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Research Article

The Relationship Among Fiscal Deficit, Stock Market, and Money Supply: Empirical Evidence for Turkey

Mali Açık, Hisse Senedi Piyasaları ve Para Arzı Arasındaki İlişki: Türkiye'den Kanıt

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Abstract

The objective of this paper is to examine the asymmetric relationship among fiscal deficit, stock market, and money supply in Turkey for the period between January 2006 and September 2019 by utilizing non-linear autoregressive distributed lag (NARDL) methodology. Our findings demonstrate that while positive changes in share price affect fiscal deficit significantly and symmetrically in the long-run, in the short-run only negative changes in share prices influence fiscal deficit asymmetrically. Fiscal deficit does not seem to have significant impact on share prices neither in long- nor short-run. Finally, money supply is affected from both decrease and increase in share prices symmetrically and negatively in the short-run. Neither changes in fiscal deficit nor share price have significant influence on money supply in the long-run. The findings of this study provide valuable inputs for the investors in stock market and policy makers.

Keywords: *Fiscal deficit, share prices, money supply, non-linear autoregressive distributed lag (NARDL)*

Jel Classification: *E62, G1, H62*

Öz

Bu çalışma, Türkiye için mali açık, hisse senedi piyasaları ve para arzı arasındaki ilişkiyi, doğrusal olmayan otoregresif dağıtılmış gecikme (NARDL) yöntemini kullanarak ampirik olarak incelemeyi amaçlamaktadır. Türkiye'nin Ocak 2006-Eylül 2019 arasındaki aylık zaman serisi verileri kullanılmıştır. Bulgularımız, hisse senedi fiyatındaki olumlu değişikliklerin mali açığı uzun vadede etkilediğini, kısa vadede ise hisse senedi fiyatlarındaki negatif değişikliklerin asimetrik olarak etkilediğini göstermektedir. Mali açığın kısa veya uzun vadede hisse senetleri üzerinde bir etkisi bulunmazken, hisse senedi fiyatlarındaki azalış ve artışın kısa vadede simetrik ve negatif olarak para arzını etkilediği gösterilmiştir. Bu çalışma, hisse senedi piyasası yatırımcıları ve politika yapıcılar tarafından önemli bulgular sunmaktadır.

Anahtar kelimeler: Mali açık, hisse fiyatları, para arzı, doğrusal olmayan otoregresif dağıtılmış gecikme (NARDL)

Jel Sınıflandırması: *E62, G1, H62*

Introduction

The relationship between macroeconomic variables and stock market is one of the debated topic in the economic theory and empirical studies. Although, macroeconomic indicators like inflation and interest rate are commonly examined in the literature, some papers claim that fiscal deficit is

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also one of this macroeconomic variables that is expected to influence the stock prices. However, studies do not reach consensus on the significance of the relationship between stock market and fiscal deficit. Researches on this area explain the link between share prices and fiscal deficit indirectly through the impact of fiscal deficit on interest rate, and then interest rate on stock prices. Interest rate increases as a result of the borrowing raise by government to manage with the budget deficit. This action diminishes the cash-flows of the stock's discounted value. Similarly, expected returns of shares will decrease, due to an increase in the taxes by government. Consequently, fiscal deficit has an inverse impact on share prices (Laopodis, 2009). Then again, other studies such as Barro (1974) demonstrate that unless individuals alter their net value by accurately expecting and discounting prospective tax rise from the extant tax reduction, stock prices will not be influenced from fiscal deficit..

The objective of this paper is to contribute to this literature by empirically demonstrating the link among fiscal deficit, stock market, and money supply for Turkey. Non-linear autoregressive distributed lag (NARDL) approach is employed to find the asymmetric influences and cointegrating relationship between variables in the long- and short-run. Sample period that is employed to examine the relationship between variables in interest in this study is from January 2006 to September 2019. Discount rate, which is expected to be influenced by the government actions, is also incorporated to the model to get rid of any biases. To the extent of our knowledge, this research is the first one that employ NARDL approach to examine the asymmetric link among fiscal deficit, share prices, and money supply.

In this study, we support and extend the literature on the link between macroeconomic variables and stock market by explicitly documenting the asymmetric impact of the fiscal deficit and money supply on the share prices in Turkey. Our primary finding is that, although fiscal deficit does not have significant impact on the share prices neither in long-nor short-run, changes in share prices do have influence on the fiscal deficit. While the long-run relationship shows that positive changes in share prices increase fiscal deficit, in the short-run negative changes have negative and asymmetric effect on the fiscal deficit. Another important result we reach is that money supply reduces fiscal deficit only in short-run, and no significant impact in the long-run. This finding is important since it explicitly demonstrates the ineffectiveness of money supply as a long-term fiscal deficit management tool. Finally, analysis conducted in this study show that while changes in share prices do not have any influence on the money supply in the long-run, in the short-run both decreases and increases in share prices affect money supply negatively and symmetrically.

The balance of the paper is organized as follows. The next section clarifies the extant studies. In the third section data and the methodology is described. Our findings are demonstrated in the fourth section. The last section concludes the study.

