terms ; $B_{jt} = 1$ for $t = T_{Bj} + 1$, $j = 1, 2$ and 0 otherwise. Model CC, as an extention of Model C, includes two changes in the intercept and the slope and is described by $Z_t = [1, t, D_{1t}, D_{2t}, DT_{2t}]'$, where $DT_{jt} = t - T_{Bj}$ for $t \geq T_{Bj} + 1$, $j = 1$, 2, and 0 otherwise. For Model CC we have the following hypotheses:

$H_0 : y_t = \mu_0 + d_1 B_{1t} + d_2 B_{2t} + d_3 D_{1t} + d_4 D_{2t} + y_{t-1} + v_{1t}$,

$H_A : y_t = \mu_1 + \gamma t + d_1 D_{1t} + d_2 D_{2t} + d_3 DT_{1t} + d_4 DT_{2t} + v_{2t}$,

where v_{1t} and v_{2t} are stationary error terms; $B_{jt} = 1$ for $t = T_{Bj} + 1$, $j = 1$,2 and 0 otherwise. The LM unit root test statistic is obtained from the following regression:

$\Delta y_t = \delta' \Delta Z_t + \phi \bar{S}_{t-1} + \mu_t$ where $\bar{S}_t = y_t - \hat{\psi}_x - Z_t \hat{\delta}_t$, $t = 2, ...T$; $\hat{\delta}$ are coefficients in the regression of Δy_t on ΔZ_t ; $\hat{\Psi}_x$ is given by $y_t - Z_t \delta$; and y_1 and Z_1 represent the first observations of y_t and Z_t ,

respectively. The LM test statistic is given by: $\overline{\tau} = t$ - statistic for testing the unit root null hypothesis that $\phi = 0$. The location of the structural break (T_B) is determined by selecting all possible break points for the minimum t - statistic as follows:

$$\ln f\hat{\tau}(\tilde{\lambda}_i) = \ln_\lambda f(\tilde{\lambda}), \text{ where } \lambda = \frac{T_B}{T}$$

The variables, FDI inflows, policy interest rate Euro are applied Lee-Strazicich unit root test with two breaks that allows breaks in both intercept and slope whereas confidence index is applied Zivot-Andrews unit root test with one break which allows for change in the intercept only. The results of both tests are reported below:

Table 4: The result of Zivot-Andrews Unit Root Test

Variable	Berakpoint Test Statistics (2010:02)	Sig.Level %1	Sig.Level %5
Confidence Index	-4.33516	-5.34	-4.8

Table 5: The Results of Lee-Strazicich Unit Root Test

Variables	Lee-Strazichich Test Statistics	Critical values
Interest Rate	-6.0497	-5.65
FDI inflows	-9.4704	-5.59

Here null hypothesis is that there is no structural break in the series while alternative states there is structural break in the series. In addition, rejecting null hypothesis is ruled out as if test statistics is bigger in absolute value than critical values, then reject the null hypothesis. As seen from Table 4, test statistics of Zivot-Andrews is less in absolute value than critacal values at %1 and %5 significance level. Therefore, it is concluded that the null hypothesis can not be rejected and there is no structural break in the series of confidence index. Hence, the unit root in the series are real unit root so that first difference of the series should be taken inorder to make it stationary.

As seen from table 5, the test statistics of Lee-Strazicich are bigger in absolute value than critical values such that suggesting there is structural break in both series. In other words, since the null hypothesis can not be rejected, it is cocluded that the unit roots in both series, policy interest rate Euro and FDI inflows, are not real roots, they are caused by structural breaks in the series. Therefore, it is not needed to take first difference of both varaible inorder to make them stationary in our model.

CONDİTİONAL MEASURE OF VOLATİLİTY

The conditional variance (H) of the real effective exchange rate is used to measure the volatility (uncertainty) associated with the real effective exchange rate for Turkey in this study. H is derived from a generalized autoregressive conditional heteroskedastic GARCH (Bollerslev, 1986) model. A GARCH (m,s) model can be written as

$$REX_t = \text{d}_0 + \sum_{i=1}^{p} \text{d}_i REX_{t-i} + \text{e}_t \, ,$$

$$\sigma^2_t = \alpha_0 + \sum_{i=1}^{m} \alpha_i a^2_{t-i} + \sum_{i=1}^{s} \beta_j \sigma^2_{t-j}$$

The model for the mean of the series is specified with ARİMA model using traditional Box and Jenkins (1976) methodology. AR(1) model is determined as mean equation and GARCH (1 1) model is determined as volatility equation.The result of GARCH (1 1) model is given below:

