THE EFFECT OF BUDGET DEFICITS ON STOCK MARKET RETURNS IN EMERGING MARKETS: A PANEL VAR ANALYSIS

Gelişmekte Olan Piyasalarda Bütçe Açıklarının Hisse Senedi Piyasası Getirileri Üzerindeki Etkisi: Panel VAR Analizi

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Abstract
This study examines the impact of fiscal deficits on stock returns. The sample covers emerging markets for the period 2016Q1-2021Q4. The analysis results using panel vector autoregression (PVAR) and Granger causality tests indicate that fiscal deficits cause stock returns. These results are confirmed for countries with low and medium levels of financial development and for European countries. However, in countries with high levels of financial development such as the BRICS and ASEAN countries, no effect is observed. It is also found that this effect disappears during the COVID-19 pandemic. The results of the study question the strong form of the efficient market hypothesis (EMH). According to the EMH, stock prices should fully reflect all available information. However, the impact of fiscal deficits on stock returns in low- and middle-income countries and European countries suggests that market participants may not fully reflect this information, addressing the existence possibility of markets that are not efficient in the strong form.

Öz
Bu çalışma, bütçe açıklarının hisse senedi getirileri üzerindeki etkisini incelemektedir. Örneklem olarak 2016Q1'den 2021Q4' kadar olan döneme ait gelişmekte olan piyasa verileri kullanılmıştır. Panel vektör otoregresyon (PVAR) ve Granger nedensellik testleri ile uygulanan analiz sonucunda bütçe açıklarının hisse senedi getirileri üzerinde nedensel bir etkisinin olduğu tespit edilmiştir. Bu sonuçlar, finansal gelişmişlik düzeyi düşük ve orta olan ülkeler ile Avrupa ülkeleri için doğrulayıcıdır. Ancak, finansal gelişmişlik düzeyi yüksek, BRICS ve ASEAN ülkelerinde herhangi bir etki yoktur. Ayrıca, etkinin COVID-19 pandemi döneminde ortadan kalktığı gözlemlenmiştir. Çalışma sonuçları, Etkin Piyasa Hipotezi'nin (EMH) güçlü formunu sorgulamaktadır. EMH'ye göre, hisse senedi fiyatları tüm mevcut bilgileri tam olarak yansıtmalıdır. Ancak, finansal gelişmişlik düzeyi düşük ve orta olan ülkeler ile Avrupa ülkelerinde bütçe açıklarının hisse senedi getirilerini etkilemesi, piyasa katılımcılarının bu bilgileri tam olarak yansıtamadığını ve güçlü formda etkin olmayan piyasaların olabileceğini göstermektedir.

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1. Introduction

Budget deficits play a crucial role in determining the value of financial assets by distorting the optimal resource allocation. Adrangi and Allender (1998) concatenate the effects of budget deficits on stock prices using four channels. Firstly, a large budget deficit hurts economic growth in the short and long run, and it decreases stock prices by harming investor confidence. Secondly, an unsustainable budget deficit may affect stock prices through inflationary expectations. Thirdly, compensating the budget deficits by monetizing or increasing tax revenues affects the stock prices. Lastly, budget deficits adversely affect the competitiveness of domestic products in the international market, so stock prices decrease through the interest and exchange rates.