Literature review

This study is related to the literature on the relationship between fiscal deficit and stock market. Existent studies demonstrate that many macroeconomic indicators influence share prices through influencing future dividends and discount rates (Chen et al. 1986). Studies on the relationship between fiscal deficit and stock market, on the other hand, reveal mix results. Theoretical literature does not reach agreement on the direction and significance of the link between fiscal deficit and stock prices. On one hand, studies including Osamwonyi and Osagie (2012) consider fiscal deficit as one of the variables that is expected to influence share prices by influencing macroeconomic indicators. Furthermore, Burney and Akhtar (1992) claim that a fiscal deficit, which is the difference between expenditures and revenues of government, might be financed by utilizing five approaches, which are through rising money supply, through public borrowing, through borrowing from the external sources, through drawing on external reserves, or through the combination of these four methods. If the government purchases T-bills with the aim of rising reserves, money supply will escalate. This is going to have a direct effect on share prices by reducing the pressure on the interest rate. On the contrary, when the increasement of the borrowing is preferred by the government, the interest rate is going to rise, which result with the reduction of the shares' expected returns (Roley and Schall, 1988). Furthermore, some researches, including Ball and Mankiw (1995), and Hall and Taylor (1993), demonstrate that fiscal deficit decreases stock prices via rising the future tax rate, since current consumption will decrease. On the other hand, some other studies that support Ricardian Equivalence Proposition, such as Barro (1974) and Darrat (1987), asserts that if the upcoming tax rise is appropriately anticipated and discounted from the extant tax decrease, investors will not change their net worth, therefore stock market will not be influenced from the fiscal deficit. Empirical studies also do not reach consensus on the significance of the relationship. While some studies, like Wacthel and Young (1987), show the existence of the significant direct link between interest rates and fiscal deficit, some others are incapable of finding some (see Findlay, 1990; Mascaro and Meltzer, 1983). We try to contribute this literature by proposing the asymmetric link between fiscal deficit and stock prices for Turkey.

Another strand of literature that our paper relates to is the literature on the relation between money supply and stock market. Studies do not reach consensus on the relation between money supply and stock market. A large body of theoretical work that supports efficient market hypothesis states that share prices are not influenced by money supply since the entire historical info about the supply of money is revealed by the current prices of shares (Cooper, 1974). However, another rich theoretical literature that defends the portfolio approach claims that money supply might influence share prices as the equilibrium position of investors between money and securities will be altered by the raise in the money supply till the part of the extra money is replaced by other assets such as securities (Hamburger and Kochin, 1971). Moreover, inflation will escalate as a result of an increase in the money supply, which diminishes the stock prices as investors prefer to invest in real assets instead of financial ones. Empirical studies on developed countries, such as Boztosun (2010), Osamwonyi and Osagie (2012), and Rozeff (1994), also demonstrate this negative impact of money supply on share prices. Finally, some studies claim that stock prices are not affected from the money supply itself, but affected from the unexpected changes in it (see Tobin, 1963; and Pearce and Roley, 1983)

Another interest of this paper is the link between fiscal deficit and money supply. There is a considerable debate regarding the link between fiscal deficit and money supply. Government activities to deal with the deficit influence future monetary policy decisions. For instance, the tendency of the government to rise spending will cause an increase in the interest rate. This put tension on the economic growth, and government enhance the supply of money to get rid of some part of this tension (Laopodis, 2009). By empirically examining 10 developed countries, Giannaros and Siegel (1986) demonstrate that fiscal deficit does not have significant influence on the money supply. Likewise, Barnhart and Darrat (1988) present the insignificant impact of fiscal deficit on money supply by employing the Granger causality test. On the other hand, by examining 94 countries, Fischer et al. (2002) show that fiscal deficit significantly increases money supply.

Finally, federal discount rate is included to the model as a control variable in order to prevent any biased conclusions that might be reached. As changes in discount rate might imply the prospective changes in government's current and future monetary policy, it is expected to influence stock prices, money supply, and fiscal deficit (see Batten and Thornton, 1984).

As the extant literature is unable to propose a clear decision about the link among fiscal deficit, money supply, and share prices, we aim to contribute to the literature by empirically examining the link among suggested variables in developing countries such as Turkey.

Data and methodology

Data

In this paper, as an indicator of stock market, share price index, hereafter SP, is employed. Fiscal deficit, hereafter FD, is computed by general government expenses from the revenue. As a monetary policy indicator, hereafter MS, log values of broad money (M3), is used. Federal discount rate, hereafter DR, is employed as a control variable. Our sample period is between January 2006 and September 2019, on a monthly basis. Data for money supply, share prices, and discount rate are provided from the OECD databank. Data for the deficit are gathered from the Republic of Turkey Ministry of Finance's webpage.

Methodology

To examine the asymmetric impacts among variables, the non-linear autoregressive distributed lag (NARDL) methodology is used in this study. This approach helps us to separate the short- and long-run effects; moreover it helps us to detect the asymmetric relationship. Moreover, this methodology avoids endogeneity and convergence issues (Shin et al., 2014).

Unit root tests are applied to find the stationarity characteristics of variables in interest. Rejecting the null hypothesis implies variables are integrated of order 0. The amount that a series have to be differenced to turn into stationary shows the number of integration. NARDL approach requires variables to be integrated less than two (Peseran and Shin, 1998; Shin et al., 2014).

