THE EFFECT OF EUROPEAN DEBT CRISIS ON FOREIGN DIRECT INVESTMENT: CASE OF TURKEY[1]

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ABSTRACT

European Union (EU) member countries are among the most important commercial and financial partners of Turkey. Thus, a crisis that will break out in Europe will be able to seriously affect Turkish economy via especially foreign investment inflow and export. In this study, in the light of quarterly data (2008Q1-2017Q2), the effect of European debt crisis on foreign direct investment was analyzed specific to Turkey by using ARDL model. According to analysis results, a 1% increase in net external debt of the euro area member countries' will lead to 5.74% drop in Turkey's foreign direct investments. At the same model, if Turkey's national income increases by 1%, then foreign direct investment increases by %3.02. Turkey's national income variable also has a positive impact on foreign direct investment, whereas the deposit interest rate variable does not have any effect. In addition the coefficent of dummy variable was found to be negative and significant.
Keywords: European debt crisis, foreign direct investment, ARDL model.

1.   INRODUCTION

Global financial crisis breaking out in USA in 2008 entailed the countries in Eurozone to a serious recession. With the effect of global crisis, while Eurozone grows in the rate of about 4.5% in 2009, that the structural problems also become unsustainable became the predictor of this debt crisis. As a matter of fact, in the year 2009, crisis breaking out in Greece, spreading to the other countries that are weak from the financial and economic point of view (Ireland, Portugal, Spain, and Italy), became a more intense.

European debt crisis holding the quality of public debt crisis certainly has a potential to affect the countries having close financial and commercial relationships with EU member countries. In case that Turkey exporting an important of the products it has produced to EU market cannot find an alternative market, it is expected that it will experience a decrease in its export. This case can lead the

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problem with current deficit in Turkey to increase much more. On the other hand, foreign direct investments, reducing saving deficits of the investing countries or their capital accumulations, can create a positive directional effect on the employment and growth. Furthermore, the investments of interest can be an important determinant of economic growth in terms of especially developing countries like Turkey. When we look at the distribution of foreign direct investment coming in Turkey according to the countries, the dominance of EU member countries attracts attention. While there is a total of 53,156 international capital company in respect of the end of 2016, 21,751 of the companies under consideration belong to EU member countries. Moreover, it is seen that 4 out of top 5 countries investing the most are EU member countries (Netherland, United Kingdom, Germany, and Spain, in order). Thus, debt crisis experienced in Europe can result in the decrease of foreign direct investment coming in Turkey.

This study reaching the effect of European debt crisis on foreign direct investment consists of five sections including introduction and conclusion. While in the second section, the theoretical descriptions related to European debt crisis are given place, in the third section, literature review is dealt with. In the fourth section takes place of the study method and analysis results. The study is finally completed with the section of conclusion.

2.   THEORETICAL FRAMEWORK

Foreign debt crisis, depending on that government cannot pay for liabilities due and experiences problem with finding foreign credit, breaks out in the form of attaching foreign debts to a new payment plan or delaying debts (Güney, 2016: 14). But, similar problems resulting from private sector can also trigger the debt crisis. In this context, that banks opening a credit in terms of national currency are borrowed in terms of foreign currency can form a threat element in terms of countries (Cole and Kehoe, 1998).

That Euro is accepted as a common monetary unit led the structural problems in EU to gradually increase (Tuncsiper and Bicen, 2013: 486). Moreover, following global crisis, that capital inflows suddenly interrupts toward PIIGS[2]; that growth performance is low; and that governments are obliged to accept their debts became the current accounts deficit and public debt stock of EU member countries of interest unsustainable. Following such a developments, that a debt crisis is experienced in Europe became unavoidable (Baldwin and Gros, 2015: 2). Some of the developments triggering European Debt Crisis can be put in order as follows (Eser and Ela, 2015: 215-218):

• While a single monetary policy is applied in European Union, that the countries independently act in their financial and budgetary policies led the differences between countries to gradually increase. Together with that Euro is accepted as a common monetary unit, while the countries, whose economic ground are weak, find the possibility to borrow with lower cost, the debt levels in these countries reached the serious dimensions (Ozcan, 2012: 12-16).

