FDI and Macroeconomic Stability: The Turkish Case

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Abstract:

This study investigates the relationship between foreign direct investment (FDI) and macroeconomic stability for Turkey. To represent the macroeconomic stability, two main variables are examined. The first of these is inflation rate that represents the economic stability in real sector and the second one is real exchange rate representing the stability in the financial sector. In addition to these variables, the market size, openness to trade and financial development variables are also used as control-transmission variables. Used data are monthly and cover the period from January 2003 to April 2015. Empirical methods used in the study are unit root tests, cointegration analyses, vector error correction model (VECM) and Granger causality test. Obtained empirical results show that fluctuations in inflation and the real exchange rate have a negative and permanent effect on FDI, meaning that instabilities that occurred in real and financial markets negatively affected the inward FDI. Therefore Turkey, which has enough potential to attract FDI, has to provide stability in its macroeconomic indicators to attract a higher volume of FDI.

Key Words: Foreign Direct Investment; Macroeconomic Stability; Turkish Economy.

JEL classification: F21, E20.

1 Introduction

One of the important aspects of globalization is increasing foreign capital flows. Inside of these flows, foreign direct investment provides further advantages to both the home and host country. While it brings capital, technology, know-how and new management skills to the host country, FDI also positively affects the home country's balance of payments through an increase in the inward flow of foreign earnings. From this aspect, flow of the direct foreign capital is a win-win game. Also, in terms of a foreign firm, while it contributes to an increase in the employment level of the host country, it also reduces its production costs thanks to lower labour costs and increases its profits. Here, the critical issue is that since foreign firms prefer less risky and more stable countries, host countries have to

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provide stability in some areas such as real and financial sectors. This contributes to an attraction of larger volumes of FDI.

Since FDI provides important benefits to the host country, developing countries compete with each other to attract more volume of FDI. On the other hand, from the investors' side, country selection is an important decision. When taking this decision, they take into consideration some country specific factors. For example, host country's market size is important because it shows this country's demand structure. Yet another determinant for investors is a low level of wage rates in host countries. Another important determinant for foreign investors is the fiscal burden. Low levels of tax rates attract foreign investors and countries that are aware of this situation provide some tax incentives to attract more FDI (Çinko, 2009: 120-121). Foreign investors also take into consideration the host country's openness to trade, level of integration with the world markets and its contemporary judicial system (Karacan, 1997: 97). In addition to these aspects, the country and political risk are main determinants of FDI (Akay and Karaköy, 2008: 73). Among these aspects, the country's macroeconomic situation has a big importance for investors. Stability in the real and financial sector is one of the most important determinants for a multinational company in its selection of the host country. Also, financial development in the host country is an important determinant for investing in a foreign country. Therefore, this study aims to search for existence of these relations.

This study aims to research the relationship between FDI and macroeconomic stability while Turkey's monthly variables are used, covering the period from 2003: January to 2015: April. It is aimed to see whether instabilities in the real and financial sector effect inward volume of FDI. For this purpose, real exchange rate that represents stability in the financial sector and inflation that represents stability in the real sector are used. Market size, openness to trade and financial development variables are also used as control-transmission variables. Thus, the effects of fluctuations in inflation and real exchange rate on inward FDI are analysed. To analyse this relationship, firstly the unit root test is conducted to see whether the series are stationary or not. Then, cointegration analyses, Granger causality test and vector error correction model (VECM) are conducted.

The remaining part of the study is organized as follows. In the second section, relevant literature is examined. In the third section, a brief history of FDI and macroeconomic stability in Turkey is examined. In the fourth section, econometric model, methodology and used data are reviewed. Lastly, empirical results and the conclusion of the study are presented.

2 A short literature review

There are many theoretical and empirical studies that research the relationship between FDI and macroeconomic stability.

Inside FDI theories, the differential rate of return hypothesis assumes that FDI is the result of the highest return seeking process. Namely, FDI is channelled to countries which are capital scarce rather than capital abundant. This way, firms can achieve the highest rates of return (Agarwal, 1980: 741). Since developed countries are capital abundant and less developed countries are capital scarce and labour abundant, according to this hypothesis the direction of FDI should be from developed countries to the less developed ones. However, when we look at the FDI flows, it is clear that until 2013, FDI to developed countries was higher than the flow to developing countries (UNCTAD, 2013). Because in the real world, an investor thinks not only in terms of the rates of return but assumes also macroeconomic performance and political factors and the location preference can be different from the hypothesis.

In comparison with differential rates of return hypothesis, diversification hypothesis inserts the risk factor into FDI decision. Here while FDI is a negative function of risk, it is a positive function of the rate of return. This hypothesis' theoretical background relies on the Tobin (1958) and Markowitz (1959). Since the country's' macroeconomic performance indicates whether the individual country is a risky one or not, it is an important factor for deciding on the target country selection. In terms of host countries, this means that the less risky is macroeconomic and political environment, the more FDI inflow and vice versa.

In addition to these theories, market size hypothesis assumes that FDI is a function of the host country's GDP (Agarwal, 1980: 746). Therefore, this theory also takes the issue from the macroeconomic side.

There is also a marked increase in studies searching for factors that affect the foreign capital flows to both the developed and developing countries. Some of the studies that correlate FDI and macroeconomic variables are summarized below.

Fedderke and Romm (2006) examined the determinants of FDI in developing countries in 1960–1997. They reached the conclusion that political stability, property rights, market size, openness to trade, labour cost and corporation tax rate are efficient factors to attract FDI. Moreover, they suggested some policies such as reducing political risks, incentive economic growth, keeping wage increases at modest levels and increasing the openness to trade.

