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RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN TURKEY AFTER THE GLOBAL FINANCIAL CRISIS

Abstract:

With the globalization process, economic, commercial and technological boundaries have become uncertain and in this way capital transfer has been possible between different countries. Capital transfers which is realized through short term portfolio investment and foreign direct investment are very important for the countries. In this study on existence of a potential relationship between economic growth (GDP) and foreign direct investment (FDI) was examined for the period of 2008-2015 quarterly for Turkish economy after the global financial crisis. The mentioned relationship was investigated using stationary, test, Johansen-Juselius co-integration test, Granger causality test and variance decomposition. As a result, Granger causality test, variance decomposition showed that there exist a uni-directional causality relation running from GDP to FDI.

Keywords:

Foreign Direct Investment, Economic Growth, Turkish Economy, Co-Integration Test

JEL Classification: A10, C01, E00

1. Introduction

Together with the phenomenon globalization beginning in 1980s, a period, when capital movements also become liberalized, was entered. Beginning from the early 1980s, that in the world, liberal economic policies begin to rise and that international production gradually increases have enabled foreign direct investments to enter the tendency of increase.

Many developing countries trying to increase their economic growth, adopting outward-oriented industrialization policy, support foreign direct investments to enter the country. It is accepted that foreign direct investments, especially in the developing countries, increasing the use of resource, infrastructure investments, and technological investments, foster economic growth. In this direction, in the economic theory, it is accepted that there is a positive relationship between foreign direct investments and economic growth (Ekinci,2011:72). The effect of foreign direct investments on economic growth can be discussed under four titles as “Contribution to the National Income of Host Country”, “Contribution of Export and Foreign Trade Volume of Host Country”, “Management Knowledge to Host Country, Know-How, Contribution to Branding and Technology Transfer, and Contribution to Positive Externalities” (Ayaydın,2010).

Turkey in parallel with the development trend in the world, in 1980, with the decisions of January 24, initiated economic liberalization process and, in 1989, made liberal capital movements. Beginning from 1990s, although an intensive capital flow is realized to Turkey, a large part of this capital is in the form of short term capital movements based on speculative aimed high real interest and fixed exchange rate. (Dilek, 2016:147).

From 1990 to 2001, the amount of foreign direct investment entering country is at considerably slight level. It entered increase trend beginning from 2001, and reached . US \$ 22 billion, the highest level of its history, in 2007, Until 2008, direct foreign investments in Turkey actualized in the form of privatization, merging, and acquirement. Beginning from 2008, from the global direct investments that decrease due to economic crisis impacting all the world, Turkey was also affected. Foreign direct investments entering the country followed a rather unstable course after global financial crisis. The amount of foreign direct investment seeing the lowest level in 2009, also in 2010, decreased in the significant amount. In the next years, as a result of monetary policies applied by US, it recovered and increased. While international direct investments passing to increase again beginning from 2010 reached a high value with US S 16.2 billion, in 2012, 2013, and 2014, they ranged under this figure at the levels close to each other. In 2015, the amount of foreign direct investment actualized as US \$ 11.4 billion (Ekonomi Bakanlığı, 2015:9). GDP entered a growth period, which is first speed and later slow trended, after global financial crisis. After global financial crisis, in the period of 2009-2015, in our country, input of US \$ of 83.5

billion was experienced, our annual growth rate in the same period was 3.6% (TCMB, Elektronik Veri Dağıtım Sistemi).

In this study, the relationship between direct foreign investments and economic growth is discussed in the context of Turkish economy. What differentiates this study from the other studies is dealt with the period after global financial crisis. The study consists of three sections as literature review, methodology, and empirical findings.

2. Empirical Literature

In the literature, there are the studies examining the effect of foreign direct investments on economic growth by means of the different economic methods. In most of the studies carried out, it was concluded that direct foreign investments had positive effects on economic growth. In some studies, a negative relationship was found in both variables.