• That Maastricht criteria are violated are considered as an important reason for the crisis In Maastricht Treaty, it was stated that public debt stock in EU member countries must not exceed 60% of GDP (National Bank of Belgium, 2014: 18). However, in the practice, even in pre-crisis period, this rate is seen to be exceeded. In 2000, while in Greece, the rate of public debt to GDP was 104.9%, this rate realized as 109.4% in 2008 and 197.7% in 2014. In PIIGS countries, the rate of public consolidated gross debt to GDP is shown in Figure 1.

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[2] PIIGS is an abbreviation used to determine the countries in debt crises. In the abbreviation of interest, which form with the combinations of initial letters of the counties under consideration, 'P' represents Portugal; 'I', Ireland; 'I', Italy; 'G', Greece and 'S', Spain.
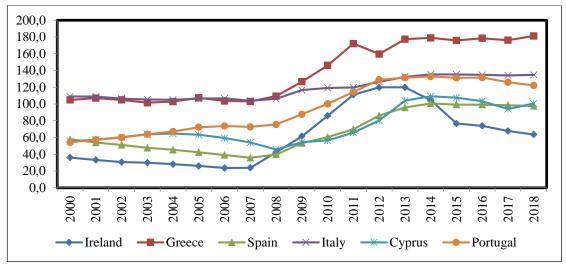
Figure 1. In PIIGS countries, the rate of Public Consolidated Gross Debt to GDP
Source: Eurostat, 2019.

- Depending on the financial crisis breaking out in USA spreads to the other countries, an intensive recession was experienced in world economy. With the effect of global crisis, world economy cumulatively downsized in the rate of 6% (Worldbank, 2018). When the constrictive effect of global crisis the economic activities is combined with the structural problems in Eurozone, economic problems gradually increased, especially Greece, in many EU member countries. As a matter of fact, some EU member countries experiencing serious difficulties in accessing to international capital market entailed this debt crisis (Erarslan and Timurtas, 2015: 31).

The wrong decisions of credit rating agencies are considered as one of the reasons for debt crisis. In pre- crisis period, although some negativities in macroeconomic indicators, Greece, whose credit rating is increased by credit rating agencies, caught the possibility to find debt in lower cost, and this case caused the debt stock of Greece to increase. On the other hand, following Global Crisis, that the problems in Greek economy appear, bringing rating decreases together with it, led the crisis to deepen (Bayar, 2015: 51-52).

3. LITERATURE REVIEW

In the literature, the studies toward examining the relationship between European Debt Crisis and export were carried out. Hence, the number of the studies dealing with the relationship of European Debt Crisis –Foreign Direct Investment is not more. In this section of the study, the summaries of empirical studies dealing with the effect of economic crises on foreign direct investments are given place.

Ucal, Ozcan, Bilgin and Mungo (2010) mentioned about the effect of financial crises experienced in the developing countries on foreign direct investment. In the analyses made by means of GPLM regression method, following financial crises, while the conclusion that investment inflows of interest decreased was reached, it was observed that they increased before crisis.

Bogach and Noy (2012), in the light of the data belonging to the period of 1987 – 2009, examined the effects of financial crises on foreign direct investment. In the study under consideration, the developing countries were selected as sample. The results obtained are in the direction of that financial crises within sample have a strong negative effect on financial crises.

Despordes and Wei (2013), in the study they carried out, between the years of 2007- 2010, they reached the conclusion that foreign direct investments inflowing to the developing countries decreased with the effect of global crisis.

Kim (2013) attempted to predict the relationship between banking crises and foreign direct investment in 60 countries for the period of 1990-2013. The findings are in the direction that banking crises do not have an important effect on foreign direct investment. As a cause of this case, the view

that the domestic banking system more affected the domestic investments, and that foreign direct investments are relatively long -termed was put forward.

Dornean and Oanea (2015), with moving from the data belonging to the period of 2000- 2013, specific to the Central and East European Countries, analyzed the effect of economic crises on foreign direct investments by using dynamic panel data method. The results obtained from the study reveal that crises affect foreign direct investments at the negative and high level.