Rusike (2007) updated a relatively wide range of a study for South Africa in 1975–2005. He researched the tendency of inward FDI and the factors that affect these investment levels. According to the author, the growth rate, labour costs, market size, openness to trade, financial development, exchange rates and

international interest rates have all effects on FDI. Also in this research are carried out long run and short run diversifications and it is pointed out that financial development, market size, openness to trade and exchange rate determine FDI in the long run.

A relatively close area is also studied by Kiat (2010). The effect of exchange rate flexibility on FDI is examined and examined macroeconomic policies are handled in terms of exchange rate. According to the results of this study, although exchange rate flexibility is one of the main determinants for FDI, developing countries' administrators do not take adequate precautions. Therefore, according to author, during the examined period, there is a recession in the flow of FDI.

It will be useful to mention studies that show the effect of inflation in developing countries on the corresponding inflow of FDI. Before handling these topics on individual bases, the common side of these studies should be emphasized. In these studies, increasing inflation is handled as a factor that decreases the real return of investments and it is viewed as a deterrent factor for investors. Inherently, this situation ends up with a low level of FDI. Narayanamurthy et al (2010), Elijah (2006), Ahmed et al (2005), Onyeiwu ve Sherstha (2004), Nonnemberg and Mendoca (2004), Rogoff and Reinhart (2002) and Fuat and Ekrem (2002) have the same opinions and results. On the other hand, there are other empirical studies that show the ineffectiveness of inflation on FDI. Although Wijeweera and Mounter (2008), Moosa and Cardak (2006), Hisao and Hisao (2006) used inflation in their models as a determinant for FDI, they could not get statistically significant results and concluded that inflation has no effect on FDI. In an economy that adopts inflation targeting monetary policy regime, inflation should be evaluated as a local or pull factor for FDI since inflation should be accepted as an indicator of domestic macroeconomic conditions. There is plenty of empirical evidence that exhibit the benefits of the inflation targeting regime. This regime decreases the political uncertainty and forms clearer, more predictable macroeconomic environment. Thus, investor can infer from the central bank's policy announcements and can plan his/her investment accordingly (Hodge, 2006). Such a macroeconomic environment positively effects the foreign investments. Mishkin and Hebbel (2007) and Waglom (2003) support this opinion theoretically and empirically by their studies.

According to economic policy theory, although inflation targeting regime has macroeconomic benefits, it has some disadvantages as well. In terms of our topic, there is a need to examine the difference between the countries that conduct inflation targeting regime and those that do not. In this topic, one research that is conducted to developing countries showed that there is no statistical discrepancy in main macroeconomic variables including FDI between the countries that conduct this regime and those that do not conduct it (Ball and Sheridan, 2005:

250). Therefore, these authors concluded that inflation targeting regime cannot be a long run policy. In another recent research it is pointed out that conducting this regime in developing countries brings a cost in the form of low level of growth rates (Brito and Bystedt, 2010: 4). According to authors, low and flexible economic growth rates make a disincentive effect on inward FDI since it worsens expectations about efficiency and profitability. Ultimately, a decrease in inward FDI to the developing countries occurs.

As the above mentioned studies show, while inflation is considered in many studies as the determinant factor for FDI, in some studies the results show that inflation does not statistically rank among these factors. Especially in studies that consider developing countries it remains an unresolved issue whether inflation is a determinant factor for FDI or not. Inherently, the solution of this problem should be empirically based. On the other hand, the macroeconomic benefits of inflation targeting regime are not universally accepted. Along these benefits, existence of costs is a reality. Therefore, in this study was researched the question of whether there is a relationship between inflation and FDI in the long run. In Turkey as a country that has adopted the inflation targeting regime, researching this problem and searching for causality connections will allow to offer suggestions to the policymakers.

Although there is a wide range of studies related to developing countries, studies for Turkey are limited.

Batmaz and Tunca (2005) examined the long run relationship between FDI and macroeconomic variables for Turkey. Their results show that while there is a positive relationship among inward FDI and GDP, infrastructure investments and foreign trade ratio; there is a negative relationship among inward FDI and exchange rate, wages and interest rates.

Dumludağ (2007) found that the effect of macroeconomic indicators such as market size, growth rate, GDP per capita on FDI is positive. In addition, institutional variables such as low level of corruption, government stability, enforcement of contract law, functioning of judicial system, transparent, legal and regulatory framework, political and economic stability, intellectual property rights, efficiency of justice and prudential standards have also significant impact on FDI in Turkey.

Another study is done by Alıcı and Ucal (2003). Using VAR methodology they analysed the existence of causality between export, FDI and domestic performance of Turkey. Results do not confirm the existence of FDI-growth nexus, in other words they have not found significant positive spill overs from FDI to output.

Loewendahls (2001) found that Turkey has under-performed in attracting FDI due to the slow pace of privatisation and political-institutional obstacles, of which chronic inflation is a manifestation.

3 FDI and Macroeconomic Stability in Turkey

When we look at the Turkey's FDI past and macroeconomic performance we will see that between 1980 and 2003, Turkey has experienced three economic crises which are April 1994, November 2000 and February 2001. These economic disturbances and also political instabilities have affected the foreign capital entry. Between 1980 and 2003, while total authorized FDI was USD 35 million, realized FDI was USD 18 million. When compared to the rest of the world, Turkey's FDI share attracted only 0.03 % of the worldwide total FDI in 1980. This ratio rose to 0.33% in 1990 but subsequently decreased from mid 1990s and came to 0.07% in 1999 and 2000. Its share in developing countries was 0.21 % in 1980, 0.77 % in 1995 and 0.68 % in 2002.