Darrat (1988) tests the impact of budget deficits on stock prices for Canada and reports that there is no impact in terms of available information on fiscal policy. Darrat and Brocato (1994) investigate the link between the efficiency of the US stock market and six other macro-finance factors and show that federal budget deficits have an impact on future stock returns. Adrangi and Allender (1998) scrutinize the effect of budget deficits on stock prices in the USA, Germany, France, and Japan and reveal that a reduction in budget deficits harms stock prices in the USA but not others. Tekeli (2007) investigated the effect of budget deficits on stock price movements (ISE 100). As a result of the study, it was determined that there is no long-term integration between stock prices and budget deficits and that there is no Granger causality relationship between these variables. Jansen et al. (2008) analyze the role of fiscal policy on stock and treasury bonds markets and find no direct link between fiscal policy and asset prices. Laopodis (2012) examines the relationship between federal budget deficits, interest rates, and the stock market in the USA and suggests that budget deficits negatively affect stock returns. Agnello and Sousa (2010) assess the role of fiscal policy on the stock market for ten industrialized countries and indicate that a positive budgetary shock hurts stock prices. Chatziantoniou et al. (2013) seek the effects of monetary and fiscal shocks on the stock market performance in Germany, the UK, and the USA. They highlight the coordination between monetary and fiscal policies for stock market performance. Stoian and Iorgulescu (2020) inquire whether stock market prices include fiscal policy information for Romania in the short and long run. They reveal that the long-term effect of fiscal policy on the stock market prices is statistically insignificant, but the short-term impact is significant. The study conducted by Kaya et al. (2013) examined the relationships between the IMKB-100 index and macroeconomic variables such as the exchange rate and money supply from 2002 to 2012. The findings indicate a negative relationship between the exchange rate and stock returns but a positive relationship with the money supply. On the other hand, Sevinc's (2014) study investigated the relationships between the BIST-30 index and various macroeconomic variables from 2003 to 2013. While a negative relationship was found between the money supply, interest rates, gold prices, and stock returns, a positive relationship was observed with the current account balance, inflation, and the export-to-import ratio. Additionally, no relationship was identified between exchange rate fluctuations, industrial production increases, and stock market returns. Koyuncu's (2018) study focused on the relationship between the BIST-100 index and the industrial production index, inflation, interest rates, and economic growth from 1988 to 2016 using EKK tests. The dynamic EKK findings suggest that industrial production and inflation positively affect the BIST-100 index, while real economic growth and interest rates have a negative impact. The results imply that increases in industrial production significantly boost the BIST-100 index. Guler and Haykir (2023) estimated the effects of budget deficits on the BIST-100 index for the 2003Q1-2019Q4 period using the ARDL model. The analysis results of the

study show that although the model is integrated in the long term, there is no statistically significant relationship between the budget balance and the stock market index. However, in the short term, a decrease in the budget deficit positively affects the stock market index. Although there is no statistically significant relationship between GDP, CPI, and exchange rate variables and the stock market index in the long term, there is a positive relationship between money supply and the stock market index. There is a negative relationship between interest rate and stock market index.

Budget deficits have a significant impact on stock market returns in emerging markets. Studies reveal that budget deficits can influence stock prices positively or negatively based on the short-term or long-term perspective. Budget expansion tends to boost stock market returns in the short run, while budget contraction can adversely affect stock performance (Lee et al., 2022; Khatab, 2022). Additionally, the relationship between budget deficits and stock market returns can vary across different periods within the same country, as seen in the case of Ghana, where the impact changed between two sub-samples (Nwakobi, 2020). Furthermore, the nature of the effect of fiscal policy on stock market development in emerging economies like Nigeria emphasizes the need for careful accommodation of fiscal policies to support stock market activities and overall economic growth (Abakah, 2016). Whereas some studies find a positive relationship between budget deficit and stock market prices (Van Aarle et al., 2003; Grobys, 2013), other studies find a negative relationship (Ewing, 1998; LAopodis, 2006).

Studies provide different results regarding the impact of budget deficits on stock prices. These differences may depend on various factors such as countries' economic structures, financial policies, and market dynamics. Studies explicitly conducted in Türkiye show that budget deficits do not significantly affect stock prices in the long term, but a positive effect is observed in the short term. This suggests that Türkiye's economic structure and financial policies may direct short-term market reactions. This paper investigates whether budget deficits affect stock market returns and contributes to the existing literature in four-folds. First, the study focuses on emerging markets rather than analyzing advanced economies or a single country. Second, we investigate the impact of financial development on the budget deficits and stock returns nexus. Third, this paper examines the sub-groups of emerging markets such as BRICS, Europe, and ASEAN. Finally, we study whether the relationship between budget deficits and stock returns differs during the COVID-19 pandemic.

2. Data and Methodology

We employ panel vector autoregression (PVAR) and panel-granger causality tests for 16 emerging markets using quarterly data of budget deficits to GDP, stock returns, GDP growth, money supply to GDP, and inflation from 2016Q1 to 2021Q4. This period encompasses critical years for emerging markets. Additionally, its coverage of the pandemic era is significant for examining the effects on budget deficits and stock returns, which holds importance in the literature. Panel Vector Autoregression (PVAR) is a statistical technique used to model the interactions of multiple variables over time. This technique is achieved by adapting the traditional vector autoregression (VAR) to cases involving panel data. Panel data includes time series data for individuals or cross-sections. For example, annual GDP, inflation, and investment rates for multiple countries are defined as panel data. PVAR analyzes the dynamic relationship between variables in such cases, considering the lagged effects between them. Panel Granger Causality