After applying unit-root test, bounds-test methodology is used to find the long-run cointegration. The error correction presentation of the linear ARDL models are as follows.

$$\Delta FD_t = \mu + \propto_1 FD_{t-1} + \propto_2 SP_{t-1} + \propto_3 MS_{t-1} + \propto_4 DR_{t-1} + \sum_{i=1}^{p-1} \lambda_1 \Delta FD_{t-i} + \sum_{i=0}^{q-1} \lambda_2 \Delta SP_{t-i} + \sum_{i=0}^{q-1} \lambda_3 \Delta MS_{t-i} + \sum_{i=0}^{q-1} \lambda_4 \Delta DR_{t-i} + \varepsilon_t \quad (1)$$

$$\Delta SP_t = \mu + \propto_1 SP_{t-1} + \propto_2 FD_{t-1} + \propto_3 MS_{t-1} + \propto_4 DR_{t-1} + \sum_{i=1}^{p-1} \lambda_1 \Delta SP_{t-i} + \sum_{i=0}^{q-1} \lambda_2 \Delta FD_{t-i} + \sum_{i=0}^{q-1} \lambda_3 \Delta MS_{t-i} + \sum_{i=0}^{q-1} \lambda_4 \Delta DR_{t-i} + \varepsilon_t \quad (2)$$

$$\Delta MS_t = \mu + \propto_1 MS_{t-1} + \propto_2 SP_{t-1} + \propto_3 FD_{t-1} + \propto_4 DR_{t-1} + \sum_{i=1}^{p-1} \lambda_1 \Delta MS_{t-i} + \sum_{i=0}^{q-1} \lambda_2 \Delta SP_{t-i} + \sum_{i=0}^{q-1} \lambda_3 \Delta FD_{t-i} + \sum_{i=0}^{q-1} \lambda_4 \Delta DR_{t-i} + \varepsilon_t \quad (3)$$

where Δ shows the first-difference of the related variables. Optimum lag lengths demonstrated by p and q are chosen according to the Akaike information criterion (AIC).

In order to prevent misleading results that might be occurred due to nonlinearity of the relationship among variables, NARDL methodology is applied in this paper. Following Shin et al. (2014), the cointegrating regression demonstrated in equation 4 is used.

$$y_t = \beta^+ x_t^+ + \beta^- x_t^- + u_t \quad (4)$$

where x_t indicates FD and SP, and y_t refers to FD, SP, and MS. β's show the related long-run parameters.

In our empirical analyses, the error correction demonstration of the NARDL models shown in equation 5, 6 and 7 are employed.

$$\Delta FD_t = \mu + \chi FD_{t-1} + \omega_1^+ SP_{t-1}^+ + \omega_1^- SP_{t-1}^- + \omega_2 MS_{t-1} + \omega_3 DR_{t-1} + \sum_{i=!}^{P-1} \tau \Delta FD_{t-i} + \sum_{i=0}^{q-1} \phi_1^+ \Delta SP_{t-i}^+ + \sum_{i=0}^{q-1} \phi_1^- \Delta SP_{t-i}^- + \sum_{i=0}^{q-1} \phi_2 \Delta MS_{t-i} + \sum_{i=0}^{q-1} \phi_3 \Delta DR_{t-i} + + \varepsilon_t \quad (5)$$

$$\Delta SP_t = \mu + \chi SP_{t-1} + \omega_1^+ FD_{t-1}^+ + \omega_1^- FD_{t-1}^- + \omega_2 MS_{t-1} + \omega_3 DR_{t-1} + \sum_{i=!}^{P-1} \tau \Delta SP_{t-i} + \sum_{i=0}^{q-1} \phi_1^+ \Delta FD_{t-i}^+ + \sum_{i=0}^{q-1} \phi_1^- \Delta FD_{t-i}^- + \sum_{i=0}^{q-1} \phi_2 \Delta MS_{t-i} + \sum_{i=0}^{q-1} \phi_3 \Delta DR_{t-i} + +\varepsilon_t \quad (6)$$

$$\Delta MS_t = \mu + \chi MS_{t-1} + \omega_1^+ FD_{t-1}^+ + \omega_1^- FD_{t-1}^- + \omega_2^+ SP_{t-1}^+ + \omega_2^- SP_{t-1}^- + \omega_3 DR_{t-1} + \sum_{i=!}^{P-1} \tau \Delta MS_{t-i} + \sum_{i=0}^{q-1} \phi_1^+ \Delta FD_{t-i}^+ + \sum_{i=0}^{q-1} \phi_1^- \Delta FD_{t-i}^- + \sum_{i=0}^{q-1} \phi_2^+ \Delta SP_{t-i}^+ + \sum_{i=0}^{q-1} \phi_2^- \Delta SP_{t-i}^- + \sum_{i=0}^{q-1} \phi_3 \Delta DR_{t-i} + +\varepsilon_t \quad (7)$$

where χ and ω_n demonstrate the long-run coefficients, and τ and $\phi_i$show the short-run coefficients. To examine the null hypothesis of no asymmetric cointegration, F-statistics is employed.

In the final step, standard Wald test is used to test the long- and short-run asymmetries (see Shin et al., 2014, and Kocaasrslan and Soytas, 2019). Symmetry is indicated by $\beta^+ = \beta^-$. Moreover, the long-run coefficients of the variables with negative and positive changes are obtained by $\beta^+ = -\omega_n^+/\chi$ and $\beta^- = -\omega_n^-/\chi$. To investigate the short-run symmetry, the null hypothesis where $\sum_{i=0}^{q-1} \phi_k^+ = \sum_{i=0}^{q-1} \phi_k^-$is tested. The findings of these analyses are demonstrated in the next section.