In 5 June 2003, Foreign Direct Investments Law (No. 4875) was enacted. Its aims are encouraging foreign direct investments, protecting foreign investors' rights, following international standards in the description of investment and investor, transferring allowance and confirming system to the informing system, and regulating policies to increase foreign direct investments (Official Gazette, 2003). With enacting of the FDI law No. 4875, FDI entry and number of companies with foreign capital established has increased. While FDI entry could not surpass USD 1 billion in 1990s, it catches a rising trend especially after 2004. In 2006, Turkey raised to the 17th rank in attracting FDI in the world. Until 2008 global financial crisis, the number of new MNCs increased year by year. Also, the biggest part of these companies was undertaking greenfield investments which create more job possibilities. The increasing amount of FDI also stems from the privatization policies. Figure 1 shows the inward FDI amount between 2003 and 2014 for Turkey.

Fig. 1   Turkey's FDI Amount between 2003-2014 (in USD million)
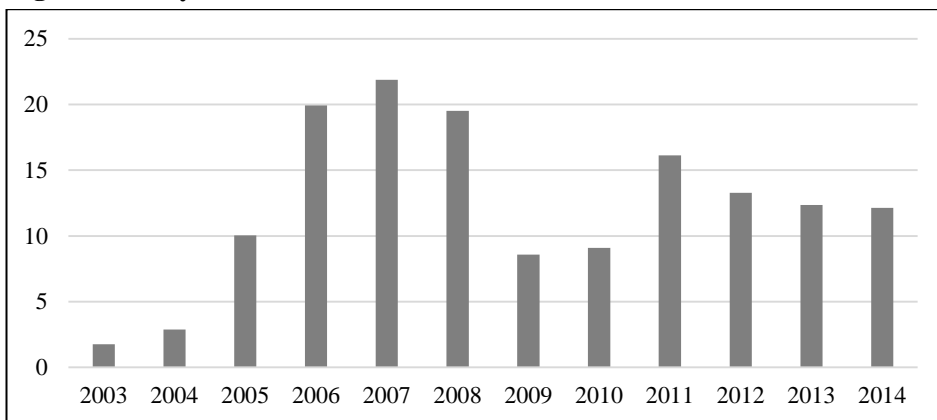
Source: Central Bank of the Republic of Turkey (CBRT).

Also when macroeconomic stability of Turkey in the sample period is examined, it can be seen that Turkey overcame an important economic crisis just before 2002. In November 2000, unfavourable economic environment and political contentions brought the country to a big crisis. In 1 December 2000, overnight repo interest rate increased to 1700 %. Foreign exchange reserves of the Central Bank decreased. On-going problems in the economy, translated into an economic crisis by 2001 and administrators were obligated to take urgent and radical precautions. Then the government presented a new programme "Transition to the Strong Economy Programme (TSEP)" that was supported by IMF. With the TSEP, the rate of growth has increased to 6.2% in 2002 and the average growth rate was 5.3% between 2002 and 2014. Also the per capita income has increased to USD 3.492 in 2002 and reached USD 10.518 in 2014. Recovery in inflation has also occurred and the inflation rates declined to one digit numbers first time in 2004 May. Furthermore, budget deficit decreased thanks to sustained fiscal discipline. After the stabilization program, export has also increased and reached USD 169 billion in 2014. Because of the country's dependent structure, in order to produce more, the country needed to import more. Therefore, import has also increased and reached USD 232 billion in 2014. This gap between export and import has caused an increase in the y-o-y current account deficit and it reached USD 45 billion in 2014.

In 2008, the global financial crisis has started with a collapse of the mortgage market in the US. This crisis affected many countries, both developed and developing, including Turkey. According to TURKSTAT data, following the 2008 crisis, GNP in real terms declined by 4.8%, unemployment rate rose to 13.1%, domestic debt stock increased and export volume declined by 22.6%. Central Bank conducted some regulations against the 2008 global financial crisis. It decreased the borrowing interest rates in terms of both TL and foreign currency. Also, it decreased the reserve requirements ratio in terms of both TL and foreign currency. Thus, it reduced the cost of borrowing and increased the credit demand (Kutlar and Gündoğan, 2013: 276). Following the implemented policies, recovery in the economy occurred and the growth rate reached 9.2% in 2010. In comparison to European and other developing countries, Turkey recovered more quickly. Also, reduced export has increased and reached USD 157 billion by the end of 2014. Unemployment rate, that climbed to 13.1% in 2009, has decreased and stood at 9.9 % in 2014 (TURKSTAT, 2015).

4 Methodology

The purpose of this study is researching the theoretical relationship between FDI and macroeconomic stability for Turkey in the long run. From this perspective, to represent the macroeconomic stability two variables related with FDI are handled. The first of these is inflation rate that represents economic stability in the real

sector and the second one is real exchange rate that represents stability in the financial sector. As in previous studies, in this study is inward FDI to the country handled as the ratio of net FDI to GDP (Moolman et al, 2006; Rusike, 2007; Kiat, 2010). Similarly, inflation rate is represented by the rate of change in the Consumer Price Index and the real exchange rate is represented with CPI-based real effective exchange rate.

On the other hand, some other variables should be included as control-transmission variables, used in the empirical literature. Therefore, from examined empirical studies are selected "market size" and "openness to trade" for Turkey as the main control variables and included in the model. Furthermore, it is thought that as a transmission variable, including the rapid financial growth in Turkey realized following the 2001 crisis is suitable (Rusike, 2007). Here, market size is represented with real GDP and openness to trade is represented with the ratio of foreign trade volume (export + import) to GDP. For the financial development, alternative representative variables can be used.

Since no a priori information about these variables' causality direction is available, a VAR model should be formed to represent the relationship between these variables. In the developed VAR model, the rank of variables is as follow:

- Foreign direct investments;
- Market size;
- Openness to trade;
- Financial development;
- Real Exchange rate;
- Prices.