Table 1: Literature Review

Author(s)	Sample	Method	Findings
Lensink and Morrissey (2001)	1975-1998, Developing countries	Panel data analysis	FDI has a positive effect on growth whereas volatility of FDI has a negative impact. The evidence for a positive effect of FDI is not sensitive to which other explanatory variables are included. In particular, it is not conditional on the level of human capital
Aslanoğlu (2002)	1975-1995, Turkey	Granger Causality	According to the results of Granger Causality Test, between direct foreign investments and economic growth, any causality relationship was not met.
Basu et. al (2003)	23 developing countries	Panel data analysis	A long run co-integrating relationship is found between FDI and GDP. The cointegrating vectors reveal a bidirectional causality between GDP and FDI for more open countries. For relatively closed economies long run causality appears unidirectionally and runs from GDP to FDI.
Alici ve Ucal (2003)	1987-2002 Turkey	Granger causality	The results indicate that the integration of the Turkish economy with the world economy should be enhanced with policies to attract more FDI in order to gain the spill over effects of FDI to output and FDI-led export growth
Chowdhury and Mavrotas (2005)	1969-2000 Chile, Malaysia and Thailand	Toda-Yamamoto test	Empirical findings clearly suggest that it is GDP that causes FDI in the case of Chile and not vice versa, while for both Malaysia and Thailand, there is a strong evidence of a bi-directional causality between the two variables.
Afşar (2007)	1992-2006 Turkey	Granger causality	there is a one-way relationship between Foreign Direct Investment and Economic Growth and the direction of this relationship is from Foreign Direct Investment to Economic Growth.
Alfaro and Charlton (2007)	1985-2000 29 country	Panel data analysis	they find that the growth effects of FDI increase when accounting for the quality of FDI.
Alagöz et. Al (2008)	1992-2007 Turkey	Granger causality	According to models, elasticity coefficient, foreign direct investment effects on economic growth is found medium intensity.

Vu and Noy (2009)	6 OECD countries	Cross-country regressions	FDI has positive, or no statistically discernible, effect on economic growth directly and through its interaction with labor. Moreover, the effects seem to be very different across countries and economic sectors.
Ağavey (2010)	25 transition economies	Panel data analysis	According to panel co-integration analysis, the variables of foreign direct capital investments and economic growth move together in the long period and have an common orientation. The results of panel causality tests, in which short term relationship was examined, show that there was a strong causality relationship from direct foreign capital investments to economic growth, while in the opposite direction, there was a weaker causality relationship. These results, in transition economies, show that there was a double directional causality relationship between direct foreign capital investments and economic growth.
Azman-Saini et. Al (2010)	1975-1995 85 country	Panel data analysis	FDI by itself has no direct (positive) effect on output growth. Instead, the effect of FDI is contingent on the level of economic freedom in the host countries. This means the countries promote greater freedom of economic activities gain significantly from the presence of multinational corporations (MNCs).
Erçakar and Yılmaz (2010)	1985-2005 19 developing countries	Panel data analysis	In this study where panel data analysis and unit root tests are applied, it is fixed that FDI flows where they take place affect on the GDPs of the countries.
Şen and Saray (2010)	Turkey	Panel data analysis	According to the results of panel data analysis, in Turkey, direct foreign capital investments make positive contribution to economic growth. This effect on Turkey is more than that of the countries such as Argentina, Brazil, Poland, etc. compared.
Ayaydın (2010)	1970-2007 Turkey	VAR Analysis	By means of VAR causality analysis and variance study, it was identified that there was one directional causality relationship from direct foreign investments to gross national product. In addition, in Turkey, a positive relationship was found between foreign direct investments and gross national product.
Kogid et. Al (2011)	1971-2009 Malaysia	Johansen and VECM	the existence of a long-run cointegration relationship between the FDI and the RGDP. In addition, a causal effect exists running from the FDI to the RGDP implying that FDI does influence economic growth.
Ekinci (2011)	1980-2010 Turkey	Johansen Co-integration and Granger causality	eventhough a long term relation between foreign direct investment and economic growth is found, there is no relation between foreign direct investment and employment. On the other hand, there is a two-way causality between foreign direct investment and economic growth.
Koyuncu (2011)	1990-2010 Turkey	Co-integration and Granger Causality	Granger causality test, in the period studied, showed that there was a mutual interaction between variables. According to the action-reaction analysis carried out, an increase that will occur in FDIs made an effect in the direction increasing growth. The findings regarding action-reaction functions support

			the results of Granger causality test.
Acar (2016)	2001-2015 Turkey	Granger Causality	foreign investment according to the result of the study and could not find a causal relationship between economic growth.