Empirical results

In the first step, we investigate the stationarity characteristics of variables. To prevent misleading results, several unit-root tests, which are augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and generalized least squares- detrended Dickey-Fuller (DF-GLS) are employed (see Dickey and Fuller, 1979; and Phillips and Perron, 1988). Akaike Information Criterion (AIC) is used to decide the lag lengths. Unit-root tests results are shown in Table 1. The findings indicate that the integrations of the variables are either 0 or 1. Therefore, without reluctance ARDL and NARDL models can be employed (Peseran and Shin, 1998; Shin et al., 2014).

Table 1. Results of the unit-root tests

		ADF		**DF-GLS**		**PP**
		Statistics	**Lag**	**Statistics**	**Lag**	
Panel A: Levels						
SP	*Intercept*	-1.0495	1	-0.2589	1	-0.9713
FD		-0.4967	11	0.7882	11	-16.467***
MS		0.239	4	2.2935	5	-0.9928
DR		-1.392	0	-0.8309	0	-1.4062
SP		-3.5315	1	-3.0579	1	-3.0398
FD		-1.2778	11	-1.408	11	-18.0209***
MS		-2.1482	4	-1.7065	4	-3.7368**
DR	*Intercept and Trend*	-0.7158	0	-1.0332	0	-0.7169
Panel B: First-Differences						

		Statistics	Lag	Statistics	Lag	
SP		-10.3188***	0	-9.1559***	0	-10.2429***
FD	*Intercept*	-9.701***	10	-0.303	12	-140.164***
MS		-8.9216***	3	-8.9552***	3	-5.8014***
DR		-12.6966***		-12.7312***	0	-12.6966***
SP		-10.2953***	0	-9.9286***	0	-10.219***
FD		-9.7347***	10	-0.6355	12	-150.522***
MS		-8.8741***	3	-7.6813***	3	-5.9023***
DR	*Intercept and Trend*	-12.781***	0	-12.7838***	0	-12.781***

Significance at 1%, 5%, and 10% are demonstrated by superscripts ***, **, and *, respectively. Dickey-Fuller, Phillps-Perron, and Dickey- Fuller GLS detrended are demonstrated by ADF, PP, and , DF-GLS respectively. To establish the lag lengths Akaike Information Criterion (AIC) is used. SP, FD, MS, and DR denote share price, fiscal deficit, log value of M3, and discount rate respectively.

We continue our analysis with the Bounds test to get the cointegration results. The findings of the Bounds test, shown in Table 2, indicate there is long-run cointegration among fiscal deficit, money supply, share price, and discount rate at least at 10 percent. The existence of cointegrating relationship leads us to investigate the asymmetric relations among fiscal deficit, share prices, and money supply. To this intend, NARDL methodology is applied in the next step.

Table 2. Bounds Testing Procedure Results

Cointegration Hypotheses	F Stat.
$F(FD_t/SP_t^+,SP_t^-,MS_t, DR_t)$	6.642***
$F(SP_t/FD_t^+,FD_t^-,MS_t, DR_{t)}$	3.342*
$F(MS_t/SP_t^+,SP_t^-,FD_t^+,FD_t^- ,DRt)$	8.372***

For the case of the dependent variable (FD), the critical rates are 2.56-3.49and 3.29-4.37 for the significance levels of 5%, and 1 %, respectively. For the case of the dependent variable (SP), the critical values are 2.56-3.49 and 3.29-4.37 for the significance levels of 5%, and 1 %, respectively. For the case of the dependent variable (MS), the critical rates are 2.39-3.38 and 3.06-4.15 for the significance levels of 5%, and 1 %, respectively. 1%, 5%, and 10% significances are demonstrated by superscripts ***, **, and * , respectively.

Tables 3, 4 and 5 reveal the results of the estimated NARDL models given in equation 5, 6, and 7. Short- and long-run asymmetries, examined via Wald tests, are shown in Table 6. Findings of the Wald tests indicate that the short- and long-run symmetry hypothesis are rejected for most of the analyses.

The results of the empirical model in which fiscal deficit is a dependent variable are presented in Table 3. Share price has a significant impact on fiscal deficit both in long- and short-run. In the long-run, positive changes in share price have significant positive impact on fiscal deficit. However, in the short-run, as can be seen in Table 6, asymmetry arise between the influences of negative and positive changes in share prices. While positive changes in share price do not have significant effect on fiscal deficit, negative changes in share price influence fiscal deficit negatively. These findings suggest that decrease (increase) in the share prices increase (reduce) T-bill demands of the investors, which increase (decrease) the government revenue, and therefore decrease (increase) the fiscal deficit. Moreover, while money supply does not seem to have significant impact on fiscal deficit in the long-run, increase in the money supply reduces the fiscal deficit in short-run. So, rising the money-supply to manage fiscal deficit only has short-term impact.

In Table 4, empirical results of the model, in which share price is employed as a dependent variable, is demonstrated. Findings suggest that, changes in fiscal deficit do not have significant impact on share prices neither in short- nor long-run. These results are consistent with the Ricardian Equivalence Proposition. Money supply does not have significant effect on the share prices in the short-run, which supports the findings of Kandir (2008). On the other hand, it has significant negative impact on share prices in the long-run. This finding resonates well with the empirical studies on developed countries, which present the inverse relationship between share prices and money supply (see Boztosun, 2010; Osamwonyi and Osagie, 2012; Rozeff, 1994).

