EFFECTS OF 2008 GLOBAL ECONOMIC CRISIS ON DIRECT INVESTMENTS AND CAUSALITY BETWEEN DIRECT INVESTMENTS FLOW AND INTERNAL FACTORS: EVIDENCE FROM TURKEY

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ABSTRACT
This article attempts to determine two aims. First, examine if structural shift exist in the direct investments of Turkey because of the 2008 global economic crisis. Second; determine the causality between direct investments and internal macro economic factors of Turkey. More clearly, taking into consideration that Turkey has become more integrated with the global financial system last years, the direct investments situation is to be analyzed both from the perspective of 2008 global economic crises and in relation with the internal fundamental economic variables such as industrial production, exchange rates, consumer confidence index and inflation rate. In the study, using the methodology of Zivot Andrews structural break and Granger Causality tests, results show that foreign direct investments of Turkey have been affected by the 2008 global economic crisis, whereas outflow of direct investments not. In addition it has been found Granger causality between direct investments and exchange rates, industrial production and consumer confidence index.

Key Words: Direct Investments, 2008 Global Economic Crisis, Macro Economic Factors

2008 KÜRESEL EKONOMİK KRİZİNİN DOĞRUDAN YATIRIMLAR ÜZERİNE ETKİSİ VE DOĞRUDAN YATIRIM AKIMLARI İLE İÇSEL FAKTÖRLERİN NEDENSELLİĞİ: TÜRKİYE ÖRNEĞİ

ÖZET

Bu çalışmada iki temel amaç hedeflenmektedir. Birincisi 2008 küresel ekonomik krizi Türkiye'nin direk yatırımlarında yapısal bir değişim meydana getirip getirmediğini araştırmaktır. İkincisi, Türkiye'nin makro ekonomik verileriyle direk yatırımları arasında nedensellik ilişkisinin varlığını ortaya koymaktır. Daha açık bir şekilde ifade edilirse Türkiye'nin direk yatırımları, son yıllardaki finansal sisteme entegrasyonunun artması dikkate alınarak, hem 2008 küresel ekonomik kriz perspektifinde hem de endüstriyel üretim, döviz kurları, tüketici güven endeksi ve enflasyon gibi makro ekonomik değişkenlerle ilişkileriyle analiz edilmiştir. Zivot Andrews yapısal değişim ve Granger Nedensellik test yöntemlerinin kullanıldığı çalışmada, sonuçlar Türkiye'nin doğrudan yabancı yatırımlarının küresel krizden etkilendiğini gösterirken, Türkiye'den yurt dışına yapılan direk yatırımların etkilenmediğini göstermektedir. Buna ek olarak direk yatırımlar

ile döviz kurları, endüstriyel üretim endeksi ve tüketici güven endeksi arasında Granger nedensellik ilişkileri bulunmuştur.

Anahtar Kelimeler: Doğrudan Yatırımlar, 2008 Küresel Ekonomik Krizi, Makro Ekonomik Faktörler

INTRODUCTION

The 2008 global economic crisis which arose as a result of the explosion of the balloon formed in the mortgage market in the USA caused very large recession all around the world. The crisis which started in the USA, spread rapidly to the economies of the other developed and developing countries. The effects of the crisis on economies were experienced at different rates but deeply. Global FDI flow also has a one affected by the crisis significantly. According to 2009 UNCTAD report after global FDI flows reached a historic record of $ 1,9 trillion in 2007, they are estimated to have declined by 15 percent in 2008, and a further decline is almost certain in 2009. The decline has been caused by two main factors. First, global economic growth has decreased sharply. As a result, there are less investment opportunities and firms have adopted more cautious investment strategies. Second, it has become more difficult to access finance, owing to widespread difficulties in the global financial sector, including the opportunity to raise funds through initial public offerings and corporate bond issues, and the sharp fall in global stock prices. Economy and also direct investments of Turkey were significantly affected by the crisis like many other developing countries too. Shrinkage was experienced in the direct investments of Turkey depending on the decrease in world demand. The direct investments inflow to Turkey, which was at the level of $ 22,0 billion in 2007, was $ 19,5 billion in 2008. However, there was a fall to $ 8,4 billion in 2009 because of the global economic slowdown in 2008 global economic crisis. In the present study, the effect of the global crisis on the inflow and outflow of direct investments of Turkey is analyzed. Most of the literature on direct investment has focused on inward flows. Outward of direct investments is an important field to study either. We have analyzed the effect of the 2008 global crisis both inflow and outflow of direct investments and also net value of these.

The opening of markets in developing countries in the last decade has brought with it burgeoning foreign direct investment (FDI) flows. The relationship between direct investments and internal factors of a nation such as the growth of economic activity, exchange rate and productivity of economy and domestic credit is deeply covered by researchers. Therefore, in this study we have also analyzed the causality of direct investments with internal factors of Turkey as well as the effect of the 2008 global economic crisis on it. For developing countries to compete for direct investment inflows, they must implement macroeconomic policies designed to reduce inflation, stabilize the exchange rate and increase the GDP (Trevin˜o, Franklin and Mixon, 2004, p:235). Thus, in this study inflation, exchange rates, industrial production (as a proxy for the market size) and finally consumer confidence index have been taken to analyze their relations with direct investments of Turkey.