As can be seen, while the real exchange rate and prices, accepted as the most exogenous variables, are at the bottom end of ranking; FDI that is the most endogenous variable and at the top of the rank. This ranking is named as Cholesky decomposition and it should be used in the VAR model's prediction and other tests' process. Accordingly, the formed VAR model can be written as:

$$x = VAR (FDI, Y, OPEN, FDEV, RFX, P). \qquad (1)$$

In this notation; FDI represents net inward foreign direct investments to Turkey, Y represents real GDP, OPEN represents openness to trade, FDEV represents financial development, RFX represents real exchange rate and finally P represents consumer price index.

Within the next stage of this study, variables expressed with capital letters mean level series; variables expressed with lower case letters mean logarithmic level series. Inherently, variables included into the model as ratios are level series (like openness to trade ratio).

Within estimation of the model, short run responses can also be obtained against the economic stability shocks. Indexes that are based on different base years are reduced to one base year with respect to the rate of exchange. To do this, back extension of the series' method is used and the base year difference is abolished.

From these variables, real and nominal GDP variables are not observable on monthly basis. Monthly data, regarding to these time series, are handled under the label of quarterly data, by using the quadratic function. When evaluating results of the model, this data derivation method should definitely be taken into account.

Since the data used are monthly data, seasonal component should be searched. With adoption of the most widely used Tramo-Seats method, time series that include seasonal component are observed and deseasonalized. These series are P, Y, FDEV and RFX. These converted time series' natural logarithm is taken, except for FDI. In turn, obtained time series are used in the estimation of the above model.

According to the cointegration analysis that searches whether the nonstationary time series in level moves together in the long run or not; if nonstationary series are cointegrated, taking the difference of these variables is not a proper method in terms of statistical properties. Since the variables have a trend that provides co-movement, taking the difference of them abolishes this joint trend. Correspondingly, in the analyses that is done in the cointegrated series' level, (series that move together in the long run) spurious regression is beside the point. Engel-Granger two step cointegration test that is asserted by Engel–Granger (1987) and other cointegration tests improved by Johansen–Juselius (1990) require stationary series in the case of taking the differences (at the same level) of nonstationary time series. Although Engel–Granger method is easily conductible, if there are more than two variables, it does not give robust results since cointegrated relationship increases with the increasing variable number. Notably, in the case of undertaking normalizing in different numbers, results can change. Therefore, Johansen–Juselius method seems as more consistent and more predictable method.

Johansen–Juselius (1990) assert two different statistical tests to find the cointegrated vector number. These tests are the Trace test and the Eigenvalue test. The results that are obtained from these tests are compared with the table critical values that are suggested by Johansen–Juselius. Critical values of Johansen test has three parts that depend on how the linear trend and seasonal dummy variable added to the predicted model. In the first one, constant term is added to model without any constraint. In the second one, again constant term is added to the model but it is constrained as for cointegrated vectors. In the third one, constant term is not added to the model.

According to Granger (1988), if there is a cointegrated vector between variables, there should be at least one-way causality between these variables. In this case, doing the causality analyses with vector error correction model (VECM) is more suitable. This model is used to make discrimination between long-run equilibrium and short run dynamics that are among variables. The advantage of this model is that it can use the data's short run and long run information without forming a spurious relations between dependent and independent variables. Error correction model can be shown as:

$$\Delta X_t = \alpha + \sum_{i=1}^m \beta_i \, \Delta X_{t-i} + \sum_{i=1}^m \gamma_i \, \Delta Y_{t-i} + \sum_{i=1}^m \omega_i \, \Delta Z_{t-i} + \sum_{i=1}^m \eta_i \, \Delta W_{t-i} + \sum_{i=1}^m \zeta_i \, \Delta Q_{t-i} + \sum_{i=1}^m \vartheta_i \, \Delta P_{t-i} + \lambda \, EC_{t-1} + \varepsilon_t. \tag{2}$$

Here X represents the FDI variable, Y represents real GDP, Z represents openness to trade, W represents financial development, Q represents the real exchange rate, P represents the consumer price index and λ parameter is the error correction parameter that compels the variables to converge to the equilibrium level in the long run. If this parameter is statistically significant, there is a deviation from the equilibrium. The speed of adjustment is determined according to the parameter's size. In the long run, to converge to the equilibrium level, this parameter should be negative and significant. Although error correction parameter is negative, if it is not statistically significant, significance of dynamics between the variables cannot be sufficiently represented. If the coefficient is positive, in case of a deviation from the long run equilibrium level, reaching the equilibrium again will not be possible. Here, EC_{t-1} express the lagged one period value of the error correction term that is obtained from the cointegration equation. $\beta_i, \gamma_i, \omega_i, \eta_i, \zeta_i$ and ϑ_i parameters are short run parameters that show the effect on the dependent variable. If F statistics that expresses the overall significance of the model or t statistics of the error correction coefficient are significant, this indicates causality.

The first stage to conduct the VAR or VECM model is testing the cointegration. Cointegration test starts with the determining characteristics of time series. Therefore, firstly the used time series' unit root properties should be examined and then estimated results of the model should be presented behind the cointegration analyses.

To obtain the significant relationships between variables used in the econometric models, series should be stationary. Stationary means a constant mean, constant variance and dependency of the covariance not on the examined time, but on the difference between the two time values. Series that have a trend or a seasonal fluctuation are not stationary. Dickey-Fuller (ADF) test that is improved by Dickey and Fuller is the mostly used method to test the stationarity of series. In this study, models with constant and trend and with constant-without trend are handled. Also, since the ADF test is sensitive to the trend, existence of unit root is confirmed by a second test. According to this second test named as Phillips-Peron,

to control the high degree correlation in the time series, a non- parametric method should be used. In the literature, PP unit root test is seen as a complementary test to ADF rather than an alternative test. It is expressed that PP test is more effective to catch the structural breaks. In PP test there is an adaptation estimator rather than determining the Newey West optimal lag length. Therefore, in the PP test, the lagged value of the dependent variable to eliminate autocorrelation is not added. Instead, the coefficient is adjusted so the below mentioned equation is used in the PP test and with using the same hypothesis tests, existence of unit root is tested.