Caglak and Karaca (2016) tried to introduce the effect of crises 1994, 2001, and 2008 on foreign direct investments with moving from quarterly period data belonging to the period of 1990-2011 by means of Granger causality test. The results of analysis introduce the information regarding that the crises of interest negatively affect the amount of foreign direct investment in negative direction.

4. DATA, METHOD AND FINDINGS

In this study, the effects of the Euro Area member countries'[3] net external debt on Turkey's foreign direct investment are analyzed using the ARDL model in the light of quarterly data (2008Q1-2017Q2 period).

The data used to evaluate the effects of the external debt of the Euro Area member countries on the foreign direct investments in Turkey are as presented in Table 1. Foreign direct investments made in Turkey by Euro Area countries were used as dependent variables, while the external debt of the Euro Area countries, national income of euro area countries, Turkey's national income and deposit interest rates in Turkey were used as the explanatory variables. The variables were used in logarithmic form and were seasonally adjusted by Census X13 technique.

Table 1. Data Set

LNFDI	This variable indicates the foreign direct investment they have made in Turkey, 19 countries in the euro area.
LNDEBT	The external debt (or the foreign debt), at any given time, is the outstanding amount of the actual current (and not contingent) liabilities that require payment(s) of principal and/or interest by the debtor at some point(s) in the future and that are owed to non-residents by residents of an economy http://ec.europa.eu/eurostat/cache/metadata/en/tipsed_esms.htm.
LNGDP_EU19	This indicator shows the gross domestic product figures of 19 European Union member countries in the euro area.
LNGDP_TR	This indicator shows the gross domestic product figures of Turkey.
LNDEPOSIT	Monthly weighted average interest rate applied to deposits over Euro.
DUMMY	It is defined as the variable that takes 1 for periods (this period; 2009Q1, 20009Q2, 20009Q3, 2009Q4, 2011Q2, 2011Q3, 2011Q4, 2012Q1 and 2012Q2) when the financial and external borrowing crisis are experienced and 0 value for other periods.

Sources:

1. http://sdw.ecb.europa.eu/browse.do?node=9691141;
2. https://evds2.tcmb.gov.tr/index.php?/evds/publicDash/;
3. http://ec.europa.eu/eurostat/data/database

The advantages of the ARDL model are as follows: (I) no need for all the variables in the system be of equal order of integration, (II) it is efficient estimator even if samples are small and some of the regressors are endogenous, (III) it allows that the variables may have different optimal lags, and (IV) it employs a single reduced form equation (Ozturk and Acaravci, 2013: 264).

According to Pesaran, Shin and Smith (2001), The ARDL model has two steps for estimating long run relationship. The first of these step is to analyze the presence of long run relationship among all variables in the equation under estimation. The ARDL model estimates (p + 1)k number of regressions in order to acquire optimal lag length for each variable, where p is the maximum number of lags to be used and k is the number of variables in the equation. The second step is to estimate the long-run relationship and short-run bi-directional causality between variables. The important

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[3] Euro Area-19 countries are; Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Greece, Slovenia, Cyprus, Malta, Slovakia, Estonia, Latvia and Lithuania.

point here is that if a long-lasting relationship is detected, the second stage can be reached (Shahbaz, Ahmed and Ali, 2008: 187).

The bound test to be followed in the ARDL cointegration method is as follows (Esen, Yıldırım and Kostakoglu, 2012: 257-258):

$$\Delta Y_t = \zeta_0 + \sum_{i=1}^{p} \zeta_{1i} \Delta Y_{t-i} + \sum_{i=1}^{p} \zeta_{2i} \Delta X_{1t-i} + \dots + \sum_{i=0}^{p} \zeta_{ki} \Delta X_{kt-i} + \xi_1 Y_{t-1} + \xi_2 X_{1t-1} + \dots + \xi_k X_{kt-1} + u_t$$

ARDL approach to short-term relationships between variables based error correction model is used. With the error correction model, it is determined how much of the short term imbalance will be corrected in the long term. In order to ensure the stability of the error correction model, the sign of the coefficient of the error correction variable must be negative and meaningful (Demirgil and Turkay, 2017: 919).