Table 6: The Statistical Test Results of GARCH (1,1) Model

	Coefficients	Std. Error	t-value	Probability

Const. of Mean	100	9.5573	10.46	0.0000*
AR (1)	0.989117	0.0063309	156.2	0.0000*
Const. of Variance	2.827823	1.8134	1.559	0.1223
ARCH (Alphal)	0.098534	0.11759	0.838	0.4042
GARCH (Betal)	0.578938	0.19856	2.916	0.0044*

$$Q(10) = 8.32494 \qquad\qquad Q^2(10) = 7.37562$$

As Table 6 shows, there is an significant GARCH effect with t value, 2.916 and low P value, 0.0044 in the REX for Turkey whereas ARCH term in the model seems not to be insignificant with high P value and low t-value 0.4042 and 0.838 respectively. Finally, the Boxand Pierce statistics of $\tilde{a}_t$ can be used to check the adequacy of the mean equation while that of $\tilde{a}_t^2$ can be used for testing the adequacy of the volatility equation. As the Q and Q^2 statitics indicate in Table6, the GARCH (1,1) model produces a White noise series for the residual and squared residul series. In other words, GARCH (1 1) model creates white noise residuals for both mean equation and volatility equation.
A plot of H (conditional volatility) in real exchange rate is shown in Figure 2. As the figure shows, conditional variance is not constant in REX over time, but most important thing that can be educed from the figure is that, conditional variance is more volatile during the period between 2008-2010 due to world economic crisis started at the end of 2007 in USA and felt mostly in both developed and developing countries in 2009.

Figure 2: Volatility of1 Turkeys' Real Exchange Rate Between 2004-2012
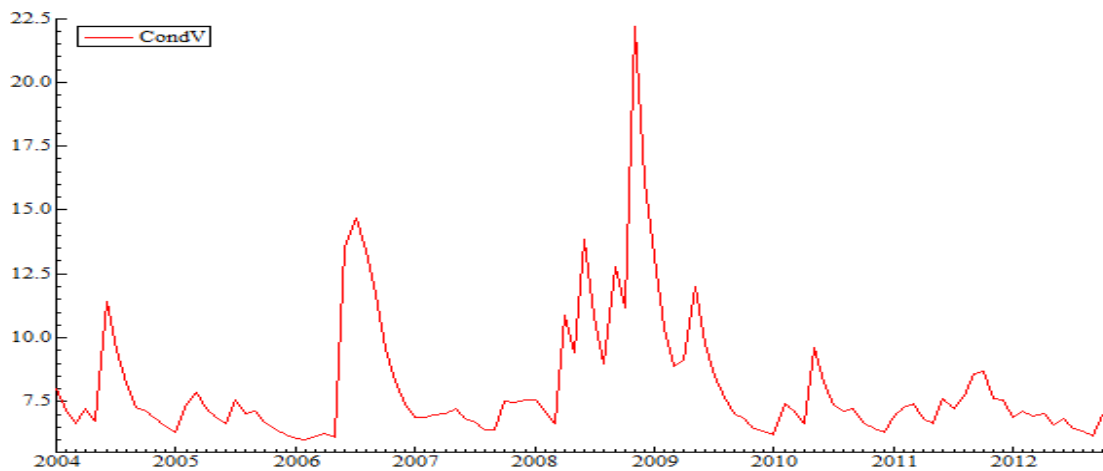
REGİME SWİTCHİNG MODELS:
Many financial and economic time series seem to face situations in which the behaviour of the series changes quite dramatically compared to that exihibited previously. The behavior of series may change over time interms of its mean value, its volitility or to what extent its current value is related to its previous value.If the behaviour of serieschange for a period of time before reverting back to its orginal behaviour or swithcing to yet another style of behaviour, this kind of behaviour of series is termed as regime switch or regime shift.Regime swithcing models allow some part of the model to depend on the state of the economy (the 'regime'). For-example, mean or variance of the model can be allowed to change between recessions and expansions. There are several types of models that use this concept in different ways such as Self-exciting Threshold Autoregressions (SETAR, Tong, 1990), Smooth-transitions models (such as LSTAR, Terasvirta, 1994) and Markow-Switching models (Hamilton, 1989). This study is concerned with Markow-Switching Model. Markow Switching model is appropirate when a series is to thought to exposed to shifts from one type of behaviour to another and back again, but where the fourcing variable that lead to the transitions of regime or the regime shifts is unobservable. Markow-Stwitching model is usefull time series model

if the series are non-linear and it splits series into two or more component (regimes) so that the specification within each regime is liner wheras the model is globally (when it is taken as a whole) non-linear.The objective of the Markow Regime Switching model is allow for different behaviour in different states of nature, while simultaneously estimating when there is a transition from one state to an other (only rarely are the exact dates known).