Finally, Table 5 presents the empirical analysis results of the model, in which money supply is considered as a dependent variable. Findings show that in the long-run, neither changes in share price nor changes in fiscal deficit have significant impact on the money supply. However, in the short run, while changes in the fiscal-deficit still do not have significant effect on the money supply, both negative and positive changes in the share prices affect money supply negatively. Moreover, as can be seen from Table 6, these effects are symmetric. The fact that changes in fiscal deficit do not have significant impact on the money supply in Turkey for a given period of time suggests that changes in fiscal deficit do not lead change in money supply in Turkey between the period of 2006 and 2019. Finally, results show that consistent with the literature, discount rate affects both fiscal deficit and money supply.

Table 3. Estimation Results of the NARDL (Dependent Variable: $\triangle FD_t$)

Panel A: Estimated coefficients (Adj. R^2= 0.805)				
Explanatory Variable	Coeff.	Std. Error	t-stat.	Prob.
C	62155.95	5029506	0.012	0.990
FD_{t-1}	-1.16953	0.190231	-6.148	0.000
SP_{t-1}^-	91465.72	66899.31	1.367	0.174
SP_{t-1}^+	90661.33	45494.48	1.993	0.048
MS_{t-1}	-74235.2	118126	-0.628	0.531
DR_{t-1}	-14014	237088.5	-0.059	0.953
DFD_{t-1}	-0.2979	0.134785	-2.210	0.029
DFD_{t-2}	-0.37042	0.079515	-4.658	0.000
DSP_t^-	-195221	147872.2	-1.320	0.189
DSP_{t-1}^-	146592.1	133229.9	1.100	0.273
DSP_{t-2}^-	-52466.3	158617.4	-0.331	0.741
DSP_{t-3}^-	-462739	147242.1	-3.143	0.002
DSP_t^+	124320.3	183304.9	0.678	0.499
DMS_t	-649714	653875.4	-0.994	0.322
DMS_{t-1}	491535.7	724188.1	0.679	0.499
DMS_{t-2}	1334604	1178779	1.132	0.260
DMS_{t-3}	-2283594	1035034	-2.206	0.029
DDR_t	-333722	400781.2	-0.833	0.407
DDR_{t-1}	-591061	253450.6	-2.332	0.021

DDR_{t-2}	23531.51	354790.6	0.066	0.947
DDR_{t-3}	1195094	241583.7	4.947	0.000
Panel B: Long-Run Coefficients for the asymmetric parameters				
SP^+	77519.1914**		SP^-	78206.9782

Panel A contains the results from the error correction representation of the NARDL model for the case of dependent variable $\triangle FD_t$. t-statistics and standard errors, which are the Newey-West (1987) autocorrelation and heteroskedasticity robust, are presented. Positive and negative partial sums are denoted by the superscripts "+" and "−", respectively. The estimated long-run coefficients related to the negative and positive changes of the related variables are demonstrated in Panel B. Significance at 1%, 5%, and 10% are demonstrated by superscripts ***, **, and *, respectively.

Conclusion

In the literature, although there are several studies that examine the impacts of various macroeconomic variables on the stock market, the number of papers on the link between fiscal deficit and stock market is scarce. This study aims to contribute to the literature by exploring the relation among fiscal deficit, stock market, and money supply in Turkey empirically. To this end, NARDL approach that takes into account the asymmetric effects is employed. This novel approach helps us to assess the long- and short-run relationship among variables in interest. Moreover, asymmetric impacts of the positive and negative changes in variables can be identified.

Empirical findings in this study can be summarized as follows. First of all, to get the cointegrating relationship, Bounds-test is applied. Bounds-test results show the existence of the long-run relationship among fiscal deficit, share prices, and money supply. Secondly, we present the directions of the relationship by employing NARDL methodology. Our results suggest that the link between the fiscal deficit and stock market is from share price to fiscal deficit both in the short- and long-run. While just the positive changes in share prices influence the fiscal deficit positively in the long-run, in the short-run only the negative changes have significant and asymmetric effect on the fiscal deficit. These findings suggest that increases (decrease) in share prices decrease (increase) the demand for T-bills, and this causes the reduction (increasement) in the government revenue. The link between money supply and share prices is bidirectional and negative. Finally, although money supply affects fiscal deficit negatively in the short-run, it does not have significant effect in the long-run. This finding resonates well with the literature that suggests increasing money supply to manage with the fiscal deficit is not a long-term solution. Fiscal deficit does not have significant influence on the money supply in Turkey neither in the short- nor long-run.

To sum up, findings of this study demonstrate the important association among stock market, fiscal deficit, and money supply empirically. We believe that our results offer valuable input to investors and policy makers in Turkey.