Once the long-run relationship between the variables has been achieved, the following model is estimated for short-term relationships:

$$\Delta Y_t = \zeta_0 + \sum_{i=1}^{p} \zeta_{1i} \Delta Y_{t-i} + \sum_{i=0}^{q} \zeta_{2i} \Delta X_{1t-i} + \dots + \sum_{i=0}^{r} \zeta_{ki} \Delta X_{kt-i} + \mu ecm_{t-1} + u_t$$

Examining the stationary levels of the series has an important place in econometric investigations. In this study, the stationarity of the series was tested using Augmented Dickey-Fuller (ADF) and Phiilips-Perron (PP) tests. According to the result of these tests are presented in Table 2, LNFDI is stationary at the level of the variable, while the other variables has the unit root. The variables except for LNFDI were made stationary by taking the first differences. There is no inconvenience in estimating the ARDL model since there is no case of I (2) in any of the series.

Table 2. Unit Root Tests

Tests	ADF		PP	
Variables	**Constant**	**Constant & Trend**	**Constant**	**Constant & Trend**
LNFDI	-5.022775***	-5.149554***	-5.114902***	-5.175113***
LNDEBT	1.668586	-1.182685	1.267310	-1.458440
LNGDP_EU19	2.078354	-2.452879	1.169189	-2.422732
LNGDP_TR	-1.450299	-1.912950	-1.601030	-2.106410
LNDEPOSIT	-1.552600	-1.831597	-1.435997	-2.136641
First Differences				
ΔLNDEBT	-4.830339***	-5.704212***	-4.811963***	-5.704975***
ΔLNGDP_EU19	-3.138997**	-3.831187**	-3.138997**	-3.829543**
ΔLNGDP_TR	-4.803946***	-4.736384***	-4.689516***	-4.604598***
ΔLNDEPOSIT	-4.569065***	-4.506834***	-4.569065***	-4.506834***

Note: The Schwarz information criterion was used in selecting the lag length.

The long-term effects of foreign direct investment on foreign debt were explored using the bound test. As can be seen from Table 3 where the Bound test results are included, the H_0 hypothesis can not be rejected because the F statistic value (3.75) calculated for model I is smaller than the upper critical value. For this reason, there is no long-term relationship in the first model. On the other hand, since the F statistic values calculated in the second (5.58) and third models (14.78) are larger than the upper critical values in 5% significance level, there is a long-run relationship in these models.

Table 3. ARDL Bound Tests

Statistics	F-statistic	k	I(0)		I(1)	
Models			%1	%5	%1	%5
I	3.756578	3	5.666	4.048	6.988	5.09
II	5.588102	3	5.666	4.048	6.988	5.09
III	14.78995	3	5.666	4.048	6.988	5.09

Note: Null Hypothesis: No levels relationship

When the long term coefficients of the ARDL (4,6,4,6) model are examined, it is seen that the signs of coefficients of external debt (LNDEBT) and dummy variable are statistically significant and their signs are negative in expectation direction. In addition, Turkey's national income variable (LNGDP_TR) is also having a positive impact on foreign direct investment. In the ARDL (6,3,5,6) model, it is understood that the external debt variable has a negative effect on foreign direct investments, whereas the deposit interest rate variable does not have any effect. Since all variables are used in logarithmic form, the effects of variables can also be expressed as elasticity. For ARDL(4,6,4,6) model, a 1% increase in net external debt of the euro area member countries' will lead to 5.74% drop in Turkey's foreign direct investments. At the same model, if Turkey's national income increases by 1%, then foreign direct investment increases by %3.02 (see Table 4). In additon the coefficent of dummy variable was found to be negative and significant. In this case, the period of experienced debt crisis in Europe shows a negative impact on foreign direct investment to Turkey.