3. Data and Methodology

In our study, utilizing the data of quarter period belonging to the period of 2008-2015, in Turkey, post –global crisis period, the effect of direct foreign investments on economic growth is studied. In the study, logarithmic values of the variables were used. The data of Real Gross Domestic Product (Index (1998=100) (GDP) and foreign direct investments (US \$ in million) (FDI) were reached through electronic data distribution system of Turkish Republic Central Bank.

In the determination of the relationship the variables, in the models of time series, VAR model the most used in the last periods was utilized. VAR models, developed by Sims, examines, dealing with all variables selected in together in a system entity, and determines the degree and direction of relationship between the variables. There is no variable distinction between the variables used in model (Özgen and Güloğlu, 2004:95). Since model does not require the internal and external distinction of the variables, setting out from any economic theory, with this direction of it, it differentiates simultaneous equation systems. In addition, in VAR models, that the lagged values of dependent variable take place also makes it possible to make strong predictions toward the future (Kumar, Leona, Gasking, 1995: 365).

Two-variable VAR model can be expressed in its standard state as follows:

$$y_t = a_1 + \sum_{i=1}^p b_{1i} y_{t-i} + \sum_{i=1}^p b_{2i} x_{t-i} + v_{1t} \quad (1)$$

$$x_t = c_1 + \sum_{i=1}^p d_{1i} y_{t-i} + \sum_{i=1}^p d_{2i} x_{t-i} + v_{2t} \quad (2)$$

In the above model, (p) represents the lengths of lags, while (v) denotes randomized error terms, whose averages are zero, covariance with their own lagged value are zero; and variances are fixed, and which have normal distribution . In VAR model, the assumption that the errors are not related to their own lagged values does not bring any constraint to the model, because the problem with autocorrelation can be eliminated by increasing the lag length (Özgen and Güloğlu, 2004: 96).

In order to be able to make in the method specified, ordering stated below is followed.

- to research stationarity regarding all variables to be included in the model by unit root tests;
- to identify optimal lag lengths by using information criteria;
- to determine the long and short term relationships between variables by co-integration and Granger causality tests;

- To assess the relationships between variables by means of action-reaction functions and variance decompositions.

4. Empirical Analysis and Findings

In order to be able to process, first of all, it is necessary for the series to be stationary. For this aim, the stationarity of series in analysis was tested by Augmented Dickey-Fuller (ADF) ve Philips-Perron (PP).

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \gamma Y_{t-1} + \sum_{i=1}^N \Phi \Delta Y_{t-1} + \varepsilon_t \quad (3)$$

where, Δ represents the first difference processor; t , a time trend; ε_t , error term; Y_t , series used; and N , lag number of dependent variable, determined by Akaike information criterion to eliminate the successive dependence of error terms. This type of unit root tests is specified as ADF tests. That series is not stationary forms null hypothesis and that series is stationary, alternative hypothesis. ADF test is based on the estimation of parameter γ and its t-statistics. Null hypothesis is rejected, if it is negative and statistically different from zero. The problem related to ADF test requires to be incorporated the additional differences of the term in test equation. This is concluded with a loss in freedom degree and decrease in the strength of test procedure. Alternatively, autocorrelation of PP approach considers the presence of unknown figures and conditional heteroscedasticity in error terms and uses a non-parametric correction for serial relationship. Then, in order to eliminate the effects of serial relationships on asymptotic distribution of test statistics, statistics is turned. Also in both test, that t-statistics is bigger than critical values leads null hypothesis of the first root to be rejected (Günaydın, 2004: 172-173).

Table 2: Stationary Test Results

Augmented Dickey Fuller Test			
Variables		Constant	Constant+Trend
FDI	Level	-3.442 [0.0123]**	-3.421 [0.054]*
GDP		0.3701 [0.849]	-3.5632 [0.037]*
FDI	First Difference	-7.786 [0.000]***	-7.688 [0.000]***
GDP		-4.198 [0.000]***	-16.644 [0.000]***
Phillips-Perron TEST			
Variables		Constant	Constant+Trend
FDI	Level	-3.442 [0.0132]**	-3.431 [0.062]*
GDP		-1.471 [0.460]	-5.224 [0.004]***
FDI	First Difference	-8.041 [0.000]***	-8.006 [0.000]***
GDP		-6.404 [0.000]***	-6.272 [0.000]***

Note: The values of significance level are represented as * (10%), ** 5 (%) and *** (1%). The values in parentheses are the values of probability.