Accordig to the Markow Switching appoach, the universe of possible occurrence is split into m states of the world, denoted s_i, $i = 1,......., m$ corresponding to m regimes. In this study, it will be assumed that $m = 2$. So, if $s_t = 1$, the process is in regime 1 at time t, and if $s_t = 2$, the process is in the regime 2 at time t.

A simple regime switching model would be:

Regime 1: $y_t = \mu_1 + \rho y_{t-1} + \varepsilon_t, \ \varepsilon_t \quad N \left[0, \sigma^2 \right]$,

Regime 2: $y_t = \mu_2 + \rho y_{t-1} + \varepsilon_t, \ \varepsilon_t \quad N \left[0, \sigma^2 \right]$,

If we write s_t for the variable denoting the regime, then the mean can be written as a function of s_t:

$$\mu(s_t) = \begin{cases} \mu_1 & if \ s_{t=1} \quad regime1 \\ \mu_2 & if \ s_{t=2} \quad regime2 \end{cases}$$

In the Markow-switching model, the unobserved random variable s_t follows a Markow chain, defiend by transition probabilities between the M states:

$$p_{i/j} = P\left[s_{t+1} = i \big| s_t = j \right], \ i, j = 1,.......M$$

So the probability of moving from state j in one period to state i in the next only depends on the previous state. Because the system has to be in one of the m states we have that:

$$\sum_{i=1}^{m} p_{i \mid j} = 1$$

5- EMPIRICAL RESULTS

In this study, Markow-Switching dynamic regression model (MS-DR) is applied to both dependent and independent varaibles to capture the different behavior of series in different states. The states (regimes) are classifed into two groups as low and high. Low group respresents the regime 1 in which a small amount of FDI inwards are received whereas high group represents regime 2 in which a high volume of FDI inwards are recieved by Turkey. The results of MS-DR model and the transition probabilities between 2 states are reported below:

Table 6: The Resulst of The Markow-Switching Dynamic Regression Model

	Coefficient	Std.Error	t-Value	t-Prob
Cond.Volatility	0.0158469	0.02121	0.747	0.457
Interest Rate Euro	0.256211	0.0491	5.22	0.000*
Dummy	0.58868	0.1171	5.03	0.000*
Real Exchange Rate	-0.00174629	0.004915	-0.355	0.723
Inflation	-0.0409399	0.0428	-0.957	0.342
Confidence Index	1.42295	0.6378	2.23	0.028
Trans. And Comm. Index	-0.247252	2.104	-0.117	0.907
FDI_1	0.011378	0.05393	0.211	0.833
Constant (1)	-0.261036	0.5544	-0.471	0.639
Constant (2)	1.45617	0.7035	2.07	0.042

Sigma (1)	0.204226	0.03586	5.7	0.000*
Sigma (2)	1.53707	0.2163	7.11	0.000*

As Table 6 shows, conditonal volatility, real exchange rate, inflation, transportation and communication index and lagged value of FDI are insignificant with low t value and high p value. However, interest rate Euro has a highly positive significant effect on FDI with high t statistics, 5.22 and low p value,0.000. Beside that, dummy variable used to understand the impact of legistlation of new investment incentive system in 2009 has very statically significant effect on FDI with high t value, 5.03 and low p value,0.000. The other interesting result comes out as a positive significant effect of confidence index for real sector on FDI inflows into Turkey.we found out that the impact of confidence index on FDI inflows is significant with t value, 2.23 and low p value, 0.028, so that, expectations of domestic ivestors about the future investment climate in Turkey are also a pull factor for foreign investors.

