THE ECONOMETRIC ANALYSIS OF THE DOMESTIC BORROWING AND CREDIT-DEPOSIT RELATIONSHIP IN TURKEY

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ABSTRACT

In this study, the effects of public sector domestic debt stock on the banking sector in Turkey have been analyzed in terms of credits and deposits. For this purpose, monthly data covering the period between January 2006 and December 2018 were taken as the basis and time-series econometric methods were applied. In the first stage, Kapetanios's (2005) unit root test, which allows for multiple structural breaks, and in the second stage, Maki's (2012) cointegration test, which takes into account multiple structural breaks, were applied. After a cointegration relationship was found between the series, FMOLS (Fully Modified Ordinary Least Square) cointegration coefficient estimation was implemented for long-run coefficient analyzes. Finally, short-run relationships were determined through the error correction model. As a result of the abovementioned econometric analyzes, it was found that a 1-unit increase in the domestic debt stock decreased the credit volume by 0.22 units, and it decreased the total deposits by 0.14 units, in other words, there is a negative relationship between domestic debt stock indicators and credit and deposits.

Keywords: Public Domestic Debt Stock, Banking, Credits, Deposit, Crowding-Out Effect

TÜRKİYE'DE İÇ BORÇLANMA ile KREDİ-MEVDUAT İLİŞKİSİ ÜZERİNE EKONOMETRİK ANALİZ

ÖZET

Bu çalışmada, Türkiye'de kamu kesimi iç borç stokunun bankacılık sektörüne olan etkileri krediler ve mevduatlar açısından incelenmiştir. Bu amaçla, Ocak 2006 ile Aralık 2018 dönemini kapsayan aylık veriler esas alınmış ve zaman serileri ekonometrik yöntemleri uygulanmıştır. İlk aşamada, Kapetanious (2005)'un çoklu yapısal kırılmaya imkân veren birim kök testi, ikinci aşamada ise çoklu yapısal kırılmaları dikkate alan Maki (2012)'nin eşbütüleşme testi uygulanmıştır. Seriler arasında eşbütünleşme ilişkisi bulunduktan sonra ise, uzun dönem katsayı analizleri için FMOLS (Fully Modified Ordinary Least Square) eşbütünleşme katsayı tahmini uygulanmıştır. Son olarak, kısa dönem ilişkiler hata düzeltme modeli yardımıyla belirlenmiştir. Bahsedilen ekonometrik analizler neticesinde, iç borç stokundaki 1 brimlik artışın, kredi hacmini 0.22 birim azaltırken, toplam mevduatı ise 0.14 birim azalttığı yani, iç borç stoku göstergeleri ile krediler ve mevduatlar arasında negatif yönlü ilişkinin olduğu tespit edilmiştir.

Anahtar Kelimeler:, Kamu İç Borç Stoku, Bankacılık, Krediler, Mevduat, Crowding-Out Effect

1.INTRODUCTION

As one of the most important power elements steering the economic system; the state is the most influential market interventionist, that exercises its power concerning all legal and administrative arrangements on the activities of economic units, through economic and fiscal policies in the context of the interaction between macroeconomic parameters and public deficits (Martin & Oughton, 2000), (Stiglitz & Walsh, 2006). The state, on the one hand, generates public income especially through fiscal policies and on the other hand, makes public expenditures. Approaches regarding how to finance public deficits arising if the public expenditures made are realized above the public revenues obtained are brought to the agenda. Governments meet their financing needs by borrowing through finding funds from domestic or foreign markets. Failures in governance elements such as the democratic deficit, accountability, and transparency, especially in underdeveloped and developing countries compared to developed countries, are other factors that increase the cost of financing public deficits (Chomsky, 2007).

Besides, problems arising in major areas such as discipline in public expenditures, the volume of the informal economy, financing need of local administrations, level and efficiency of capital accumulation, the efficiency of the tax system can bring along budget deficit problem and affect macro balances negatively. The function of the banking sector in terms of domestic borrowing policy in financing the budget deficit that might arise at this point is about the state's internal borrowing from banks to cover public expenditures. Kumhof & Tanner (2005) indicate that as financial institutions intermediating the sale of debt instruments, banks direct the deposits and other funds they obtain at low cost to government domestic debt instruments, which are attractive investment instruments due to their risk and return balance. Jamimovich & Panizza (2006) emphasized that banks demand the debt instruments directly as buyers with the profit motive, while De Haas et al. (2010) highlighted that banks perform their roles in borrowing policy by financing the state's budget deficit.