When regarded to the level values of series, it is seen that they generally carry unit root.

According to Table 2, in which the results calculated at the level and first difference are presented, of the variables dealt with, in the first difference of foreign direct investments and gross domestic product, for significance level of 1%, it is possible to say that they are stationary in terms of both test technique.

In the analysis of time series, in terms of presence of co-integration relationship, stationarity test has extreme importance. That the variables of foreign direct investments and gross domestic product do not include unit root in their first differences makes it possible to examine this relationship. In order to identify, whether or not there is a significant relationship between the variables concerned, in this study, Johansen Juselius Test was used. VAR indication, which is the beginning of Johansen co-integration application takes place in the following Equation (4). (Johansen and Juselius, 1992).

$$X_t = A_1 X_{t-1} + \dots + A_k X_{t-k} + \mu + \Psi D_t + \varepsilon_t, \quad t=1, \dots, T, \quad (4)$$

by taking the difference of this model;

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \dots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-k} + \mu + \Psi D_t + \varepsilon_t, \quad t=1, \dots, T, \quad (5)$$

$$H_1(r): \Pi = \alpha \beta' \quad (6)$$

In Equation (6), α and β are the matrices in the dimension of $p \times r$. Γ and Π represent coefficient matrix; Δ represents difference equation; k , lag length. $H_1(r)$ assumes that the process ΔX_t is stationary. Even if X_t is not stationary, $\beta' X_t$ is stationary. If the rank of Π is zero, it cannot be mentioned about that there is a stationary linear combination relationship between variables. If the rank of matrix Π is bigger than zero, there are linear combinations as stationary as r (Johansen and Juselius 1992). In co-integration analysis, long term balance is provided, only when the variables are integrated at the same level. The presence of co-integrated vector points out that there is a long term balance relationship (Verbeek, 2008).

In the literature, that Johansen co-integration tests are more sensitive to the selection of lag length is generally accepted. As a result, VAR (Vector Autoregression) model, for being able to find the appropriate lag length is applied to co-integration analysis (Chang and Caudill 2005). In co-integration analysis, for the appropriate lag length, by selecting Schwarz information criterion (SC), 5 lag lengths were found. In the framework of optimal lag length determined, according to Trace and Max-Eigen statistics, Johansen-Juselius co-integration test was first applied for long term relationship between the variables of LNFDI and LNGDP.

Table 3: Johansen Co-integration Test Results

Cointegration Test by Trace Statistics			
Hypothesis	Eigenvalue	Trace Statistics	Critical Value (%5)
Non-existence	0.623233	42.28899	24.21
Max 1	0.247456	8.647230	12.68
Cointegration Test by Max-Eigen Statistics			
Hypothesis	Eigenvalue	Max-Eigen Statistics	Critical Value (%5)
Non-existence	0.623233	32.66234	17.97
Max 1	0.247456	7.683030	11.22

As will be seen from the findings of Johansen co-integration test in the table, according to both Trace and Max-Eigen test statistics, for the significance level of 5%, there are one co- integration vector between the variables. This result means that the variables of foreign direct investments and economic growth move together.

Short term relationship of the variables was examined by Granger Causality Test. In economic theory, identification and test of relationship between variables first of all depend on the identification of whether the variables are internal or external. Granger (1969) and Sims (1972), setting out from these relationships, introduced causality (Granger, 1980: 297). If two time series are mutually cause of each other, causality will be mutual and a feedback relationship will occur (Granger ve Newbold,1986: 220-221). In order to study this relationship, the following model was put forward:

$$Y_t = \sum_{i=1}^n \alpha_i X_{t-i} + \sum_{j=1}^n \beta_j Y_{t-j} + u_{1t} \quad (7)$$

$$X_t = \sum_{i=1}^m \lambda_i Y_{t-i} + \sum_{j=1}^n \delta_j Y_{t-j} + u_{2t} \quad (8)$$

Model is only in a structure built on lagged values and, if $\beta_i = 0$, X_t will not be Granger cause of Y_t (Maddala, 1989: 329-330).