The paper is organized as follows. Section 1 provides an overview of financial channels of global crises and factors related with direct investments. Section 2 gives literature review about the effects of the crises on direct investments and the relations between direct investments and other factors. Section 3 is about metedology that we use to analyze the 2008 global economic crises effect on direct investments and relations between direct investments and internal factors. And finally, Section IV gives information about the data and model results.

1. FINANCIAL CHANNELS OF GLOBAL CRISES AND FACTORS RELATED WITH DIRECT INVESTMENTS

Because of the rapid globalization, all countries have become more integrated with the global financial system. Increased financial integration can increase economic growth rates, but may also increase the speed and the number of channels through which financial crises in general. The 2008 global economic crisis is indisputably global in scope, impacting large and small, developed and developing economies. It has spread rapidly through multiple channels, including declines in trade volumes, commodity prices, foreign direct investments, and international credit.

There are two main financial channels through which the recent turmoil, triggered by the mortgage crisis in the USA since mid-2007, has spread to developing countries: (Cali, Massa and Velde, 2008, p:4) *Net private equity flows* and *Net private debt flow.* First one includes foreign direct investment aimed at acquiring a long lasting stake in developing country entities and portfolio equity inflows. Second one includes short, medium, and long-term debt flows.

The damage inflicted through these financial channels is very high in general. Because although the crisis originated in developed countries, all of the developing countries were quickly affected by the ensuing credit crunch significantly. According to the Institute of International Finance 2008 Report, in a sample of 30 developing countries, foreign direct investment flows have faced a decline from $302 billion in 2007 to $288 billion in 2008. The crisis hit some countries harder than other. For example, FDI in India dropped by 40% from 2008 first quarter to second quarter, FDI to China was $6 billion in September 2008, 20% down from the monthly average in 2008, and mining investments in South Africa have been put on hold. Previous downturns in world growth in the range of 2% led to falls in FDI to developing countries of around 25%. Turkey also has experienced a reduction of 40% in FDI which has a significant effect on prospects for economic growth. In our study, the effects of this financial channel during the 2008 global crisis have been analyzed empirically.

When the subject is factors related with direct investments, Gross Domestic Product (GDP), industrial production, exchange rates and trade openness are the factors which have been investigated mostly. *Home market size* is an important determining factor for the inflow direct investments. Most foreign investors consider the size of the market in making a decision to investment. Thus, GDP or industrial production has been taken as a proxy of market size a wide array of studies. *Exchange rate* has been considered from different angles. Changes in exchange rates can both lower the costs of production by multinational corporations and/or affect the competitiveness of the goods produced that yield profit for the foreign firms. An appreciation of the host country's currency would cause foreign

investors to reap greater earnings, while depreciation would allow source country's firms to purchase assets and technology at a lower price in the host country. Thus both the appreciation and depreciation of the host country's currency could increase FDI. For these reasons, no exact relationship between changes in exchange rates and FDI exists. *Inflation rate* is also an internal macroeconomic factor of consideration as it may tell a story about economic stability of a country. Lastly, *trade openness* is believed that the greater the degree of trade openness a country has towards the external market the more such a country would be open to receiving foreign capital. Therefore, it is believed that trade openness is positively correlated with the FDI flow.

2. RELATED LITERATURE

Literature of direct investment subject can be divided into several areas. Two of these areas are the relations of the internal factors with DI and structural shifts of DI during economic crises. While there exists many studies about factors affecting DI or impacts of DI on the nation's economy, there is not much empirical studies of DI focus on structural shifts because of the transformation or financial crises. Especially there has been a very few studies that analyzed this topic empirically. This paper aims to fill this gap in the literature by providing evidence empirically whether a structural change of DI in and out flow Turkey during the 2008 global economic crisis. In addition to examine the 2008 global economic crisis effects on DI, we try to show causality between DI and other variables such as industrial production, exchange rates, inflation rate and consumer confidence index of Turkey. The studies about the effect of the financial crisis or an important economic event on direct investments are below.

Edgington and Hayter (2001) examined the extent to which the Asian crisis of 1997-1998 impacted upon Japanese foreign direct investment (FDI) in the manufacturing sector. The analysis of aggregate investment trends, surveys of corporate strategies, and case studies of individual companies indicated that the impact of the crisis on Japanese FDI has been multi-faceted. Thus, besides an initial increase of FDI into the region in 1997, later results for 1998 indicated a substantial drop in expected flows of inward direct investment to the region, in part due to the deteriorating economic situation in Japan itself. In addition the effects of the Asian crisis certainly varied by host country and by industry. However, the effects of the Asian crises on FDI flow have not been analyzed empirically by the researchers.

Soliman (2005) measured the sensitivity of three measures of U.S. outbound non-bank FDI activity to currency crises in 21 emerging economies. In the study the currency crises effect on FDI flow measured with a dummy variable of the crises in a regression model. The results of this study suggest that contrary to common perception currency crises did not seem to have a negative effect on FDI activity in the crisis economy. Indeed, it was found some evidence that currency crises could increase FDI activity in the affected country.