2. THEORETICAL BACKGROUND

2.1. Reasons for Public Borrowing

Budget deficits that might arise due to factors such as insufficiency in savings level, inefficiency in labor force and capital, inadequate export level, and decrease in per capita income can be specified as the main reasons increasing the borrowing need of a country.

Table 1: Central Government Public Revenues and Expenditures (Million TRY)

Time	Public Revenues	Public Expenses	Difference
2006	173,483	178,126	-4,643
2007	190,360	204,068	-13,708
2008	209,598	227,031	-17,433
2009	215,458	268,219	-52,761
2010	254,277	294,359	-40,082
2011	296,824	314,607	-17,783
2012	332,475	361,887	-29,412

2013	389,682	408,225	-18,543
2014	425,383	448,752	-23,369
2015	482,780	506,305	-23,525
2016	554,140	584,071	-29,931
2017	630,349	677,722	-47,373
2018	696,829	762,753	-65,924

Source: Prepared by us by taking into account the data of the Ministry of Treasury and Finance (2019).

As seen in Table 1, as a result of the inadequacy of public revenues in Turkey to cover public expenditures, financing needs of the public sector has continued over the years. Lazzarato (2012) states that rationales for public borrowing exhibit different characteristics. Allen & Gobind (2004) and Hudson (2009) indicate that external debts, which consists of foreign funds obtained from any financial institution, organization or country outside the borders of the country; and public borrowing, which contains domestic debts composed of local funds obtained from national sources through financial instruments such as bonds and bills issued by the state treasury, gain importance as the major sources of public finance that are widely employed by developed and developing countries.

Table 2: Central Government Debt Stock Instrument Distribution (At Current Prices) (Thousand TRY)

| Years	Treasury Bond (I)	Government Bonds	International Bonds	Total Bond (II)	Credit (III)	Domestic Debt Stock	External Debt Stock	Total Stock (I+II+III)
2006	9,594	241,876	51,336	293,213	42,696	251,470	94,032	536,042
2007	6,134	249,176	45,342	294,518	33,210	255,310	78,552	537,696
2008	13,978	260,849	59,122	319,971	46,880	274,827	106,002	380,830
2009	14,036	315,969	61,881	377,850	50,163	330,005	112,044	696,136
2010	9,525	343,317	68,641	411,957	52,664	382,841	121,305	474,146
2011	0	368,778	88,308	457,087	61,983	368,778	150,291	519,070
2012	3,684	382,858	91,726	474,584	54,633	386,542	146,359	532,901
2013	0	403,007	119,007	522,014	64,179	403,007	183,186	586,193
2014	0	414,649	135,161	549,809	62,708	414,649	197,869	612,517
2015	0	440,124	167,345	607,469	70,777	440,124	238,122	678,246
2016	1,025	467,620	211,386	679,006	79,921	468,644	291,307	759,952
2017	974	534,473	252,318	786,791	88,729	535,448	341,047	876,494
2018	5,495	580,647	364,914	945,561	116,059	586,142	480,973	1,067,115

Source: Ministry of Treasury and Finance (2019).

Central government gross domestic debt stock in Turkey shows the distribution of the debt securities stock issued inland by the Undersecretariat of Treasury, at secondary market value

as of a certain date, and according to the holders. Table 2 shows that bonds have been the leading instruments used in financing domestic borrowing over the years.

Figure 1: Share of Government Bonds in Domestic Debt Finance (%)
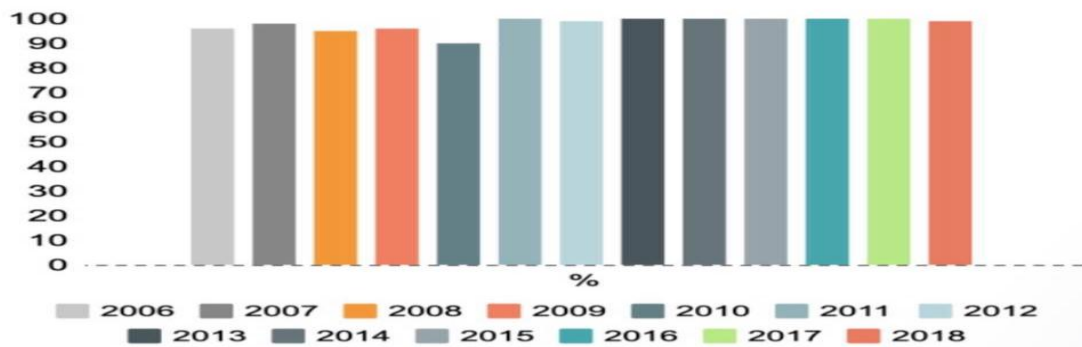
Source: Prepared by us by taking into account the data of the Ministry of Treasury and Finance (2019).