Table 4: Granger Causality Analysis Results

Hypothesis	Wald Statistics	Probabilty Level	Result
FDI is not cause of GDP.	4.03	0.5214	There is no causality from FDI to GDP
GDP is not the cause of FDI.	10.24	0.0365	There is causality from GDP to FDI

According to the results of Granger causality test, while there is no causality from foreign direct investment to gross domestic product, there is a causality of 5% from gross domestic product to foreign direct investments.

After Granger causality analysis, by means of action-reaction analysis, the reactions each variable gives to the positive shocks in the other variables are examined.

Action-reaction analysis shows foreign direct investments makes contribution to economic growth and economic growth, to foreign direct investments.

After action-reaction analysis, variance decomposition analysis, which tests that shock occurring in each variable can be accounted for by the other variables, was carried out. With the technical assistance mentioned, the effect of statistical shocks on the other variables will have been seen. Calculating the rate of accounting for the shock

that will occur in error term of a variable by the other variables, economic relationships between the variables can be better explained. If shock regarding error term of a variable can account for the forward variance of estimation error of the other variable, the relevant variable can be internally evaluated (Lütkepohl, 1993:56-57).

Variance decomposition obtained from movable means section of VAR was individually carried out for foreign direct investments and economic growth.

Table 5: Variance Decomposition Results

	FDI's Variance Decomposition		GDP's Variance Decomposition	
	FDI	GDP	GDP	FDI
1	100.0000	0.000000	100.0000	0.000000
2	95.45303	4.54697	96.79395	3.20605
3	88.44836	11.5164	92.24081	7.75919
4	80.67623	19.32377	86.87540	13.1246
5	75.77144	24.229856	81.69527	18.30473
6	74.61565	25.38435	78.86687	21.13313
7	70.75732	29.24268	76.98261	23.01739
8	68.65949	31.34051	73.45513	26.54487
9	67.56231	32.4379	69.24371	30.75629
10	65.83077	34.16923	67.29846	32.70154

According to the results of variance decomposition analysis, in the first period, all of shock experienced both in foreign direct investments and gross domestic product are accounted by them themselves. In the progressing periods, the strength of two variables to account for each other increases. For example, in 6th period, 25% of shock in foreign direct investments are accounted for by GDP. This shows that while investments enter economy, economic growth is taken into consideration. On the other hand, in 10th period, 32% of shock in gross domestic product is accounted for by foreign direct investments. This result shows that foreign direct investments so important for Turkish economy.

Conclusion

In Turkey, together with liberalization process actualizing beginning from 1980s, in order to attract foreign capital to the country, many incentives were applied. After financial liberalization process 1989, from 1990 to 2000, the amount of foreign direct investment entering the country is at the relatively slight level. From 2001 to 2008, foreign direct investments in Turkey actualized as privatization, merging, and acquirement. With foreign direct investments entering country, investments followed a considerably instable course. After the decreases, in the years of 2009 and 2010, in the forthcoming years, with the monetary policies applied by US, they rose by recovering and GDP, after global financial crisis, entered a growth period, which is first rapid and then slow trended.

In literature review carried out, in most of the studies, while the conclusion that foreign direct investments makes contribution to the country economy was reached, in the remaining part of them, a significant relationships could not be reached. In terms of seeing this effect, in the period of post- 2008 global crisis, in Turkish economy, the

relationship between foreign direct investments and economic growth was examined and, in the long term, it was concluded that there was a relationship between two variables. However, in the short period, it was seen that there was no causality from foreign direct investments to gross domestic product, in return to this, there was a causality from gross domestic product to foreign direct investments. Action-reaction analysis is in the direction of that foreign direct investment contributed to economic growth and economic growth, to foreign direct investments. The results of variance research analysis, on the one hand, shows that foreign direct investments, while entering country, taken into consideration economic growth, on the other hand, foreign direct investments were so important for Turkish economy.

When the results obtained from all analyses are evaluated together, in the post crisis period, it is possible to say that foreign direct investments have an important place for Turkish economy. Although the increase in foreign direct investments triggers economic growth, its contribution is limited. It will be true to say that increase of Foreign direct investments, which have an extremely important role in increase of gross domestic product, will be an important factor of high rate growth in the forthcoming years.

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