Test is a statistical test used in conjunction with PVAR. It is used to evaluate the causal relationship between two variables. This test measures one variable's past values' ability to predict another variable's future values. If one variable's past values significantly predict another variable's future values, Granger causality is said to exist. PVAR and Panel Granger Causality Tests do not prove causality but demonstrate a statistical relationship. Interpretation of causality should be done carefully, and other factors should also be considered. International Financial Statistics (IFS, 2024) is the primary data source for macro variables. If the data is missing in the IFS, we collect the data from each country's official government website. We obtain the stock market returns from Investing.com.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min.	Max.
Stock Returns	512	8.645	1.608	6.038	11.848
Budget Deficits To GDP	512	-0.028	0.050	-0.418	0.238
GDP Growth	512	0.118	2.185	-0.885	48.612
Money Supply To GDP	512	1.320	3.450	0.0003	11.750
Inflation	512	4.886	0.196	4.625	5.629

Table 1 presents summary statistics for five economic variables, each based on 512 observations. Stock Returns have an average of 8.645 with a standard deviation of 1.608. The returns range from a minimum of 6.038 to a maximum of 11.848. Budget Deficits to GDP show an average deficit of -0.028 with a standard deviation of 0.050. The deficits range from -0.418 to 0.238. GDP Growth has an average growth rate of 0.118 with a standard deviation of 2.185. The growth rates vary widely, from a minimum of -0.885 to a maximum of 48.612. Money Supply to GDP has an average ratio of 1.320 with a standard deviation of 3.450. The ratios range from a minimum of 0.0003 to a maximum of 11.750. Inflation has an average rate of 4.886 with a standard deviation of 0.196. The inflation rates are tightly clustered, ranging from 4.625 to 5.629.

The analysis includes two sections; in the first section, we use the entire sample, and in the second section, we distinguish countries according to the Financial Development Index of 2018 (latest available data) constructed by IMF and strategic partnership groups, namely BRICS (Brazil, Russia, India, China, South Africa), Europe (Bulgaria, Croatia, Hungary, Poland, Romania, Serbia, Türkiye), and ASEAN (Philippines, Malaysia, Thailand, Indonesia).

To disentangle the impact of budget deficits on stock returns, we estimate the following PVAR:

$$X_{it} = A(L)X_{it-1} + \mu_i + \epsilon_{it} \tag{1}$$

where X_{it} is a vector of endogenous variables, $A(L)$ is a matrix of lag operators, μ_i is the country-specific effect, and ε_{it} is the error term. X_{it} consists of budget deficits to GDP, stock returns, GDP growth, money supply to GDP, and inflation.

We first investigate the stationary variables and cross-sectional dependency, which are reported in Table 2. The results indicate that cross-sectional dependency exists and variables are stationary at the level. Thus, we can employ PVAR analysis to identify the relationship between variables. LLC and IPS Tests: Both tests show that the null hypothesis of a unit root can be rejected at the 1% significance level for all variables (Stock Returns, Budget Deficits to GDP, GDP Growth, Money Supply to GDP, and Inflation). This implies that these variables are

stationary. The critical value at the 1% level is -2.38. All CIPS test statistics are more negative than this critical value, meaning the null hypothesis of a unit root can be rejected at the 1% level, indicating stationarity. High and significant CD-Test statistics indicate strong cross-sectional dependence for all variables. Overall, the results suggest that all tested variables are stationary, meaning they do not contain a unit root, and there is strong evidence of cross-sectional dependence among the variables.

Table 2. Panel Unit Root Tests

	LLC	IPS	CIPS	CD-Test
Stock Returns	-16.405***	-16.183***	-5.050***	33.05***
	(0.000)	(0.000)	Critical Value at 1% Level: -2.38	(0.000)
Budget Deficits to GDP	-12.398***	-14.467***	-4.339***	17.53***
	(0.000)	(0.000)	Critical Value at 1% Level: -2.38	(0.000)
GDP Growth	-29.697***	-28.219***	-5.757***	31.46***
	(0.000)	(0.000)	Critical Value at 1% Level: -2.38	(0.000)
Money Supply to GDP	-3.436***	-1.958**	-3.119***	40.74***
	(0.000)	(0.025)	Critical Value at 1% Level: -2.38	(0.000)
Inflation	-12.523***	-12.699***	-4.029***	5.76***
	(0.000)	(0.000)	Critical Value at 1% Level: -2.38	(0.000)

Notes: P-values are in the parenthesis. ** and *** show the statistical significance at the 5 and 1 percent levels, respectively.