Boyrie (2009) analyzed whether structural changes exist in the outward foreign direct investment (FDI) data from OECD countries to eight Asian countries during 1997 Asian financial crises. In order to estimate the structural breaks, Bai and Perron's (1998, 2003) model is utilized because it allows for more than one break in the data. Because the time of the 1997–1998 Asian financial crises is of interest, the breaks are associated with this

event. They found that breaks occurred for many countries during the Asian crises. Asian financial crises affected to FDI flows negatively.

For our country, Doğanlar (1998), attempts to determine whether there is a structural changes after 1980 economic program in the Turkish foreign trade by using Perron (1989) method. The results show that Turkish exports and terms of trade followed a different growth path while Turkish imports did not change its growth path after 1980 economic program.

Although there are many studies about crises effect on FDI flows, most of them are not test this effect empirically. Thus, in literature review, we only mentioned about the studies tested crises effect empirically. The studies on the relations of many variables with DI are summarizing below.

Schneider and Frey (1985) developed models explaining the flow of FDI in developing countries. The model which includes economic and political determinants performs best. The higher the real per capita GNP and the lower the balance of payments deficit are the more foreign direct investment is attracted. Among the political determinants the amount of bilateral aid coming from Western countries and multilateral aid and political instability are also important factors that explaining FDI flow.

Klein and Rosengren (1994) examined the determinants of four measures of inward direct investments to the United States from seven industrial countries over the period 1979 to 1991. The results indicated that relative wages have a significant affects U.S. inward DI. But they found no evidence that relative wages have a significant impact on the determination of U.S. FDI.

Grosse and Trevino (1996) explored the factors that contribute to the explanation of FDI in the United States by country of origin of investment. Empirical results showed that the main significant positive influences are home country's exports to the United States and home country market size. Significant negative influences include the home country's imports from the United States, the cultural and geographic distances of the home country from the United States, and the exchange rate.

Although Tuman and Emmert (1999) found GDP insignificant in explaining FDI among Latin American countries, Trevino, Daniels and Arbelaez (2002) found GDP significant in explaining FDI flow among these countries. They analyzed factors affecting FDI flows for Latin American countries between 1988 and 1999. They found that the most significant factors explaining FDI flows were GDP, privatization and inflation rate. Also in 1994 UNCTAD report market size was the primary determinant of FDI flow.

Boyrie (2009) the macroeconomic variables, which were used to determine the factors affecting FDI flow from OECD countries to eight Asian countries, were trade openness, inflation rate, gross domestic product, gross fixed capital formation and exchange rates. Trade openness was estimated as the ratio of the sum of the host country's exports and imports to the host country's GDP. The correlation coefficients between FDI and trade openness, was the most significant explanatory variable in the study.

3. METODOLOGY

Even majority of macro economic time series has been thought have a unit root, they actually are stationary around a one-time structural break because of a crash or an important economic event such as the Great Crash of 1929, Asian Crises or 2008 Global Crisis. Determining such breaks, present in many macro economic and financial time series, give some evidence and information about how much effects such events on those series that is belong to nations' economic area such as their FDI, exports, foreign exchange rate ext. Thus, examining structural breaks in direct investments because of the 2008 global crises, give information about effects of crises on inflow and outflow of direct investments of Turkey.

Once the structural breaks are determined and the time series properties of DI series are established, Granger Causality test is performed in order to establish causalities between DI and internal factors of Turkey. The variables that we investigate their causalities with DI of Turkey are industrial production, real dollar and real euro exchange rates, inflation rate and consumer confidence index.

3.1. Zivot Andrews Structural Break Tests

Testing for a unit root with a structural break was first considered by Perron (1989), where shift points were taken to be exogenous. But in many case it is very difficult to know exact shift time. Thus, Perron's test was subsequently modified for the case of unknown (determined endogenously) breakpoint by Zivot and Andrews (ZA) (1992). In our case, even we know the financial crise year we do not know what the exact date is affecting on inflow and outflow of DI of Turkey. Therefore, we analyzed the structural break of DI flow Turkey by using ZA test.

Zivot and Andrews proceed with three models to test for a unit root: Model A, which permits a one-time change in the level of the series, Model B, which allows for a one-time change in the slope of the trend function, and Model C, which consist of one-time changes in the level and the slope of the trend function of the series. In other words, ZA unit root test for a time series allowing for one structural break in the series, which might appear in the intercept, trend or both. Thus, to test for a unit root against the alternative of a one-time structural break, ZA use the following regression equations corresponding to the above three models.

$$\Delta y_t = \hat{\mu}^A + \hat{\theta}^A DU_t(\hat{\lambda}) + \hat{\beta}^A t + \hat{\alpha}^A y_{t-1} + \sum_{j=1}^{k} c_j^A \Delta y_{t-j} + \hat{e}_t \qquad \text{(1-Model A)}$$

$$\Delta y_t = \hat{\mu}^B + \hat{\beta}^B t + \hat{\gamma}^B DT_t(\hat{\lambda}) + \hat{\alpha}^B y_{t-1} + \sum_{j=1}^{k} c_j^B \Delta y_{t-j} + \hat{e}_t \qquad \text{(2-Model B)}$$

$$\Delta y_t = \hat{\mu}^C + \hat{\theta}^C DU_t(\hat{\lambda}) + \hat{\beta}^C t + \hat{\gamma}^C DT_t(\hat{\lambda}) + \hat{\alpha}^C y_{t-1} + \sum_{j=1}^{k} c_j^C \Delta y_{t-j} + \hat{e}_t \quad \text{(3-Model C)}$$