Table 4. Estimation Results of the NARDL (Dependent Variable: $\triangle SP_t$)

Panel A: Estimated coefficients (Adj. R^2= 0.1795)				
Explanatory Variable	Coeff.	Std. Error	t-stat.	Prob.
C	12.11607	3.451	3.511	0.001
SP_{t-1}	-0.10505	0.037	-2.810	0.006
FD_{t-1}^+	-8.68E-08	0.000	-0.680	0.498
FD_{t-1}^-	-1.51E-07	0.000	-1.271	0.206
MS_{t-1}	-0.22794	0.117	-1.950	0.053

DR_{t-1}	-0.10595	0.095	-1.120	0.265
DSP_{t-1}	0.201305	0.075	2.661	0.009
DFD_t^+	-1.99E-08	0.000	-0.183	0.855
DFD_{t-1}^-	-1.75E-08	0.000	-0.291	0.772
DMS_{t-1}	-0.83646	0.591	-1.416	0.159
Panel B: Long-Run Coefficients for the asymmetric parameters				
FD^+	0.0000		FD^-	0.0000

Panel A contains the results from the error correction representation of the NARDL model for the case of dependent variable $\triangle FD_t$. t-statistics and standard errors, which are the Newey-West (1987) autocorrelation and heteroskedasticity robust, are presented. Positive and negative partial sums are denoted by the superscripts "+" and "–", respectively. The estimated long-run coefficients related to the negative and positive changes of the related variables are demonstrated in Panel B. Significance at 1%, 5%, and 10% are demonstrated by superscripts ***, **, and *, respectively.

Table 5. Estimation Results of the NARDL (Dependent Variable: $\triangle MS_t$)

Panel A: Estimated coefficients (Adj. R^2= 0.6994)				
Explanatory Variable	Coeff.	Std. Error	t-statistic	Prob.
C	4.640088	1.7621	2.633	0.010
MS_{t-1}	-0.115252	0.0493	-2.337	0.021
SP_{t-1}^+	-0.015769	0.0108	-1.455	0.148
SP_{t-1}^-	0.005697	0.0061	0.940	0.349
FD_{t-1}^+	2.65E-08	0.0000	1.063	0.280
FD_{t-1}^-	-9.23E-09	0.0000	-0.539	0.591
DR_{t-1}	-0.069547	0.0345	-2.014	0.046
DMS_{t-1}	0.784498	0.0888	8.835	0.000
DMS_{t-2}	-0.814417	0.2865	-2.842	0.005
DMS_{t-3}	0.461723	0.2803	1.647	0.102
DSP_t^+	-0.033042	0.0192	-1.725	0.087
DSP_{t-1}^+	-0.058064	0.0278	-2.091	0.038
DSP_t^-	-0.045834	0.0268	-1.713	0.089
DFD_t^+	-3.36E-09	0.0000	-0.210	0.834
DFD_{t-1}^+	-1.56E-08	0.0000	-1.331	0.185
$DFDt^-$	-7.45E-09	0.0000	-0.503	0.616
DDR_t	0.004234	0.0379	0.112	0.911
DDR_{t-1}	0.096748	0.0793	1.219	0.225
DDR_{t-2}	0.080694	0.0448	1.802	0.074
DDR_{t-3}	0.238936	0.1271	1.880	0.062
Panel B: Long-Run Coefficients for the asymmetric parameters				

SP^+	-0.1368	SP^-	0.0494
FD^+	0.0000	FD^-	0.0000

Panel A contains the results from the error correction representation of the NARDL model for the case of dependent variable $\triangle FD_t$. t-statistics and standard errors, which are the Newey-West (1987) autocorrelation and heteroskedasticity robust, are presented. Positive and negative partial sums are denoted by the superscripts "+" and "–", respectively. The estimated long-run coefficients related to the negative and positive changes of the related variables are demonstrated in Panel B. Significance at 1%, 5%, and 10% are demonstrated by superscripts ***, **, and *, respectively.

Table 6. Wald test results for long- and short-run asymmetry

Panel A. Long-run asymmetry		
Dependent variables	W_{LR}(FD)	W_{LR}(SP)
DFD		0.0125
DSP	2.2425**	
DMS	-2.4085**	2.6742***
Panel B. Short-run asymmetry		
Dependent variables	W_{SR}(FD)	W_{SR}(SP)
DFD		4.0514***
DSP	-82775015***	
DMS	0.2332	0.1572

W_{LR}(FD), and W_{LR}(SP) refer to the Wald test for the null of long-run symmetry for the corresponding variable. W_{SR}(FD), and W_{SR}(SP) refer to the Wald test for the null of the additive short-run symmetry condition for the corresponding variable. . Significance at 1%, 5%, and 10% are demonstrated by superscripts ***, **, and *, respectively.

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Araştırma Makalesi

The Relationship Among Fiscal Deficit, Stock Market, and Money Supply: Empirical Evidence for Turkey

Mali Açık, Hisse Senedi Piyasaları ve Para Arzı Arasındaki İlişki: Türkiye'den Kanıt

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Genişletilmiş özet

İktisat teorisi ve ampirik çalışmalar, birçok makroekonomik değişken ile hisse senedi fiyatları arasında çift yönlü bir ilişki olduğunu göstermiştir. Yaygın olarak araştırılan bu değişkenlerden bazıları para arzı, enflasyon ve faiz oranıdır. Bazı çalışmalar, mali açığın faiz oranları gibi bazı makroekonomik değişkenleri etkileyerek hisse senedi fiyatlarını da etkilediğini iddia etmektedir. Eğer hükümet bütçe açığını yönetmek için borçlanmalarını arttırırsa, faiz oranları artacak ve bu da hisse senetlerinin nakit akışlarının iskonto edilmiş değerini düşürecektir. Aynı şekilde, vergileri arttırırlarsa, beklenen hisse senedi getirileri azalacaktır. Bu nedenle bütçe açığının hisse fiyatları üzerinde olumsuz etkisi bulunmaktadır (Laopodis, 2009). Öte yandan, diğer araştırmacılar, bireyler mevcut vergi indirimlerinden gelecekteki vergi artışlarını doğru bir şekilde tahmin ederek net değerlerini değiştirmedikleri sürece, mali açığın hisse senetleri üzerinde herhangi bir etkisi olmadığını savunmaktadır (Barro, 1974). Dolayısıyla, mali açığın borsa üzerindeki etkisi konusunda litaretürde bir fikir birliği sağlanmış değildir.