It is seen in Figure 3 that almost all government bonds have been used to finance domestic borrowing. In the case of the insufficiency of domestic savings, borrowing is proposed as a method to get rid of this spiral, as stated in Ragnar Nürkse's theory of the vicious cycle of poverty (Bass, 2009). It is possible to increase the total savings volume through domestic borrowing and channel inactive savings into investments, thus achieving positive development in production amount, national income level and labor and capital efficiency and such (Herrera, 2006). However, the extent to which domestic borrowing will contribute to growth and development by being directed to areas with high added value depends on, firstly, whether these resources are used more effectively by the public sector or private sector, whether the public sector and the private sector are competing with each other in the loanable funds market, and where the resources obtained through domestic borrowing will be used (Le Van et al., 2018).

## 2.3. The Effect of Domestic Borrowing on Banking Activities

The fact that treasury securities are risk-free and high-yielding leads to a contraction in the credit volume extended to the private sector. At this point, it is necessary to make mention of restricting the financing of investments outside the public sector while meeting the financing needs of the public sector, namely the Crowding-Out effect. In this case, as the private sector will have more limited access to finance, borrowing costs will also be high, and consequently, the decrease in the amount of investment to be made by the private sector will also affect the growth negatively (Samimi, 2000).

When it comes to the subject of interests which is the cost of borrowing, the interest payments made, on the one hand, will increase interest rates and accordingly amount of interest payments depending on the risk premium, in cases where access to finance is limited, on the other hand, it will quickly distract public resources, which play an important role in the fight against poverty such as investment and transfer expenditures, from serving this purpose (Bassetto & Butters, 2010). In most of the countries with insufficient income, even if there are attempts to overcome these problems by printing paper currency, the inflation problem that will occur will increase the risk premium once more and negatively affect the borrowing costs again (Samimi & Jamshidbaygi, 2011).

Moreover, the main macroeconomic indicators such as country risk, exchange rates, interest rates, inflation, unemployment, budget deficits, which are taken into consideration by the international rating agencies with regard to the private sector that demands funds from international markets, are among the other factors making it difficult for the private sector to access foreign resources. This situation can adversely affect the financial management of the private sector and lead to a decline in competitiveness, decrease in production and income levels, a contraction in cash flow, weakening of the financial structure, inadequate capital accumulation, and negativities in market structure and price stability. However, it is worth remembering the argument that the Crowding-Out effect might not always give negative results: If the increase in the state's domestic borrowing results in a tax reduction, after-tax net income will increase slightly and savings will be achieved depending on marginal compliance, thus, private sector's borrowing demand will decrease, and therefore, there will be no upward pressure on interest rates (Hanson, 2007). At this point, the said savings mobility will contribute to the reduction of the size of the unrecorded economy, the expansion of the tax base, and the increase of financial depth (Baliño & Sundararajan, 2008). Within this context, the main benefits expected from domestic borrowing instruments are transferring savings to the financial system, strengthening money and capital markets, and encouraging investments (Abbas & Christensen, 2010).

Figure 2: Distribution of Domestic Debt Stock By Holders (%)
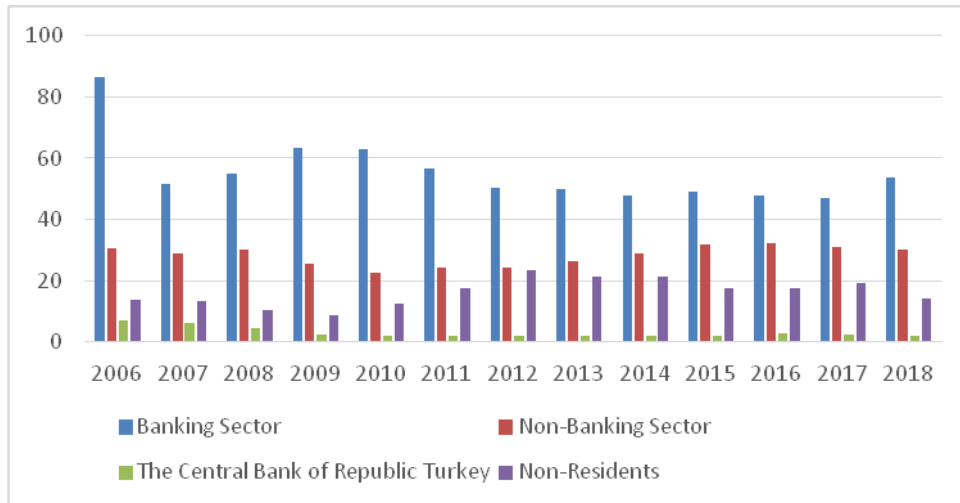
Source: Prepared by us by taking into account the data of the Ministry of Treasury and Finance (2019).