DUt is a sustained dummy variable capturing a shift in the intercept, and *DTt* is another dummy variable representing a shift in the trend occurring at time *TB*. The alternative hypothesis is that the series, *yt*, is I(0) with one structural break. *TB* is the break date, and *DUt*=1 if *t* > *TB*, and zero otherwise, *t DT* is equal to (*t-TB*) if (t > *TB*) and zero otherwise. The null is rejected if the α coefficient is statistically significant. More specifically, the ZA test asserts that the *TB* is endogenously determined by estimating the above three-equations (A, B and C) sequentially. This is done sequentially in order to allow for *TB* to be in any particular year with the exception of the first and last years. The optimal lag length is determined on the basis of the Schwartz-Bayesian Criterion (SBC) and the most significant *t* ratio, and is known as the general to specific approach. Using the ZA procedure the timing of the structural changes (impacting on both the intercept and the slope of each series) for each of the variables under investigation is detected based on the most significant *t* ratio for $\hat{\alpha}$, that is $t_{\hat{\alpha}}$. Model C is adopted for the purpose of this paper and the results subsequently reported, since this is the most comprehensive of the three models capturing breaks in both the intercept as well as the trend (Harvie, Pahlavani and Saleh, 2006, p:10-11).

3.1.1. Eliminating Structural Changes Effect From Series

According to ZA (1992) taking the first differences of the series with structural breaks to achieve stationarity may lead to spurious results. Thus if there is a structural break in the series, it is more reliable to eliminate this effect instead of taking first differences of the series. We used Altinay ve Karagol (2005) regression method to eliminate structural breaks from the series. This regression method is below:

$$y_t = \alpha + \theta DU_t + \beta t + \gamma DT_t + \tilde{y}_t \quad (4)$$

Where, du_t shows break in intercept, dt_t shows break in trend, t is trend variable and finally $\tilde{y}_t$ is detrended stationary series.

3.2. The Granger Causality Test

Causality in econometrics literature is an important concept. It refers which variable has more ability to predict the other. Suppose two variables, y_t and x_t affect each other with distributed lags. The possible results of the analysis can be a)y_t causes x_y b) x_t causes y_t c) two variables are independent d) there is a bidirectional causality. Granger (1969) developed a test that defined the causality as follows: a variable y_t is said to Granger cause x_t, if x_t can be predicted with greater accuracy by using past values of the y_t variable rather than not using such past values, all other terms remaining unchanged.

Granger Causality (GC) test for the case of two stationary variable y_t and x_t, involves the first step the estimation of the following VAR model:

$$y_t = \alpha_1 + \sum_{i=1}^{n} \beta_i x_{t-i} + \sum_{j=1}^{m} \gamma_i y_{t-j} + e_{1t} \quad (5)$$

$$x_t = \alpha_2 + \sum_{i=1}^{n} \theta_i x_{t-i} + \sum_{j=1}^{m} \delta_i y_{t-j} + e_{2t} \quad (6)$$

Where, it is assumed that both ε_{yt} and ε_{xt} are uncorrelated white-noise error terms. The null and alternative hypotheses as below:

X_t does not cause y_t or $H_0 = \sum_{i=1}^{n} \beta_i = 0$

X_t does cause y_t or $H_1 = \sum_{i=1}^{n} \beta_i \neq 0$

4. DATA AND EMPIRICAL RESULTS

In our empirical analysis, we used monthly data for the period 2005:01-2010:10. Direct Investments (DI) data are obtained from Central Bank of the Republic of Turkey (CBRT). This data is classified by CBRT based on the direction of the investment. Hence, DI divided into DI in Turkey and DI abroad. We used three DI data for our analysis; net value of DI (DINET), which is estimated by deducting DI abroad from DI in Turkey, net direct investments in Turkey (DIIN-this is commonly used as foreign direct investments-FDI) and net direct investments abroad (DIOUT). More clearly, DIIN (or FDI) is inflow of direct investments and DIOUT is outflow of direct investments and lastly DINET is net value of these two series. We have also taken industrial production (IP), reel euro and reel dollar exchange rates, consumer price index (CPI), and finally consumer confidence index (CI) in order to analyze causality between these factors and direct investments. Consumer confidence index and exchange rates are also obtained from CBRT. Whereas, industrial production index and consumer price index are obtained from Turkish Statistical Institute (TurkStat).

Because we used monthly data, we have done seasonal adjustment to the variables that we analyzed in our study. Seasonal fluctuations have been considered as a nuisance that obscures the more important components, i.e., the trend, growth and cyclical components. Consequently, seasonal adjustment procedures have been implemented to eliminate seasonality. In general, the most commonly used seasonal adjustment methods are those of Census X-11 and Census X-12. In our analyses, we used Census X-12 method to do seasonal adjustments. Then we run ADF stationary tests for all the series we used. ADF test results are in Table 1.