The existence of cointegrated vector or vectors requires at least one direction causality between the related variables. One of the most common tests to search this causality is Granger causality test. Conducting this test requires to estimate below equations that includes two variables X and Y between which a theoretical causality connection can be realized.

$$Y_t = \alpha_0 + \sum_{i=1}^{n} \beta_i X_{t-i} + \sum_{i=1}^{n} \alpha_i Y_{t-i} + \varepsilon_t,$$
$$X_t = \beta_0 + \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{i=1}^{n} \beta_i X_{t-i} + \varepsilon_t. \tag{3}$$

To test the causality relationship from X variable to Y variable, the below stated hypothesis are tested:

$H_0 = \sum \beta_i = 0$ (there is no causality from X to Y);
$H_1 = \sum \beta_i \neq 0$ (there is causality from X to Y).

In the H_0 hypothesis; hypothesis that X does not cause Y is tested. In this case, rejecting H_0 means acceptance of the alternative hypothesis which states that there is causality from X variable to Y variable. On the other hand, acceptance of H_0 hypothesis means there is no causality relationship between the two variables. The same test is conducted for Y to X causality relationship. This way, existence and direction of causality relationship are determined between variables. As seen, if there is a causality relation, this relation can be one-directional (from X to Y or from Y to X), or two-directional (from X to Y and from Y to X).

4.1. Data and statistical properties

To reach the above mentioned variables' data, Central Bank of the Republic of Turkey's electronic data distribution system is used as the data base. Figure 2 shows time series plots of variables.

Fig. 2 Time series plots of variables
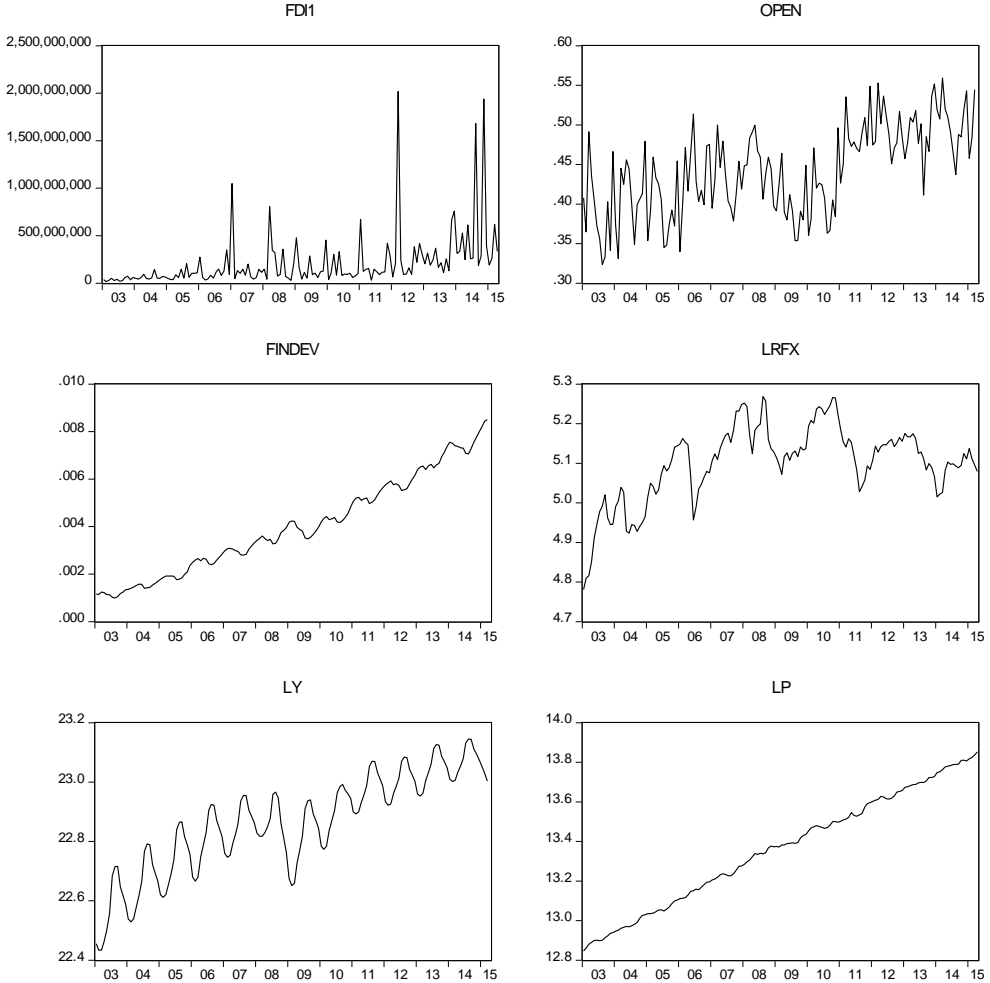
Source: Authorial computation.

Estimation term is between 2003: January and 2015: April. Monthly based data are used. Therefore, there are 147 observations. Firstly, stationarity of series are tested.

The results of conducted ADF and PP unit root tests are presented in Table 1. Both conducted tests prove that time series in the model are not stationary in their logarithmic level except for the CPI (p). As mentioned before, the price index is included to model as a logarithmic level.