As can be seen from Figure 2, the banking sector in Turkey is the sector which has been holding a majority of the domestic debt stock by years. In Turkey, the general function of the banking sector, which has the largest share in the financing of public sector deficits through domestic borrowing and is the largest funder of the public sector, is to ensure that the borrowing need of the public sector mediated by the banking sector is financed from domestic markets. Government domestic debt securities have certain effects in terms of the banking sector, such as:

a- To reduce the need for Central Bank interventions by helping banks manage their liquidity more effectively in the execution of secured debt transactions in interbank markets and indirect monetary policy transactions (European Central Bank, 2018),

b- In terms of additional collateral function, to encourage lending to more risky sectors, providing banks with a stable and secure revenue source (Aisen & Hauner, 2008),

c- To be a price indicator for long-term private debt securities issued by banks or other institutions, in terms of returns (Mishkin, 2009),

d- The positive contribution of domestic debt to the growth, inflation, interest rates and general level of exchange rates, through deeper and more sophisticated money and capital markets which increase the volume and efficiency of private investments (Bittencourt, 2012), and

e- In the long run, to help governments build a solid performance history to reach international capital markets due to increasing political responsibility (Razanarivonjy, 2015).

3. LITERATURE REVIEW

On the assumption that the money supply is considered constant, it was stated by Carlson & Spencer (1975) and Friedman (1978) that the financial need demanded by the state through domestic borrowing arise from fiscal policies, not monetary policies. Samuelson & Nordhaus, (1989) described the Crowding-Out Effect as the financial exclusion in which the funds demanded by the government to finance public expenditure or budget deficits push the private sector out of the fund market, and that leads to a decrease in private sector investments.

In this context, Gochoco (1990) ve Barry & Devereux (1992) stated that considering the functions of the banking sector related to the domestic borrowing policy and the functions of banks to meet the credit needs of the private sector, it is possible for them to face the Crowding-Out Effect if the tendency of banks towards domestic borrowing instruments leads to a reduction in the credit amount extended by the banking sector. Choi (1995) and IMF (2001) stated that if the banks are funding the public sector, the loan demands of the private sector to the banks might vary depending on the interest rates and credit ceiling limits determined by the central banks.

Additionally, it was emphasized that the changes occurring in public deficits positively affected the real interests paid by banks for deposits, and thus, this situation caused the crowding-out effect (Turhan, 2004). Similarly, it was expressed by Ardagna et al. (2004) and Abdel-Kader (2006) that when the increase in the public debt stock raised the deposit interests, this had an effect on the increase in deposit amounts. Hauner (2007), on the other hand, stated that domestic borrowing policies might have different effects in terms of the components such as interest rates, deposits, and foreign liabilities depending on the circumstances and conditions, and these have an impact on the financing methods of domestic borrowing policies.

In addition to Bakkal & Gürdal (2007), the works of Ahmed & Miller (2007) also examined the effect of domestic borrowing on macroeconomic indicators and showed that especially the increase in domestic borrowing interest rates reduced private sector investments. Blanchard (2007) argues that the Crowding-Out Effect is a situation that is seen in debt-financed fiscal policies and which often develops against the financing of private sector investments.

In the study conducted by Emran & Farazi (2009), it was determined that the borrowing to be made by the government for 1 dollar more would push the private sector out of the fund market at the level of 1.4 dollars, and it was seen that lazy banks, which are nourished in the environments bringing along easier earning in terms of reward-risk appetite, triggered the Crowding-Out Effect. Likewise, it was expressed by Fayed (2012) and World Bank (2013) that borrowing from the domestic market at a higher level than the international market imposes an additional burden on the budget, and this leads to the Crowding-Out Effect, increasing the likelihood of depriving the private sector of access to existing funds.