TABLE 1: ADF Stationary Test Results

	ADF test statistics Level	ADF test statistics First order
DIIN	-2,90473	-6,834549*
DIOUT	-8,29969*	
DINET	-2,15539	-7,044710*
Euro	-7,72526	-5,242121*
Dolar	-7,40867	-10,69782*
IP	-3,78087	-11,20374*
CPI	-2,53292	-8,65009*
CI	-2,23102	-7,038198

ADF tests have been conducted with constant and trend based on Akaiki Information Criteria
*sign shows that series are stationary at the %1 significance level

Because DIIN and DINET series are first order stationary we could examine structural breaks in these series in order to examine the effects of global crises in 2008. The results of structural break analysis of DI series are in Table 2.

Perron (1989) suggested that most economic time series can be adequately modeled using either Model A or Model C. Hence, the subsequent literature has primarily applied Model A and/or Model C. Sen (2003) shows that if one uses Model A when in fact the break occurs according to Model C then there will be a substantial loss in power. However, if break is characterized according to Model A, but Model C is used then the loss in power is minor, suggesting that Model C is superior to Model A (Waheed, Alam and Ghauri, 2006, s:6).

TABLE 2: Structural Break Dates in DI Variables

Structural Break Dates (Test Statistics)			
Variables	Change in the intercept Model A	Change in the Trend Model B	Change in the intercept and trend Model C
DINET	2006:05 (-7,158832*)	2006:06 (-7,094877*)	2006:05 (-8,103434*)
DIIN (In Turkey)	2006:05 (-6,280473*)	2006:11 (-6,270670*)	2007:04 (-7,186393*)
DIOUT (Abroad)	Direct Investments abroad variable found stationary based on ADF test, hence there is no need to test if it has a structural break,		
%1 Critical Value	-5,43	-4,93	-5,57
%5 Critical Value	-4,80	-4,42	-5,08
%10 Critical Value	-4,58	-4,11	-4,82

14 lags are obtained while carrying out ZA structural break tests. Critical values are from Zivot and Andrews (1992). *Sign shows that there exists a structural break at %1 significance level.

Therefore based on these observation results in Table 2., we choose Model C for our analysis of unit roots. ZA test results show that the estimated breakpoint for DINET series is in May 2006, and for DIIN is in 2007 based on Model C. The first two figures below shows that direction and date of the structural breaks in DINET and DIIN and the last figure shows that there is no break on DIOUT.

FIGURE 1: Structural Break in DINET (Break Date May 2006)

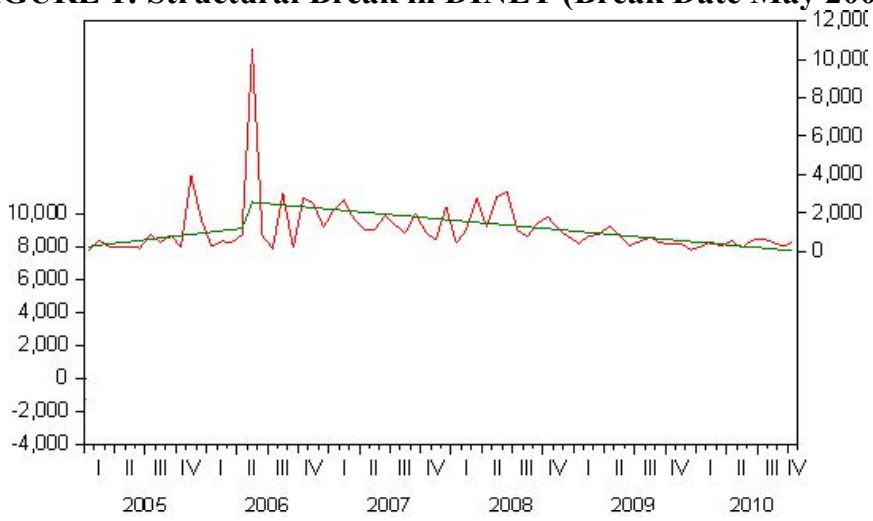


FIGURE 2: Structural Break in DIIN (FDI) (Break Date April 2007)