Tab. 1 Results of the Unit Root Tests

| Variable | Lag | ADF | | Band | PP Test | |
		Test Statistic	Marginal Significance		Test Statistic	Marginal Significance
fdi	1	1.561*	0.805	9	1.383*	0.863
Δ(fdi)	0	3.075	0.030	13	2.732	0.071
y	3	1.145	0.697	10	0.297	0.922
Δ(y)	2	2.262	0.023	9	9.448	0.001
open	0	0.931	0.776	3	0.923	0.779
Δ(open)	0	13.336	0.001	3	13.340	0.001
fdev	0	1.880	0.341	25	1.421	0.571
Δ(fdev)	2	10.753	0.001	46	25.295	0.001
rfx	0	1.750	0.404	3	1.750	0.404
Δ(rfx)	3	6.763	0.001	2	12.831	0.001
p	6	2.166	0.220	8	9.686	0.001
Δ(p)	1	15.423	0.001	28	73.666	0.001

Source: Authorial computation.

Note: * indicates trend inclusion.

According to Table 1, all time series that are not stationary in their level become stationary in their first differences. Both ADF and PP tests verified these situations. Special exception of this case is CPI (p) variable that was added to represent the price level. While ADF test shows that this time series is not stationary at level but it becomes stationary in its first difference, PP test requires reaching stationarity in its level, since the PP test includes only the first degree of lagged dependent variable to the model. When time series graph of related variables is examined, it will be clear that after the January 2001 crisis, a sharp decrease in inflation rate occurred. Because of this, the general level of prices deviates from its general trend. When the estimation year is shifted one year as 2004: January – 2015: April, probability ratio of the PP test becomes 0.35 which requires to reject H_0 hypotheses. Namely, it says related time series is not stationary. Therefore, this variable will be accepted as nonstationary in level, it provides stationary in case of taking the first difference. Accordingly, while all time series that represent the variables in the model are not stationary in level, they become stationary in their first differences. This shows that related time series are I(0) in level and I(1) in their first differences. With more technique's expressions, all time series in the model are first degree integrated.

Then, the existence of cointegration is tested with using trace test and maximum eigenvalue test. While there is one cointegrated vector between the time series that

are not stationary in level, for the Trace test, there are two cointegrated vectors for the maximum eigenvalue test. Since the existence of a cointegrated vector or vectors requires at least one direction causality between the related variables, Granger causality test is conducted. To determine the lag length, Schwartz Information Criteria is used. Obtained causality test results are given in Table 2.

Tab. 2 Granger Causality Test – F Values Matrix

	fdi	y	open	fdev	rfx	p
fdi	--	0.996	5.923	3.242	0.728	6.029
		(0.422)	(0.000)	(0.008)	(0.603)	(0.000)
y	1.853	--	1.239	1.493	1.272	2.574
	(0.105)		(0.239)	(0.195)	(0.278)	(0.029)
open	2.678	3.642	--	5.374	0.503	7.490
	(0.024)	(0.004)		(0.000)	(0.774)	(0.000)
fdev	6.504	0.734	1.687	--	0.680	2.508
	(0.000)	(0.598)	(0.140)		(0.639)	(0.032)
rfx	4.802	1.935	5.887	1.845	--	2.427
	(0.000)	(0.091)	(0.000)	(0.107)		(0.038)
p	6.488	1.062	4.804	3.044	0.877	--
	(0.000)	(0.384)	(0.000)	(0.011)	(0.480)	

Source: Authorial computation.

Note: In all squares, values that are below related F values in the parenthesis means the probability ratio.

In reading of the causality tests, zero hypotheses that states variable in the column do not cause the variable in the tested row. Results show that in all the variables there is at least one direction causality at 10% significance level. These results support the decision that VECM model should be used. Therefore, in the below part, results of the VECM model is presented.

5 Empirical Results

Since VAR or VECM models produce wide range of results, it is difficult to interpret them with estimated coefficients. Therefore, to interpret the VAR model's results, generally impulse-response functions that are the graphical presentations of variables' responses to the shocks are used. According to cointegration analyses results that tested the above part, there is at least one and at most two cointegrated vectors. Therefore, VECM model is estimated separately regarding to these two criteria. Since there is not a big difference between the results, with the idea that the model that have less cointegrated vector represents the equilibrium system better, the model that have one cointegrated vector is

preferred in this study. In estimation of the VECM model, to determine the lag length, Shwartz Information Criteria is used to provide completeness with previous tests. When monthly data are considered, lag length is determined as 12 months. In light of these explanations, summarized equilibrium related with estimated VECM model can be seen below;

$$fdi = 6.679 + 0.216(y) + 0.300(open) + 2.503(fdev) - 0.098(rfx) - 0.206(p) + 0.002(tr)$$

$$(0.025) \quad (0.059) \qquad\quad (0.343) \qquad (0.028) \qquad (0.107) \qquad (0.001)$$

$$[8.510] \quad [5.090] \qquad\quad [7.297] \qquad [3.572] \qquad [1.923] \qquad [1.998]$$

Under the estimated equilibrium coefficients, there are values between parenthesis showing standard error values and values between square brackets showing the t-statistics. As it is seen, all of the estimated coefficients are statistically significant in the 1% significance level. In the interpretation of coefficients, elasticity interpretation is not possible in comparison with traditional regression equations since cointegrated vectors show the equilibrium path that shows the long-run relations rather than short-run relations. Therefore, instead of interpreting the equilibriums that are predicted with VAR or VECM method, it will be more suitable interpreting the impulse-response and variance decomposition functions. Figure 3 shows the impulse-response function for a shock in inflation and Figure 4 shows the impulse response function for a shock in real exchange rate.