Besides, it was also emphasized that public borrowing leads to the crowding-out effect as it causes a decrease in the credit amount to be transferred to the private sector (Kamaly & Shetta, 2014), (Vogel & Winkler, 2016). Moreover, in the studies carried out by Cooper & Nikolov (2017), Yılmaz (2017), Almajali (2018), Makin (2018), and Picarelli et al. (2019) it was argued that increases in government domestic debt securities affect the credit and deposit differences in the short term, pushing the private sector out of the credit market, and thus, causing the crowding-out effect.

4.DATA AND EMPIRICAL FINDINGS

The present study covers the period between January 2006 and December 2018. The variables and data used are the figures of Turkey, and Domestic Debt Stock is expressed as DDS, Banking Sector Total Credit Volume as CV, and Total Deposits (Private + Public) as TD. Of these variables, DDS is considered as the Independent Variable and CV and TD as the Dependent Variables. The data on domestic debt stock used (Thousand TRY) were obtained from the official website of The Republic of Turkey Ministry of Treasury and Finance (https://www.hmb.gov.tr/kamu-finansmani-istatistikleri) and the information on loans and deposits were taken from the official website of The Central Bank of the Republic of Turkey (www.tcmb.gov.tr). Data analyses were performed utilizing Gaussian codes and EViews version 10.0. Stationarity is a necessary condition for impact and consistent estimates. In recent literature, it is seen that different seasonal filters are more effective than the logarithm taking process, in order to deseasonalize the variables. EViews 10.0 has quite powerful filters. The filter, developed by Hodrick & Prescott (1997) and one of the most widely used, allows the trend (long-term) cross-section to change slowly over time. However, that filter method was not used in this study due to the critiques it received in the literature as mentioned in the studies of Mise et al. (2005) and Hamilton (2018). Instead, the relevant procedures of the Census X-12 - used by the United States Census Bureau - (Findley et al., 1998) were applied to the series through the EViews Tool.

4.1. Kapetanios (2005) Unit Root Test

A time series can be stationary around different deterministic trends, in different periods during the analysis period. These changes might arise from structural differentiation (breaks) which occur in intercept and/or trend, and caused by possible situations in various periods such as natural disasters, political crises, economic shocks, transition to different policies (Bayar and Yılmaz, 2017). Zivot & Andrews (1992), Lumsdaine & Papell (1997), Lee & Strazicich (2003) used the unit root tests which allowed one or two structural breaks in the series. With the method developed and practiced by Kapetanios (2005), it became possible to take into account multiple structural breaks.

The fact that the variable used is not stationary shows that the effects of these possible situations and conditions on the variable are not transient, thus the presence of an inconstant variable in any time-series cross-section indicates the existence of unit root as well. Therefore, the results of the unit root tests, in which structural breaks are not taken into consideration, will also be inaccurate (Perron, 2005). For this reason, the model for Kapetanios (2005) Unit Root Test with Multiple Structural Breaks employed in this study is as follows:

$$y_t = a_0 + a_1 t + \beta y_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + \sum_{i=1}^{m} \varphi_i DU_{i,t} + \sum_{i=1}^{m} N_i DT_{i,t} + \epsilon_t \tag{1.1}$$

$$DU_{i,t} = \begin{cases} 1 & t > T_{b,i} \\ 0 & t \leq T_{b,i} \end{cases} \quad ve \qquad DT_{i,t} = \begin{cases} t - T_{b,i} & t > T_{b,i} \\ 0 & t \leq T_{b,i} \end{cases} \tag{1.2.}$$

As shown in the model, the structural break of the intercept is indicated by DU and the structural break of the trend by DT dummy variables. The null hypothesis of the test is expressed as: the series is not stationary in structural breaks. In this test, it is considered that each period might be a potential break point. The date specified by the dummy variable in the model, whose error sum of squares is minimum, is considered as the first break date. After the first break date is added to the model, the next structural break date is looked up. As emphasized by Capistrán & Ramos-Francia (2009), this phase continues until *m* break dates, and the structural break numbers and dates of the model, which gives minimum τ statistics, are indicated.