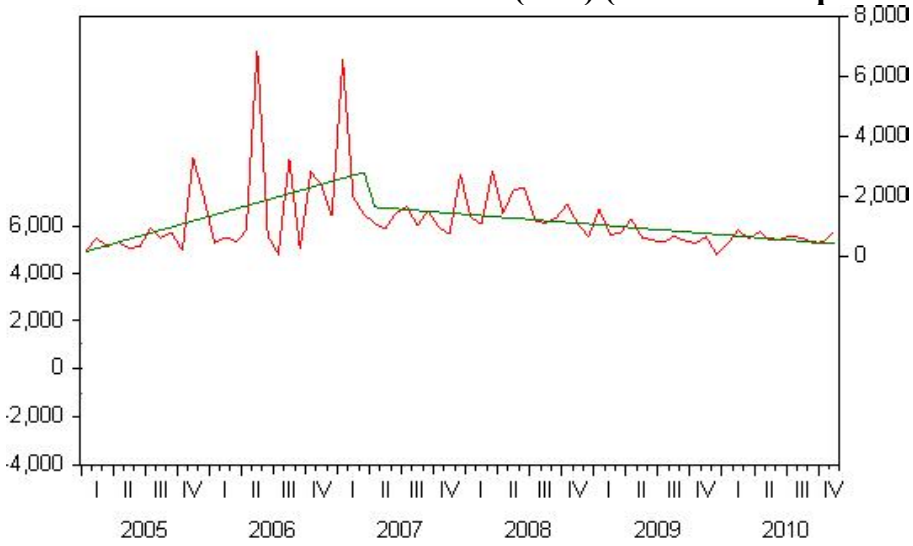
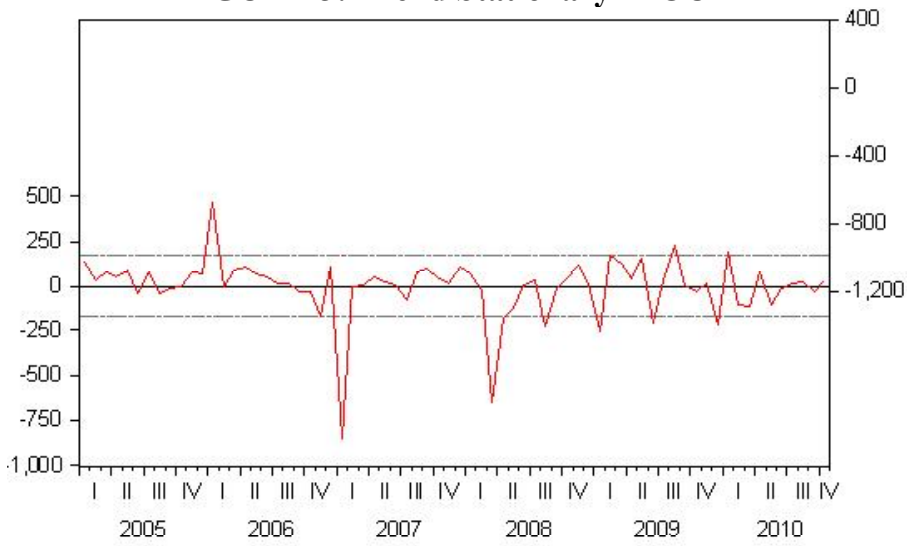


FIGURE 3: Trend Stationary DIOUT



The estimated breakpoint for DINET series is in May 2006, and for DIIN is in 2007. The crises in world financial markets began when prices started declining in the US real estate market in late 2006. So far, it is estimated that banks worldwide have had to writedown more than $550 billion in assets. Huge funds were turning around global financial markets. Thus, direct investments (DINET) might increase as a result of this positive atmosphere at the global liquidity in May 2006 in Turkey. However, then the trend of DINET flow has declined as soon as the signals of the financial crisis to be felt. On the other hand, the estimated breakpoint of DIIN(FDI) coincides with the experience in the middle of 2007 that the global financial crisis really started. Then the trend of DIIN has continued to fall since the effects of crisis to be felt until at the beginning of 2009. Unlike the effects of global financial crisis has been felt in DINET and DIIN, DIOUT has not been affected. It might be because the strong economy of Turkey and there is no mortgage backed securities in the portfolio of Turkish investors. Hence Turkish investors have continued to do direct investments abroad.

Before examine the causality between direct investments and other variables such as industrial production, exchange rates, inflation rate and consumer confidence index, we first realized structural break analysis for these series too. If there exist any break we eliminate this effects from the series before running GC tests. If there is not exit any break, we only take first differences of these series. The series that are found structural breaks are exchange rates, CPI and CI and the results are below.

TABLE 3: Structural Break Dates in Macro Economic Variables

Variables	Change in the intercept and trend
	Model C
Reel Dollar	2008:10 (-7,616737*)
Reel Euro	2006:04 (-8,086217*)
CPI	2009:03 (-4,891173***)
CI	2008:02 (-5,209810**)
%1 Critical Value	-5,57
%5 Critical Value	-5,08
%10 Critical Value	-4,82

*,**,*** Signs show that there exists a structural break at %1, %5, %10 significance level respectively.

The estimated breakpoint for reel dollar series is in October 2008. According to figures of CBRT, selling price of the U.S. dollar is 1,2372 TL on September 26, 2008 and 1,6990 TL on October 27, 2008. Dollar appreciated surprisingly in 2008 global crises. This feature argues that a combination of factors caused US dollar appreciation in the second half of 2008. Both the global flight to safety into US Treasury bills and the reversal of carry trades amidst the crisis were sources of dollar strength. In addition, the surge in dollar funding costs in the interbank and foreign exchange swap markets provided price incentives for corporate to draw on non-dollar funding to pay down existing dollar debt. Finally, dollar asset write-downs left European banks and institutional investors outside the United States with over-hedged dollar books. The squaring of their positions, which required dollar purchases, also boosted the currency.

Significant one break point is found for the reel euro series. This break occurs in the middle of the 2006. After this period reel euro exchange rate is stable. The euro share of global foreign exchange reserves recorded by currency rose from 18% at the start of 1999 to around 25% by the end of 2003, and it has remained steady since then. The euro share of global foreign exchange reserves rose to 30% by 2010. The financial markets for euro and dollar are now comparable in terms of liquidity and variety of instruments. The value of euro started to increase at the end of 2006. Euro dollar parity is discussed and the results of valuable euro are the signal of crisis of 2008.

The estimated breakpoint for CPI series is in March 2009. Turkish economy has seen impacts of the global financial crisis mainly in the first quarter of 2009. According to data of the Turkish Statistical Institute inflation rate, which had seen two digit figures since the second quarter of 2008, has declined to single digit figures since the beginning of 2009 due to impacts of economic recession. Another reason of this structural change in the inflation series is the decline of the crude oil and commodity prices all around the world.