Bu çalışma, Türkiye için mali açık, hisse senedi ve para arzı arasındaki ilişkiyi ampirik olarak inceleyerek bu alandaki boşluğu doldurmayı amaçlamaktadır. Uzun ve kısa vadede değişkenler arasındaki asimetrik etkileri ve eşbütünleşme ilişkisini bulumak adına, doğrusal olmayan otoregresif dağıtılmış gecikme (NARDL) yaklaşımından faydalanılmıştır. Türkiye'nin Ocak 2006-Eylül 2019 arasındaki aylık zaman serileri verileri kullanılmıştır. Herhangi bir yanlı sonuç ihtimalini önlemek için, mali açığı yönetmek amacıyla alınan hükümet faaliyetlerinden etkilenebilecek iskonto oranı da modele dahil edilmiştir.

Literatürde gelecekteki temettüleri ve iskonto oranlarını etkileyerek birçok makroekonomik değişkenin hisse senedi fiyatlarını etkilediği ileri sürülmüştür. Ayrıca, çalışmalar bu ilişkinin çift yönlü olabileceğini göstermiştir (Chen vd., 1986). Bu çalışmanın konusu olan mali açığın, makroekonomik değişkenler üzerinde etkisi olması nedeniyle, makroekonomik değişkenleri etkileyerek hisse senedi fiyatlarını etkilemesi beklenmektedir (Osamwonyi ve Osagie, 2012). Ricard Eşdeğerlik Önerisi, bireyler vergi değişimlerini öngörerek varlıklarının net değerlerini değiştirmedikleri sürece mali açığın hisse senedi piyasalarına bir etkisi olmadığını savunsa da, çalışmalar karışık sonuçlar vermiştir (bkz. Barro, 1974; Darrat, 1987).

Devletin gelirlerinin üzerinde fazla harcamada bulunması anlamına gelen bütçe açığı, para arzını artırarak, kamudan borç alarak, dış kaynaklardan borç alarak, dış kaynaklardan çekerek veya bu dört yöntemin tümünü birleştirerek beş yolla finanse edilebilir (Burney ve Akhtar, 1992). Hükümet rezervleri artırmak için Hazine menkul kıymetleri satın alırsa, faiz arzı baskısını hafifleterek hisse senedi fiyatları üzerinde olumlu bir etkisi olacak para arzı artacaktır. Diğer yandan, hükümet borçlanmayı artırma eğilimindeyse, faiz oranı artacaktır ve bu da hisse senetlerinin beklenen getirilerinin azalmasına neden olacaktır (Roley ve Schall, 1988). Ayrıca, bazı çalışmalar, bütçe açığındaki artışın bir sonucu olarak gelecekteki vergi oranını artmasının beklendiğini, bunun da cari tüketimi azalacağı için hisse senedi fiyatlarını düşüreceğini savunmuşlardır (bkz. Ball ve Mankiw, 1995; Hall ve Taylor, 1993). Kısacası, teorik literatürde, mali açığın hisse senedi fiyatları üzerindeki net etkisi konusunda fikir birliği sağlanamamıştır. Ampirik bulgular da net değildir. Bazı çalışmalar bütçe açığı ve hisse senedi getirileri arasında doğrudan bir ilişki bulmasına rağmen (bkz. Wacthel ve Young, 1987), diğerleri böyle bir ilişkinin varlığından söz etmemiştir (bkz. Findlay, 1990; Mascaro ve Meltzer, 1983).

Yukarıda da belirtildiği gibi, gelecekteki para politikası kararları, mali açığı yönetmek için alınan hükümet faaliyetlerinden etkilenmektedir. Bu nedenle çalışmamızda, para politikası değişkeni, mali açık ile borsa arasındaki ilişkiyi inceleyen modele açıkça eklenmiştir (Laopodis, 2009). Para arzı ve borsa arasındaki ilişki de tartışmalıdır. Etkin piyasa yaklaşımına göre, para arzı ile ilgili tüm geçmiş bilgiler mevcut hisse senedi fiyatlarına yansıtıldığından, para arzı stok fiyatları üzerinde herhangi bir etkiye sahip değildir (Cooper, 1974). Öte yandan, portföy yaklaşımı para arzındaki artışın, bu fazla paranın bir kısmını özkaynaklar gibi diğer varlıklarla değiştirinceye kadar yatırımcıların para ve özkaynaklar arasındaki denge konumunu değiştireceğini belirtmektedir (Hamburger ve Kochin, 1971). Ayrıca, para arzındaki artışın enflasyonu artırması beklenmektedir ve bu durum yatırımcıların finansal varlıklardan ziyade gerçek varlıklara yatırım yapmalarını sağlayarak hisse senedi fiyatlarını düşüreceği belirtilmiştir. Gelişmiş ülkeler için yapılan ampirik çalışmalar para arzı ve hisse senedi fiyatları arasındaki bu olumsuz ilişkiyi de kanıtlamaktadır (bkz. Boztosun, 2010; Osamwonyi ve Osagie, 2012; Rozeff, 1994).