Table 3: Kapetanios (2005) Unit Root Test Results with Multiple Structural Breaks

Variables	*τ-statistics*	*Critical Values*			*Structural Break Date*
		1%	*5%*	*10%*	
DDS	-3.176	-5.307	-4.923	-4.661	2008, 2009, 2011, 2014
CV	-2.074	-4.895	-4.352	-3.378	2008, 2009, 2010, 2013
TD	-4.178	-5.332	-4.456	-4.663	2009, 2010, 2015, 2017
ΔDDS	-11.673***	-5.307	-4.923	-4.661	-
ΔCV	-12.774***	-4.895	-4.352	-3.378	-
ΔTD	-10.782**	-5.332	-4.456	-4.663	-

Note: Δ shows first-order differences; ** and *** indicate the stationarity of the series at 5% and 1% significance levels, respectively.

Test statistics were obtained with codes written for the Gauss program. Critical values were obtained with 1000 iterations through bootstrap. As the test method, the model which determines the number of structural breaks according to the data set and allows structural breaks in intercept and trend was chosen. In order to determine the actual structural break points in the series, only the structural break dates detected in the level values of the series were reported. Accordingly, when the results of the above table are examined, it is seen that the first differences of the series became stationary after taking the differences, in other words, they are I (1). When structural break dates are examined, it is seen that the test method detected the correct fluctuations such as the effects of 2008 and 2009 global economic crises.

4.2. Maki (2012) Cointegration Test

Cointegration tests performed without considering the presence of structural breaks in the cointegration equation may result in deviation. The first studies considering the existence of structural breaks in the cointegration equation started with Gregory & Hansen (1996) and continued with Hatemi-J (2008) and similar studies. Later, Gregory & Hansen (1996) test and Hatemi-J (2008) cointegration test with two structural breaks were criticized by Maki, and a new method was developed in which structural breaks could be identified endogenously and which ensured five structural breaks to be taken into consideration (Maki, 2012). Accordingly, since each period can be a potential break point, the values of t-statistics are calculated, and the minimum t ratios are denoted as break points. In this method, in which all the analyzed series are expected to be I (1), 4 different models of the cointegration test with structural breaks are all included in order to test the existence of cointegration relationship between series in case of structural breaks (Maki, 2012):

1- The model with a break in the level, and without trend (Model 0)

$$Model\ 0: y_t = \mu + \sum_{i=1}^{k} \mu_i K_{i,t} + \beta x_t + u_t \tag{1.3.}$$

2- The model with a break in the level and coefficients, and without trend (Model 1)

$$Model\ 1: y_t = \mu + \sum_{i=1}^{k} \mu_i K_{i,t} + \beta x_t + \sum_{i=1}^{k} \beta_i x_i K_{i,t} + u_t \tag{1.4.}$$

3- The model with a break in the level and coefficients, and with trend (Model 2)

$$Model\ 2: y_t = \mu + \sum_{i=1}^{k} \mu_i K_{i,t} + \gamma x + \beta x_t + \sum_{i=1}^{k} \beta_i x_i K_{i,t} + u_t \tag{1.5.}$$

4- The model with a break in the level, coefficients, and trend (Model 3)

$$Model\ 3: y_t = \mu + \sum_{i=1}^{k} \mu_i K_{i,t} + \gamma t + \sum_{i=1}^{k} \gamma_i t K_{i,t} + \beta x_t + \sum_{i=1}^{k} \beta_i x_i K_{i,t} + u_t \tag{1.6.}$$

Table 4: Maki (2012) Cointegration Test Results

FCV=f(FDDS)	Test Statistic	1%	5%	10%	Break Dates
Model 0	-6,492**	-5,921	-5,363	-5,142	2008, 2009, 2010, 2013, 2015
Model 1	-6,117**	-6,104	-5,519	-5,267	2008, 2009, 2011, 2014
Model 2	-6,932***	-6,289	-5,654	-5,413	2008, 2009, 2010, 2013, 2015
Model 3	-8,159**	-8,234	-7,478	-7,255	2008, 2009, 2011, 2014
FTD=f(FDDS)	Test Statistic	1%	5%	10%	Break Dates
Model 0	-7,842**	-5,921	-5,363	-5,142	2008, 2009, 2010, 2013, 2015

Model 1	-8.003**	-6,104	-5,519	-5,267	2008, 2009, 2011, 2014
Model 2	-7.951***	-6,289	-5,654	-5,413	2008, 2009, 2010, 2013, 2015
Model 3	-8,755**	-8,234	-7,478	-7,255	2008, 2009, 2011, 2014

Note: The notation (F) shows the first-order difference, and ** and *** indicate cointegration at the significance levels of 5% and 1%, respectively.