February 2008 is the estimated breakpoint for CI. Turkey's Consumer Confidence Index declined by 6,44 points in March, 2008, compared to the previous month. This decline seemed to confirm consumers' uneasiness over the crisis period economic outlook. The index indicates an optimistic outlook when it is above 100, and a pessimistic one when it is below 100. The index, which was 87,60 in February, and 81,96 in March, according to Turkstat data. The decrease showed that the deterioration in consumers' assessments concerning their purchasing power, the general economic situation and job opportunities in the future because of the global crises.

After determining the structural changes in the series, we have carried out GC tests. But before examining GC tests between direct investment and the other variables, structural change effect have been eliminated from all the series (DIIN, DINET, reel dolar, reel euro, CPI and CI) that is found structural breaks. Then GC test have been realized. As an example, these eliminating results showed for DI series in Figures 4. and 5. Since the DINET has a breakpoint in 2006, and the DIIN has a breakpoint in 2007, stationary series can be obtained by detrending the series taking the estimated breakpoints into account the Altinay ve Karagol (2005) regression method in model (4). The direct investment series before and after eliminating structural change effects can be seen in Figure 4 and 5.

Figure 4: Before and After Eliminating Structural Change Effects in DINET

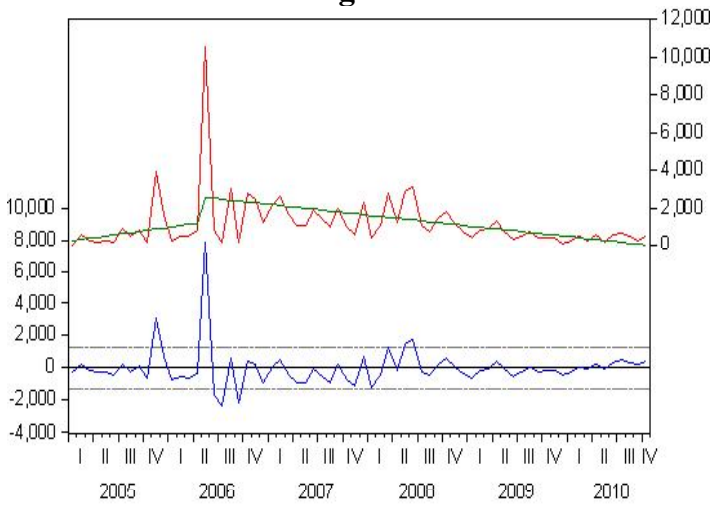
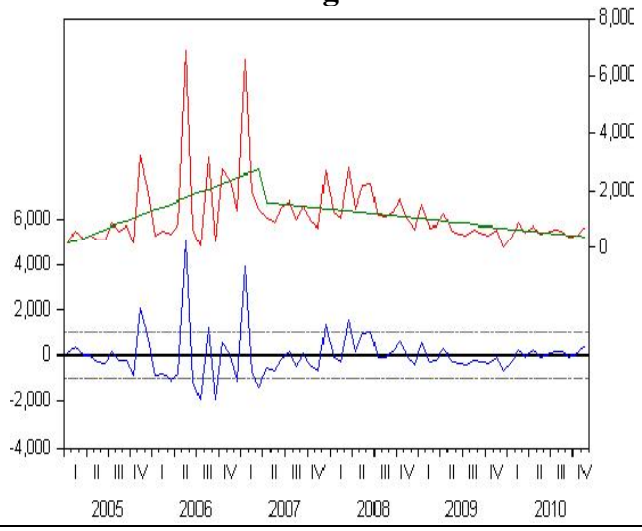


Figure 5: Before and After Eliminating Structural Change Effects in DIIN



After we obtained the stationary series by eliminating structural break effects or taking first differences, we test whether direct investments Granger Cause other macro economic variables or vice versa. Based on the least value of maximum choosing criterion in a VAR model, the optimal lagged order was set for all pair of the series. The results of GC test are shown in Table 4.

The F-statistic used to test causality in equation 2, 4, 12, 24, 28 and 30 is significant for lagged 7,2,2,1,2 and 1 respectively. Note that the GC test results have not been changed for other lags either. This result indicates that DIIN and DINET do granger cause euro and dollar exchange rates. There is only one-way causality between direct investments and exchange rates. Therefore, this implies that there only exists a unidirectional effect which is from direct investments to exchange rates. The funds coming via direct investments to

Turkey could affect the value of national currency. Therefore direct investments might be cause of the exchange rates. Actually, determining the relationship that should exist between exchange rates and direct investments is complicated. Changes in exchange rates could either lower the costs of production by multinational corporations and/or affect the competitiveness of the goods produced that yield profit for the foreign firms. An appreciation of the host country's currency would cause foreign investors to reap greater earnings, while depreciation would allow source country's firms to buy assets and technology at a lower price in the host country. Both the appreciation and depreciation of the host country's currency would increase FDI. Consequently, no clear relationship between changes in exchange rates and FDI exists. Therefore the relation that we found in GC test might be in real world. Edwards (1990) found that the real appreciation of exchange rates cause FDI to surge into the host country while Ang (2008) found negative correlation between exchange rates and FDI for Malaysia.