Son olarak modele, bir kontrol değişkeni olarak, devlet iskonto oranı dahil edilmiştir. İskonto oranının, hisse senedi fiyatlarını, para arzını ve mali açığı etkilemesi beklenmektedir.

Yukarıda da görülebileceği gibi, mevcut literatür mali açık, hisse senedi fiyatları ve para arzı arasındaki ilişki hakkında net bir sonuç vermemektedir. Bu nedenle, Türkiye gibi gelişmekte olan ülkelerde bu değişkenler arasındaki ilişkiyi incelemek için ampirik bir çalışma yapılmalıdır. Bildiğimiz kadarıyla bu çalışma, Türkiye için mali açık, hisse senedi fiyatı ve para arzı arasındaki asimetrik ilişkiyi araştıran ilk çalışmadır.

Bu çalışmada, hisse senedi piyasası, mali açık ve para arasındaki ilişkinin ekonometrik analizi için N metodolojisi NARDL kullanılmıştır. Mali açıkla ilgili veriler Türkiye Cumhuriyeti Maliye Bakanlığı'nın resmi web sayfasından, diğer değişkenlere ilişkin veriler OECD veri bankasından elde edilmiştir.

Hisse senedi piyasası göstergesi olarak hisse fiyat endeksi, SP, kullanılmaktadır. Mali açık, FD, genel hükümet gelirleri ile genel hükümet giderleri arasındaki fark ile ölçülmektedir. Para politikasının göstergesi olarak, MS, geniş para arzı (M3) kullanılmıştır. Devlet iskonto oranı, DR, kontrol değişkeni olarak kullanılmıştır.

Bu çalışmada, serinin durağanlık özelliklerini test etmek için, arttırılmış Dickey-Fuller (ADF), genelleştirilmiş en küçük kareler- Dickey-Fuller (DF-GLS) ve Phillips-Perron (PP) kullanılmıştır (Dickey ve Fuller, 1979; Phillips ve Perron, 1988) . Gecikme uzunlukları Akaike Information Criterion (AIC) tarafından belirlenmiştir. Birim kök testlerinin sonuçları, sırasıyla seviyeler ve ilk farklılıklar için Tablo 1'de gösterilmektedir. Sonuçlar, tüm değişkenlerin I(0)veya I(1) olduğunu göstermiştir. Bu nedenle NARDL metodolojisi uygulamak için bir engel bulunmamaktadır.

Birim kök testi uygulandıktan sonra, uzun dönem eşbütünleşmeyi bulmak adına sınır test metodolojisinden faydalanılmıştır. Tablo 2'de de gösterildiği gibi, sonuçlar değişkenler arasında en az yüzde on önem düzeyinde uzun dönemli bir bütünleşme olduğunu göstermektedir.

Değişkenler arasındaki ilişkinin doğrusal olmaması nedeniyle ortaya çıkabilecek yanıltıcı sonuçları önlemek için, çalışmamızda NARDL metodolojisi uygulanmıştır. Ampirik analizlerimizde 5., 6. ve 7. denklemlerde gösterilen NARDL modellerinin hata düzeltme gösterimi kullanılmıştır. Son adımda ise, uzun ve kısa süreli asimetrileri test etmek için standart Wald testi kullanılmıştır (Shin vd., 2014).

Tablo 3, 4 ve 5, denklem 5, 6 ve 7'de verilen NARDL modellerinin sonuçlarını göstermektedir. Wald testleri ile incelenen kısa ve uzun vadeli asimetriler ise Tablo 6'de belirtilmiştir. Sonuçlar, null hipotezi olan simetrik ilişki hipotezini kısa ve uzun vadede çoğu değişken için reddetmektedir.

Sonuçlarımız, uzun ve kısa vadede, mali açık ile hisse senedi fiyatları arasında hisse senedi fiyatından mali açığa doğru tek yönlü bir ilişki olduğunu göstermektedir. Hisse senedi fiyatlarındaki olumlu değişimlerin uzun vadede mali açığı olumlu etkiledği, kısa vadede ise sadece olumsuz değişimlerin mali açık üzerinde önemli ve asimetrik etkisi bulunduğu sonucuna ulaşılmıştır. Bu bulgular hisse fiyatlarındaki artışların (azalmanın) hükümetin gelir tarafını azaltan (artıran) hazine bonosu talebini azalttığı (artırdığını) çıkarımını sağlamaktadır. Para arzı ve hisse fiyatları arasındaki ilişki çift yönlü ve negatiftir. Son olarak, para arzı kısa vadede mali açığı olumsuz yönde etkilese de, uzun vadede önemli bir etkisi yoktur. Bu bulgu, mali açığı yönetmek için arttırılan para arzının uzun vadeli bir çözüm olmadığını öne süren literatürle iyi bir uyum göstermektedir. Mali açığın, ne uzun ne de kısa vadede para arzı üzerinde önemli bir etkisi yoktur; bu, mali açıktaki olumlu ya da olumsuz değişikliklerin, Ocak 2006 ile Aralık 2019 arasındaki dönemde Türkiye'nin para arzı kararını etkilemediğini göstermektedir.

Özetle, bu çalışmanın bulguları, yatırımcılar tarafından yatırım kararlarında ve politika yapıcıları tarafından mali açıkla başa çıkma eylemlerinde kullanılabilecek girdiler sunmaktadır.