Table 7: The Transition probabilities Between two Regimes

	Regime 1,t	Regime 2,t
Regime 1,t+1	0.74933	0.65681
Regime 2, t+1	0.25067	0.34319

 Moreover, Table 7 explains the transition probabilities between two regimes (regime 1 and regime2). It is clearly understood from table 7, that probability of staying in regime 1 in which FDI inflows to Turkey are in small amounts is higher by about 40 % than probability of staying in regime 2, in which FDI inflows are in large amounts. Furthermore, probability of switching from regime 1 to regime 2 is about 25 % whereas probability of switching from regime 2 to regime 1 is about 65%. Therefore, we conclude that probability of low valume of FDI inwards into Turkey is higher for examined period.
As a second step, diagnostic tests are conducted to ensure the model is adequate to explain the dependent variable and to capture the different behavior of series in different states. The result of the diagnostic tests are showed below:

Table 8: The Results of Descriptive Statistics for Scaled Residuals

	Distrubution	Statistics	Porbability
Normality Test	$Chi^2(2)$	3.6292	0.1629
ARCH 1-1 Test	$F(1,79)$	0.3015	0.5845
Portmanteau(36)	$Chi^2(35)$	40.757	0.232

As Table 8 indicates, Normality test, ARCH (1-1) test and Portmanteau Test can not be rejected with low value of t statistics and high value of probability value. Therefore, we decided that the model is adequate to describe the dependent varaible and to capture the movements of series in different sates.

6- SUMMARY AND CONCLUDİNG REMARKS

Over the last two decades, international trade and FDI become an important issue for both developing and developed countries due to their possible economic effect on national growth and employment. Turkey as a developing country with rich natural resources and low labour cost could not achieve to attract conding FDI inflows to the country for years. However, FDI inflows to Turkey have showed a fast growing pattern following the legistlation of law 4875 in 2003 up untill 2012. Therefore, our goal was to investigate the impact of exchange rate volatility upon FDI inwards into Turkey with a specific focus on montly data following the legistlation of FDI law 4875 in 2003 for the period between 2004-2012.We employed GARCH (1 1) model to measure the conditional volatility for real exchange rate and Regime switching model in order to analyze the impact of uncertainty in real exchange rate on FDI inwards.Finally, we found a strong evidence that both real exchange rate level and its volatility do not have significant effect on montly FDI inflows into Turkey for examined period whereas policy interest rate Euro, confidence index for real sector and dummy variable for the new investment incentive system effectuated on 16 July of 2009 have very significant and positive effect on FDI inflows.
Interest rate refers the cost of borrowing for foreign entitiy if so, as the cost of borrowing increase in Europe, FDI inflows into Turkey showed a growing pattern for examined period. Since, most of FDI inwards into Turkey are coming from Eropean countries, for-example, FDI inflows from EU countries amounted to USD 4.9 billon, which

were 75.1% of total inflows in 2010, Undersecretariat of Treasury (2010), this result is not surprising that foreign investors from EU countries direct their investments into Turkey as interest rate increase in home country in order to utilize lower cost of borrowing opportunities in host country. Therefore, we concluded that interest rate Euro in home country is an push factor for foreign investors to invest in Turkey.

Furthermore, legistlation of new investment incentive system in 16 th July of 2009 as an response to world economic crisis began at the end of 2007 has found to have possitivesignificant effect on FDI inflows to Turkey. This result should be accepted by policy makers an important guide to improve existing investment incentive system or to generate more efficient ones in future to encourage more foreign investors to direct their investments into Turkey.

The other interesting result of this study is that confidence index which is an idicator of expectations of domestic firms about the future investment climate in Turkey is also a pull factor for FDI inwards to Turkey since we found a statistically significant effect of confidence index on FDI.

REFERENCES

➢ Chowdhury, A.,&Wheeler, M. (2008). Does real exchange rate volatility effect foreign direct investment? Evidence from four developed economies. *International Trade Journal*

➢ Furceri,D.,& Borelli,S.(2008). Foreign direct investment and exchange rate volatility in the EMU neighbourhood countries. *Journal of International and Global Economic Studies, 1(1), 42-59*

➢ Froot, K. A. & Stein, J.C. (1991). Exchange rates and foreign direct investment: An imperfect capital market approach. *The Ouaterly Journal of Economics, 106, 1191-217*

➢ Campa, J. (1993). Entry of foreign firms in the United States under exchange rate uncertainty, *The review of Economics and Statistics, 75, 614-22*

➢ Gorg, H., & Wakelin, K. (2002).The impact of exchange rate volatility on US direct investment. *The Manchester School, 70(3), 380-397.*

➢ Cushman, D. (1985). Real exchange rate risk, expectations and the level of direct investment, *The Review of Economics and Statistics, 67, 297-308*

➢ Cushman, D. (1988). Exchange rate uncertainty and foreign direct investments in the United States, *Review of World Economics, 124, 322-35*