TABLE 4: Granger Causality Test Results Between Direct Investment Series and Macro Economic Factors of Turkey

Eq.	Null Hypothesis:	Lag	F-Statistic	Probability
1	EURO does not Granger Cause DIIN	7	1.36528	0.2417
2	DIIN does not Granger Cause EURO		3.97443	0.0017
3	DOLAR does not Granger Cause DIIN	2	1.88363	0.1605
4	DIIN does not Granger Cause DOLAR		9.15713	0.0003
5	CPI does not Granger Cause DIIN	4	0.37658	0.8244
6	DIIN does not Granger Cause CPI		1.34801	0.2635
7	CI does not Granger Cause DIIN	2	0.97476	0.3829
8	DIIN does not Granger Cause CI		0.96780	0.3855
9	IP does not Granger Cause DIIN	4	1.07296	0.3786
10	DIIN does not Granger Cause IP		0.70135	0.5943
11	DIOUT does not Granger Cause IP	2	0.10391	0.7482
12	IP does not Granger Cause DIOUT		5.70389	0.0198
13	CI does not Granger Cause DIOUT	1	0.34226	0.5605
14	DIOUT does not Granger Cause CI		1.85907	0.1774
15	CPI does not Granger Cause DIOUT	1	0.02781	0.8681
16	DIOUT does not Granger Cause CPI		0.03060	0.8617
17	DOLAR does not Granger Cause DIOUT	2	0.14854	0.8623
18	DIOUT does not Granger Cause DOLAR		1.85927	0.1642
19	EURO does not Granger Cause DIOUT	2	1.55597	0.2190
20	DIOUT does not Granger Cause EURO		0.36176	0.6979
21	IP does not Granger Cause DINET	4	1.96742	0.1120
22	DINET does not Granger Cause IP		0.76413	0.5531
23	CI does not Granger Cause DINET	1	2.53871	0.1159
24	DINET does not Granger Cause CI		4.56429	0.0364
25	CPI does not Granger Cause DINET	1	1.85071	0.1783
26	DINET does not Granger Cause CPI		0.12424	0.7256
27	DOLAR does not Granger Cause DINET	2	1.59129	0.2117
28	DINET does not Granger Cause DOLAR		9.45375	0.0003
29	EURO does not Granger Cause DINET	1	0.18791	0.6661
30	DINET does not Granger Cause EURO		15.0473	0.0002

In addition, DINET does granger cause CI. Net value of inflow and outflow direct investments of Turkey affects consumer confidence index. This result is on logic, increasing level of direct investments of Turkey leads to increase the confidence of consumers to the economy in the short period.

Finally, IP does granger cause outflow of the direct investments of Turkey. It indicates that increasing industrial production level of Turkey inside leads to decrease direct investments of Turkey outside. However the results of the other equations show that the F-statistics are not sufficient to reject the null hypothesis in all lags tried. Therefore we may say there is one-way causality between, direct investments and exchange rates, industrial production index, confidence index, which is from direct investments (DIIN and DINET) to exchange rates and confidence index, and from industrial production index to direct investments (DIOUT.)

CONCLUSION

In this study we have tried to answer two questions. First one is if the 2008 global economic crisis leads a structural shift in the inflow and outflow of DI of Turkey. Second if there is causality between direct investments and internal macro economic factors of Turkey. To determine the effects of 2008 global economic crisis on DI inflow and outflow, it has been used Zivot Andrews structural break tests. The estimated breakpoint for DINET series is in May 2006, and for DIIN is in 2007. The crises in global financial markets began when prices started declining in the USA real estate market in last quarter of 2006. So far, huge funds were turning around global financial markets. Therefore, DINET increased as a result of this positive atmosphere at the global liquidity in May 2006 in Turkey. However, then the trend of DINET flow has declined as soon as the signals of the financial crisis to be felt. On the other hand, the estimated breakpoint of DIIN (FDI) coincided with the experience in the middle of 2007 that the global economic crisis really started. Then the trend of DIIN has continued to fall since the effects of crisis to be felt until at the beginning of 2009.

There are a lot of studies associated with the FDI and the macroeconomic variable of developing countries. In our study we investigate the relations of inflow and outflow of DI with industrial production, real euro and dollar exchange rates, inflation rate and consumer confidence index of Turkey. GC test results indicates that DIIN and DINET do granger cause euro and dollar exchange rates. There exists a unidirectional effect which is from direct investments to exchange rates. The funds coming via direct investments to Turkey could affect the value of national currency. Therefore direct investments might be cause of the exchange rates. In addition, DINET does granger cause CI. Net value of inflow and outflow direct investments of Turkey affects consumer confidence index. This result indicates that increasing level of direct investments of Turkey leads to increase the confidence of consumers to the economy in the short period. Lastly, IP does granger cause outflow of the direct investments of Turkey. It demonstrates that increasing industrial production level of Turkey inside leads to decrease direct investments of Turkey outside.

For further studies, we recommend that this analysis can be done for the other developing countries such as Asian countries. The period of the study should be extended. The results can be changed from period to period for the same country. The internal factors for the countries can be varied such as growth of economy, trade openness, political risk and government stability etc.

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