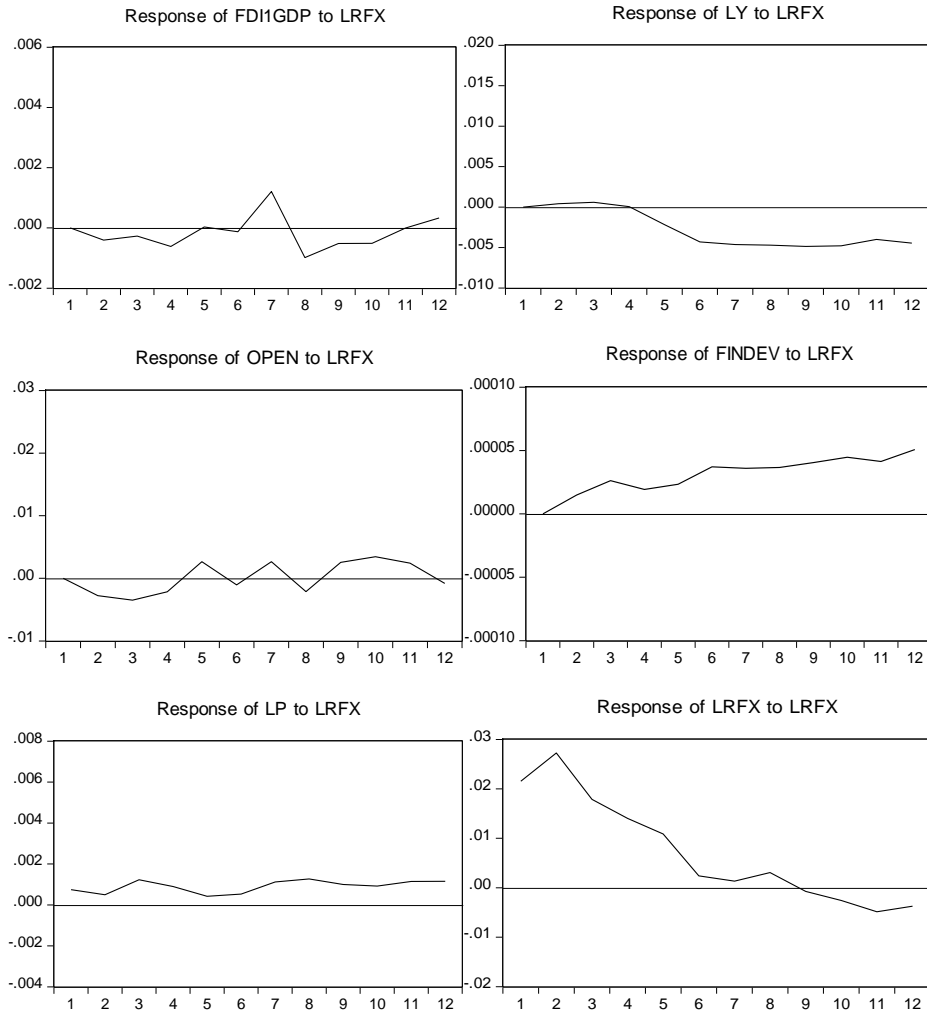**Fig. 3 Responses of Other Variables to the Inflation Shock**
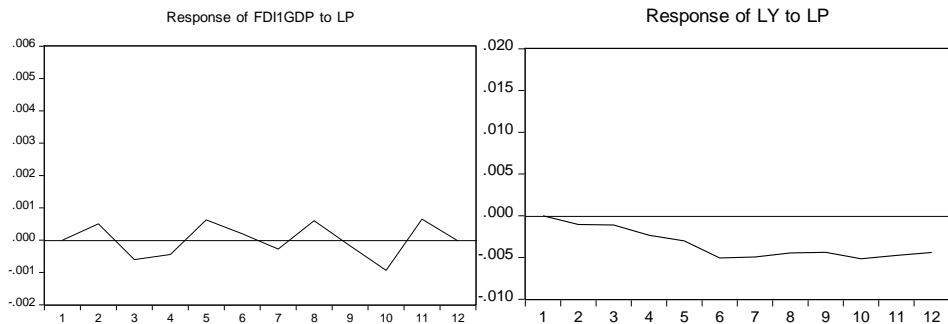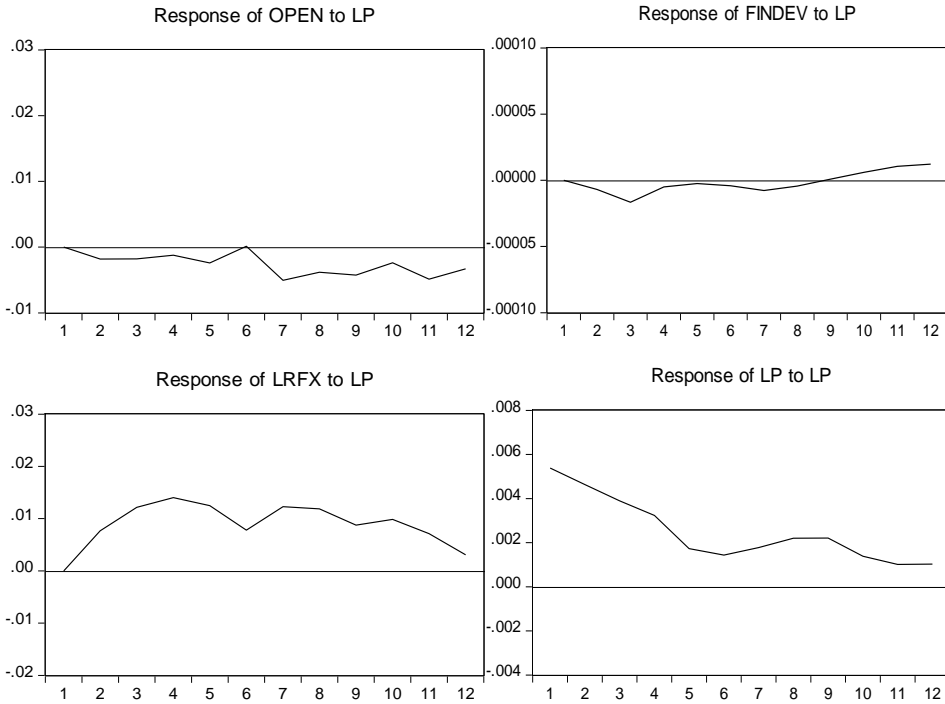
Source: Authorial computation.