Table 4. Long-Run Coefficients

Variables/Models	ARDL(6,6,6,6)	ARDL(4,6,4,6)	ARDL(6,3,5,6)
LNDEBT	-6.799126 3.216309	-5.742888** (1.732993)	-1.442660* (0.748096)
LNGDP_EU19	-44.90390 21.84052		
LNGDP_TR		3.021974* (1.401461)	
LNDEPOSIT			-0.303996 (0.330396)
DUMMY	-0.412438 1.125710	-2.255024*** (0.516562)	-2.249632*** (0.417818)
@TREND	0.058605 0.084927	-0.164110*** (0.029443)	-0.105022*** (0.009102)

The short-run dynamics are estimated by using ECM regressions. As can be seen in Table 5, in ARDL (4,6,4,6) and ARDL (6,3,5,6) models, the coefficients of ECM_{t-1} are found negative as expected. The value of ECM_{t-1} coefficient is found -2.32 and -2.43 respectively. These coefficients show that the rate of convergence is high.

Table 5. ECM Regressions

ARDL(6,6,6,6)		ARDL(4,6,4,6)		ARDL(6,3,5,6)	
Variable	**Coefficient**	**Variable**	**Coefficient**	**Variable**	**Coefficient**
C	2785.112*** (420.7182)	C	101.2425*** (15.28566)	C	93.06548*** (8.643138)
D(LNFDI(-1))	1.308637** (0.306406)	D(LNFDI(-1))	0.785962*** (0.218846)	D(LNFDI(-1))	0.921784*** (0.141594)
D(LNFDI(-2))	0.879229** (0.218839)	D(LNFDI(-2))	0.612386*** (0.148083)	D(LNFDI(-2))	0.284204** (0.084561)
D(LNFDI(-3))	0.221203 (0.131605)	D(LNFDI(-3))	0.209671* (0.107472)	D(LNFDI(-3))	0.201518** (0.071951)
D(LNFDI(-4))	0.068134 (0.135789)			D(LNFDI(-4))	0.003809 (0.073867)
D(LNFDI(-5))	-0.150356 (0.097266)			D(LNFDI(-5))	0.213422** (0.076085)
D(LNDEBT)	-2.614657 (1.313308)	D(LNDEBT)	-0.316587 (1.344174)	D(LNDEBT)	-0.895881 (0.857023)

Table 5. ECM Regressions (*continuation*)

ARDL(6,6,6,6)		ARDL(4,6,4,6)		ARDL(6,3,5,6)	
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
D(LNDEBT(-1))	19.61025*** (3.296386)	D(LNDEBT(-1))	11.02471*** (2.561340)	D(LNDEBT(-1))	5.772008*** (1.030972)
D(LNDEBT(-2))	9.706166** (2.077188)	D(LNDEBT(-2))	15.51244*** (2.774644)	D(LNDEBT(-2))	2.000456* (0.932768)
D(LNDEBT(-3))	11.66629** (2.555043)	D(LNDEBT(-3))	11.81572*** (2.587261)		
D(LNDEBT(-4))	0.013417 (2.029629)	D(LNDEBT(-4))	8.581874*** (2.009040)		
D(LNDEBT(-5))	6.748488* (2.240958)	D(LNDEBT(-5))	6.210401*** (1.642210)		
D(LNGDP_EU19)	-132.4492** (31.67104)	D(LNGDP_TR)	2.774793 (2.522215)	D(LNDEPOSIT)	2.541460** (0.912697)
D(LNGDP_EU19(-1))	128.9366** (30.99233)	D(LNGDP_TR(-1))	-0.259532 (2.294233)	D(LNDEPOSIT(-1))	0.239309 (0.971661)
D(LNGDP_EU19(-2))	40.00989 (18.14787)	D(LNGDP_TR(-2))	-5.259604 (2.853922)	D(LNDEPOSIT (-2))	3.206502*** (0.695981)
D(LNGDP_EU19(-3))	121.4327** (24.01408)	D(LNGDP_TR(-3))	8.782870*** (2.349854)	D(LNDEPOSIT (-3))	-0.618701 (0.571788)
D(LNGDP_EU19(-4))	16.68934 (15.13988)			D(LNDEPOSIT (-4))	4.042277*** (0.650098)
D(LNGDP_EU19(-5))	104.9404** (25.82784)				
D(DUMMY)	-0.823924 (0.443509)	D(DUMMY)	-1.317259*** (0.387157)	D(DUMMY)	-1.427906*** (0.254282)
D(DUMMY(-1))	0.092245 (0.361431)	D(DUMMY(-1))	2.691083*** (0.464240)	D(DUMMY(-1))	2.237501*** (0.352121)
D(DUMMY(-2))	0.891307** (0.263375)	D(DUMMY(-2))	2.056520*** (0.343443)	D(DUMMY(-2))	2.658792*** (0.243615)
D(DUMMY(-3))	1.922483** (0.347223)	D(DUMMY(-3))	2.096347*** (0.414535)	D(DUMMY(-3))	2.412375*** (0.301567)
D(DUMMY(-4))	2.112538** (0.404719)	D(DUMMY(-4))	2.008309*** (0.410162)	D(DUMMY(-4))	3.201652*** (0.351185)
D(DUMMY(-5))	1.114075* (0.442106)	D(DUMMY(-5))	0.962922** (0.389841)	D(DUMMY(-5))	1.253580*** (0.297489)
CointEq(-1)*	-3.603616*** (0.544338)	CointEq(-1)*	-2.325734*** (0.350991)	CointEq(-1)*	-2.436761*** (0.226046)