➢ Goldberg, S.L., & Kolstad, D.C. (1995). Foreign direct investment, exchange rate variability and demand uncertainty. *International Economic Review, 36(4), 855-873*

➢ Dorantes, C. & Pozo, S. (2010). Foreign exchange rates and foreign direct investment in the United States. *The International Trade Journal*

➢ Chaudhary, G., Shah, S. &Bagram, M. (2012). Do exchange rate volatility effects foreign direct investment? Evidence from selected Asian economies. *Journal of Basic and Applied Scientific Research, 2090-4304*

➢ Vita, D.G.,& Abbot, A. (2008). Do exchange rates have any impact upon UK inward foreign direct investment? *Applied Economics, 39(20), 2553-2564*

➢ *Ruiz, I & Pozo, S. (2008). Exchange rates and US direct investment into Latin America. The Journal of International Trade&Economic Development: An Alternative and Comparative review, 17:3, 411-438.*

➢ *Untac World Investment Report, (1995)*

➢ *General Directorate of Foreign Investment, Under Secretariat of Treasury, (2010).*

➢ Erdal, F. & Tataoğlu, E. (2002). Locational determinants of foreign direct investment in an emerging market economy: Evidence from Turkey. *Multinational Business review, Vol.10, No.1*

➢ Lahiri, S. & Mesa, F. (2004). Local content requirement on foreign direct investment under exchange rate volatility. *International Review of Economic and Finance,346-363*

➢ Eşiyok, B. (2011). Determinants of foreign direct investment in Turkey: A panel study approach. *MPRA (Munich Personal RePEc Archive) paper No: 36568*

➢ Vergil, H. & Çeştepe, H. (2005). Döviz kuru değişkenliği ve yabancı doğrudan yatırım akımları: Turkiye örneği. *Zonguldak Karaelmas University, Çaycuma, Faculty of Economics*

➢ Kaya, V. & Yılmaz, Ö. (2003). Turkiyede doğrudan yatırımların belirleyicileri.*Atatürk University, Faculty of Economics, No:17*

➢ Tokunbo S., O. & Lloyd A., A. (2009). Foreign direct investment and exchange rate volatility in Nigeria. *International Journal of Applied Econometrics and Ouantitative Studies V6-2*

➢ MacDermott, R. (2008). Linking exchange rates to foreign direct investment. *The International Trade Journal*

➢ Ellahi, N. (2011). Exchange rate volatility and foreign direct investment (FDI) behavior in Pakistan: A time series analysis with auto regressive distributed lag (ARDL) application. *African Journal of Business Management Vol. 5(29), pp.11656-11661*

➢ Takagi, S. & Shi, Z. (2011). Exchange rate movements and foreign direct investment (FDI): Japanese investment in Asia, 1987-2008. *Japan and the World Economy, 265-272*

➢ Cavallari, L. & d'Addona, S. (2012). Nominal and real volatility as determinants of FDI. *Apllied Economics*

➢ Crowley, P. & Lee, J. (2010). Exchange rate volatility and foreign investment: International evidence. *The International Trade Journal, 17: 3, 227-252*

➢ Sharifi-Renan, H. & Mirfatah, M. (2012). The impact of exchange rate volatility on foreign direct investment in Iran. *Procedia Economics and Finance 1, 365-373*

➢ Xing, Y. (2006). Why is China so attractive for FDI? The role of exchange rates. *China Economic Review 17, 198-209*

➢ Ogunleye, E. (2008). Exchange rate volatility and foreign direct investment in sub-saharan Africa: Evidence from Nigeria and South Africa. *African Center for Economic Transformation*

➢ Kar, M. & Tatlısöz, F. (2007). Türkiye'de doğrudan yabancı sermaye hareketlerini belirleyen faktörlerin ekonometrik analizi. *Kahraman Maraş Sütçü İmam University, Facult of Economics, No:14*

➢ *Sekmen, F. (2007). Cointegration and causality among foreign direct investment in tourism sector, GDP, exchange rate volatility in Turkey. MPRA (Munich personal RePec Archive), No: 8736*

➢ Koyuncu, F. (2010). Türkiye'de seçilmiş makroekonomik değişkenlerin doğrudan yabancı sermaye yatırımları üzerindeki etkisinin yapısal Var analizi: 1990-2009 Dönemi. *Ekonomi Bilimleri Dergisi, 1309-8020,*

➢ Karagöz, K. (2007). Türkiye'de doğrudan yabancı yatırım girişlerini belirleyen faktörler: 1970-2005. *Journal of Yaşar University*