The critical values which were calculated by Monte Carlo simulation and required for testing the hypotheses are given in the table below. The structural breaks in Table 6 are interpreted as the effects of economic events occurring in the world on Turkey. Again, when the results of Table 2 are reviewed, it is seen that there is cointegration between the series. In other words, since false regression is not expected in the long-term reviews to be made with the level values of these series that move together in the long run, long-term cointegration coefficients between the series were estimated in the next stage.

4.3. Long-Run Cointegration Coefficients Estimation via Fully Modified Ordinary Least Square (FMOLS)

In this study, long-run cointegration coefficients were analyzed by FMOLS (Fully Modified Ordinary Least Square) method. According to Phillips & Hansen (1990), the FMOLS method eliminates second-order bias effects, as it takes into account the simultaneous relationships between error terms of equations of the variables. The FMOLS estimator resolves diagnostic problems that occur with standard estimators. This method was developed by improving OLS, taking into account the endogeneity and autocorrelation problem (Sezgin, 2017; Sezgin and Yazıcı, 2016). Besides, an asymptotically biased and exogenous assumption was utilized in FMOLS to eliminate the inadequacy of OLS estimator in calculating optimal values of cointegrated regressions (Chen & Huang, 2013). K1=2008, K2=2009, K3=2010, K4=2014, which are the common intersection of the break years obtained from Kapetanios (2005) and Maki (2012) tests, are included in the FMOLS equation as dummy variables. The period before the said breaks was encoded with 0 and the period after was encoded with 1.

Table 5: FMOLS Long-Run Cointegration Coefficient Estimation Findings

Dependent Variable: FCV	Coefficient	t- Statistics	Probability Value (p)
FDDS	-0.228	-4.026	0.001*
K1	-0.195	5.897	0.000*
K2	-0.216	-6.429	0.018*
K3	-0.137	-5.101	0.005*
K4	-0.174	-4.882	0.001*
Constant	0.149	5.330	0.014*
R^2=0.653, DW=2.174, J-B=0.277, Harvey Test (p)= 0.152			
Dependent Variable: FTD	Coefficient	t- Statistics	Probability Value (p)

FDDS	-0.145	7.834	0.000*
K1	-0.183	-6.991	0.016*
K2	-0.162	-6.387	0.017*
K3	-0.133	-5.635	0.002*
K4	-0.129	-6.033	0.001*
Constant	0.208	7.932	0.005*
R^2=0.602, DW=2.092, J-B=0.194, Harvey Test (p)= 0.138			

Note: Statistical significance at the 5% significance level indicates the probability value of the Jarque-Bera normality test. The problems related to the autocorrelation and varying variance in the estimations were solved by using the Newey-West method.

As can be seen from Table 5, domestic debt stock decreases credit volume by 0.22 units and total deposits by 0.14 units. The decreasing effect of domestic debt stock on loans and deposits is statistically significant. The crisis periods discussed have a significant decreasing effect on both credit volume and deposits. When structural break dates are reviewed, 2008 and 2009 global economic crises led to a decline in total demand especially due to the increase in inflation and unemployment and caused a reduction in public revenues as a result of the economic contraction, and affected Turkish economy negatively. At this point, even though it is possible to mention the positive effect of the decrease in real interest rates on borrowing, it can be said that economic contraction leads to budget deficits (Özel, 2008) and increases the debt burden (Eğilmez, 2018). Similarly, the decrease especially in tax revenues due to the economic recession caused by global crises caused a decrease in public revenues as well and as a result, the level of public sector borrowing requirement was 1.2% for 2008, 1.6% for 2009, and 6.4% for 2010, respectively, according to the data of the Undersecretariat of Treasury (Bal & Özdemir, 2011). Besides, the Federal Reserve Bank halted bond purchases as of October 2014 after it announced on May 2013 that it would taper its purchases. This situation has started a new process in the global economy, and as a result of this new process the risk perception of international investors towards developing countries has been adversely affected, domestic markets have become more volatile, and the Government Domestic Debt Securities (GDS) interest rates have increased compared to previous years. Under the influence of all these conditions, the ratio of public net debt stock to GDP in Turkey was realized as 10.7% in 2014 (The Undersecretariat of Treasury, 2015). Therefore, in addition to the increase in public sector deficits in Turkey, the tendency to fund these deficits especially with the sources obtained from the domestic market by paying high-interest rates on GDS caused a decrease in financial resources, especially loans, that would be transferred to the real economy by the banking sector, and led to the exclusion of the private sector.