Breusch-Godfrey serial correlation LM, Breusch-Pagan-Godfrey heteroskedasticity, Jarque-Bera Normality and Ramsey-Reset tests were conducted to test whether the results obtained from the models were reliable. The LM test showed that there were no autocorrelation problems in the models, that the Breusch-Pagan-Godfrey test was not of varying variance. On the other hand, the results of Jarque-Bera test revealed that error terms were normally distributed. According to Ramsey reset tests there were not a modeling errors.

Table 6. Diagnostics Tests

Tests/Models	ARDL(6,6,6,6)	ARDL(4,6,4,6)	ARDL(6,3,5,6)
Breusch-Godfrey Serial Correlation LM Test:	F-statistic= 5.968997 Prob. F(2,1)= 0.2780	F-statistic= 1.189255 Prob. F(2,5)=0.3780	F-statistic= 1.684780 Prob. F(2,3)=0.3232
Breusch-Pagan-Godfrey	$\chi^2 = 28.74118$ prop $\chi^2 = 0.4257$	$\chi^2 = 25.28713$ prop $\chi^2 = 0.3903$	$\chi^2 = 24.14868$ prop $\chi^2 = 0.56675$
Normality test	$\chi^2 = 1.232249$ prop $\chi^2 = 0.540033$	$\chi^2 = 1.257893$ prop $\chi^2 = 0.533153$	$\chi^2 = 1.16887$ prop $\chi^2 = 0.557416$
Ramsey Reset	F-statistic: 0.155882 prob: 0.7311	F-statistic: 0.010162 prob: 0.9230	F-statistic: 0.046183 prob: 0.8370

5. CONCLUSION

In 2009, the debt crisis that emerged in Greece has increased the cost of the crisis along with the jumping of the EU member countries. As the European region has entered a serious recession due to

the impact of the crisis, at the same time, some countries have had serious difficulties in accessing the international investment market. But, the impact of the crisis has not only been limited to the EU member states, but soon began to be felt in countries that are closely related to the country. It is expected in particular that impact Turkey's foreign investment and export volume of the European debt crisis.

In this study, the effects of the Euro Area member countries' net external debt on Turkey's foreign direct investment are analyzed using the ARDL model in the light of quarterly data (2008Q1-2017Q2 period). Foreign direct investments made in Turkey by Euro Area countries were used as dependent variables, while the external debt of the Euro Area countries, national income of euro area countries, Turkey's national income and deposit interest rates in Turkey were used as the explanatory variables. The results obtained within the scope of the study can be listed as follows:

- External debt and dummy variables are statistically significant and their signs are negative in expectation direction.

- Turkey's national income variable has a positive impact on foreign direct investment.

- Deposit interest rate variable does not have any effect.

In this context, countries should ensure that foreign direct investments are as long-term as possible and that they are not adhered to a single source. Thus, countries that can diversify their investment resources will be able to get away with a cost less than a possible crisis in another country.

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