Effects of a positive shock that occurred in CPI on the other variables show that economic instability has negative effects on FDI in Turkey. According to the result of impulse-response functions, a positive inflation shock has a negative effect on FDI. Inflation shock cause instability in net inward FDI and stationary in the series failed. Also, the most remarkable point of the analyses is that this instability progressively deepens so it is permanent. This case is same with the mentioned theoretical expectations. Therefore, according to the results which were obtained from the Turkish case, fluctuations in inflation rate which represents the economic stability in the model causes a negative and permanent effect on FDI.

Fig. 4   Responses of Other Variables to the Real Exchange Rate Shock

Source: Authorial computation.

Effects of a positive shock that occurred in the real exchange rate (that represents the stability in financial markets) to the other variables give certain results: FDI that comes to Turkey is affected negatively from financial instability. Fluctuations in the domestic currency value against the foreign currency value causes a certain recession in inward FDI and this negative effect is permanent. This result that is parallel to other studies based on the interest rate proves that a country which wants to attract more FDI has to provide financial stability. According to impulse-

response functions, economic stability is an effective factor with respect to FDI. Instabilities that are observed in real and financial markets affect the inward FDI negatively. Decreasing the fluctuations in inflation and providing the stability in financial variables will have positive effect on FDI amount.

Tab. 3 Variance Decomposition of FDI/GDP

Period	S.E	FDI/GDP	LY	OPEN	FINDEV	LRFX	LP
1	0.004033	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.004281	94.78804	0.935758	1.287098	0.687858	0.897850	1.403401
3	0.004479	91.95269	1.329945	1.637252	0.803699	1.192351	3.084061
4	0.004653	85.25531	1.241873	2.734115	4.154562	2.851378	3.762766
5	0.004716	83.18918	1.394610	2.661299	4.538205	2.780247	5.436462
6	0.004825	83.21541	1.568322	2.765415	4.362256	2.723253	5.365348
7	0.005079	76.82654	1.654168	4.245083	3.998633	8.143306	5.132273
8	0.005380	70.63924	1.569597	7.061597	4.286038	10.62019	5.823332
9	0.005732	64.81529	2.881089	6.436571	10.47224	10.17117	5.223637
10	0.005867	62.09503	2.773096	7.100574	10.02368	10.47862	7.529002
11	0.005931	61.20697	2.748592	6.947355	10.26923	10.25233	8.575521
12	0.005951	60.79559	2.877415	6.904219	10.41084	10.49363	8.518308

Source: Authorial computation.

Also, according to variance decomposition functions in Table 3, the main two sources of variance in FDI are the real exchange rate with about 10.49% and inflation with about 8.52% in the 12th month. Financial development with 10%, openness to trade with 7% and market size with 3% follow these two variables. When inflation rate and real exchange rate are handled together, they explain the FDI variance's 20%. This case supports the results of impulse-response functions.

6 Conclusion

FDI that provides significant benefits to the host country is an important resource especially for developing countries which have a low level of savings. Since these countries' saving rates are low, their investment amount is also low. Therefore, they want to meet their capital needs with foreign capital. However, the question is how they can attract FDI and what pushes MNCs to invest in a foreign country? To attract more volume of FDI, its determinants should be known.

In the literature, market perfection theories claim that the reason of foreign direct capital flows are firms' profit-seeking behaviour and the risk factor. Imperfect market theories asserted the later. Hymer (1976) based FDI on the difference of production costs, especially labour cost in target countries. Buckley and Casson

(1976) also pointed at cost differences as a reason of foreign direct capital flows. Vernon (1966) asserts that market size, cost of production and openness of market are important determinants of FDI. Dunning (1988) claimed that a firm has to have some advantages to invest in a foreign country, namely ownership advantages, location advantages and internationalization advantages. Dunning's concludes this "eclectic approach" in that market size, inflation level, public incentives and possibilities to access resources are the main determinants of FDI. In related studies completed following these approaches, determinants that are being pointed out include the host country's market size, input costs, and openness to trade, quality of infrastructure, growth rate, inflation rates, public incentives, and macroeconomic and political stability.

In Turkey, the first important regulation related to FDI was enacted in 1954. However, from 1954 to 1980, there was not a significant FDI inflow to the country. Although following the 1980 liberalization decisions some increase in inward FDI took place, amounts were very low compared to other developing countries. While Turkey's FDI was less than USD 1 billion during 1990–2001, it exceeded USD 21 billion in 2007 and the last data show that it has decreased again to USD 12.1 billion in 2014. As this study indicates in the positive relationship between FDI and macroeconomic stability, the reason of the increase in inward FDI after the 2001 crises depends on the country's strong macroeconomic performance. The provided political stability also plays a crucial role in this increasing.

In this study, the long run relationship between FDI and macroeconomic stability is examined for the monthly period from 2003: January to 2015: April for Turkey. Obtained results show that there is a negative relationship between FDI and macroeconomic instability. Fluctuations in inflation and real exchange rate negatively and permanently affect the inward FDI.

Here, a remarkable issue is that although the FDI amount has increased since 2001, the rank of the country in the world is not at its desired place. As pointed out, Turkey as a country which has a sustainable growth, large domestic market, dynamic private sector, liberal and secure investment environment, good location close to Europe and growing MENA market and connectivity with neighbour countries in terms of religion, language, and culture, has to attract more volume of FDI. Within international studies, as troubled issues for Turkey are notably seen the introduction of business and construction permits. Therefore, providing recoveries in these domains can contribute to an increase in inward FDI flows. Also, minimizing fluctuations in the price level and the real exchange rate that

forms a better macroeconomic environment will be effective to increase the inward FDI volume.

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