4.4. Short-Term Analysis by Error Correction Model

As emphasized by Granger & Weiss (1983), Anindya et al. (1993) and Chowdhury (1993), in determining short-run causality relationship between cointegrated series, information is obtained by employing the error correction term. In short, the error correction model shows how much of the imbalance in the independent variable will be corrected in the next period. When conducting short-term analysis, lagged values of the differenced series and one-term lagged value of the error term series obtained from the long-term analysis (Error Correction Term: ECTt-1) are utilized.

$$\Delta CV_t = \beta_0 + \beta_1 \Delta DDS_t + \beta_2 ECT_{t-1} + \beta_3 \Delta CV_{t-1} + \upsilon_t \qquad (1.7.)$$

$$\Delta TD_t = \beta_0 + \beta_1 \Delta DDS_t + \beta_2 ECT_{t-1} + \beta_3 \Delta TD_{t-1} + \omega_t \qquad (1.8.)$$

Table 6: Short-Term Error Correction Model Coefficient Estimates

Dependent Variable: ΔCV	Coefficient	t-Statistics	Probability Value (p)
ΔDDS_t	-0.194	-6.342	0.010*
ΔCV_{t-1}	0.397	4.889	0.001*
ECT_{t-1}	-0.431	-5.641	0.000*
Constant	0.522	6.349	0.000*
R^2=0.651, DW=2.17, J-B=0.273, Harvey test(p)=0.184			
Dependent Variable: ΔTD	**Coefficient**	**t- Statistics**	**Probability Value (p)**
ΔDDS_t	-0.126	-7.184	0.000*
ΔTD_{t-1}	0.249	6.451	0.000*
ECT_{t-1}	-0.384	-5.409	0.008*
Constant	0.397	4.331	0.000*
R^2=0.592, DW=2.08, J-B=0.251, Harvey test(p)=0.152			

Note: Statistical significance at the 5% significance level indicates the probability value of the Jarque-Bera normality test. The problems related to the autocorrelation and varying variance in the estimations were solved by using the Newey-West method.

As seen in Table 8, the coefficient of the error correction model is negative and statistically significant. In other words, the error correction systems of the models operate. In this case, of the short-term deviations within series that move together in the long run, 43.1% disappear for the credit volume model and 38.4% for the total deposit model, and then again the series get close the long-term equilibrium value.

5. CONCLUSION

In the present study, the effects of public domestic debt stock on credits and deposits in Turkey were studied from January 2006 to December 2018. In this context, the unit root test developed by Kapetanios (2005), which allows multiple structural breaks to be taken into consideration, was applied first. According to the findings of the study, the series covered the unit root at the level with a structural break and acquired a stationary quality after the first differences were taken. Subsequently, Maki (2012) cointegration test allowing up to 5 breaks was executed to the series. According to the results of this test, it is determined that there is cointegration between the series, in other words, the series will move together in the long run.

The direction and approximate level of the impact of public domestic debt stock on credits and deposits were estimated through FM-OLS. According to the findings, domestic debt stock decreases credit volume by 0.22 units and total deposits by 0.14 units. The decreasing effect of domestic debt stock on credits and deposits is found to be statistically significant. Furthermore, within the detected structural breaks, the impacts of the worldwide economic crises or policy changes on Turkey are seen obviously. When examining the short-run error

correction model coefficient estimations; of the short-term deviations within series that move together in the long run, 43.1% disappear for the credit volume model and 38.4% for the total deposit model; and then, the series become closer again to the long-run equilibrium value. In parallel with the decrease in the domestic borrowing needs of the state, the public-financing function of the banking sector will be enabled to focus on basic banking transactions, due to moving the asset-liability structure of the banks in terms of credits and deposits to a more balanced and higher quality level in the context of public domestic debt securities, deposits, and loans. In other words, in terms of the banking sector, the function of intermediating the fund suppliers and fund demanders, which is one of the basic principles of financial markets will be realized more effectively. Thus, it will be possible to minimize the negative effects of the exclusion of the private sector from the fund markets, known as the Crowding-Out Effect, and to make it more controllable.

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