3. Empirical Results

Table 3 presents the results of PVAR analysis and panel-granger causality tests. The first row (column) of Panel A indicates the dependent (independent) variables of PVAR analysis, and Panel B shows the Granger causality among variables. This paper focuses on analyzing the effect of budget deficits on stock returns and the effect of the COVID-19 pandemic on this relationship.

The results reveal that reducing budget deficits positively affects subsequent stock returns. Notably, a one percent decrease in budget deficits leads to a 1.78 percent increase in stock returns. Similarly, stock returns increase due to a rise in the GDP growth and money supply. On the contrary, a one percent increase in inflation lowers the stock returns. The insignificant interaction term indicates that the impact of budget deficits on stock returns disappears during the pandemic. Granger causality tests support the PVAR analysis, and all independent variables are Granger's cause for stock returns.

Table 3. Panel VAR Analysis

Panel A: PVAR Analysis					
	Stock Returns	Budget Deficits to GDP	GDP Growth	Money Supply to GDP	Inflation
L. Stock Returns	-0.233**	0.098**	0.361***	-0.438***	0.014
	(0.115)	(0.047)	(0.104)	(0.142)	(0.010)
L. Budget Deficits to GDP	1.785***	-0.013	1.739***	-2.336***	0.041
	(0.666)	(0.264)	(0.612)	(0.886)	(0.062)
L. GDP Growth	0.169**	-0.035	-0.143*	0.235*	0.006
	(0.084)	(0.034)	(0.077)	(0.128)	(0.007)
L. Money Supply to GDP	0.263**	-0.073	0.197*	0.845***	0.009
	(0.121)	(0.052)	(0.119)	(0.184)	(0.012)
L. Inflation	-3.327**	-0.048	-2.240	2.175	-0.147
	(1.607)	(0.454)	(1.440)	(1.812)	(0.251)
Covid*Budget Deficits to GDP	0.429	0.491**	-0.227	0.717	0.088
	(0.584)	(0.230)	(0.541)	(0.795)	(0.057)
Panel B: Granger Causality Test					
Stock Returns		4.184**	11.877***	9.456***	1.833
		(0.041)	(0.001)	(0.002)	(0.176)
Budget Deficits to GDP	7.175***		8.068***	6.946***	0.429
	(0.007)		(0.005)	(0.008)	(0.512)
GDP Growth	4.060**	1.016		3.378*	0.715
	(0.044)	(0.313)		(0.066)	(0.398)
Money Supply to GDP	4.700**	1.933	2.727*		0.628
	(0.030)	(0.164)	(0.099)		(0.428)
Inflation	4.284**	0.011	2.422	1.440	
	(0.038)	(0.915)	(0.120)	(0.230)	

Notes: COVID is a dummy variable equal to one when the sample period is between 2020Q1 and 2020Q4 and zero otherwise. Standard errors (in Panel A) and p-values (in Panel B) are in parenthesis. *, **, and *** show statistical significance at the 10, 5, and 1 percent levels, respectively.

Furthermore, we divide the countries into three groups according to the financial development index and strategic partnerships. The motivation behind the segmentation of the analysis by countries with different levels of financial development is essential for understanding how varying financial conditions may influence the relationship between budget deficits and stock returns. By categorizing countries based on their levels of financial development, the aim is to determine whether the impact of budget deficits on stock returns varies across these categories.

Table 4 demonstrates the results of sub-groups. Since we focus on the impact of budget deficits on stock returns, we only present the results accordingly. The results in the financial development sub-groups show that a decrease in budget deficits positively affects the stock returns for low and middle financial development groups. In other words, if the country has a strong financial system, the effect of budget deficits on stock returns disappears. In strategic partnership groups, a one percent decrease in budget deficits leads to a 1.39 percent increase in stock returns in European countries, whereas the BRICS and ASEAN countries do not exhibit significant relations. In addition, budget deficits do not significantly impact stock returns in any sub-groups during the pandemic.

Table 4. Sub-Groups Analysis

Dependent Variable: Stock Returns	Financial Development Groups			Country Groups		
	Low	Middle	High	BRICS	Europe	Asean
L. Stock Returns	-0.058 (0.123)	-0.153 (0.209)	-0.492*** (0.099)	-0.506*** (0.127)	-0.190 (0.122)	-0.307* (0.162)
L. Budget Deficits to GDP	1.737* (0.925)	1.427** (0.625)	-0.509 (0.515)	-0.766 (0.628)	1.397** (0.602)	0.603 (0.437)
L. GDP Growth	0.042 (0.103)	0.092 (0.148)	0.276 (0.209)	0.522*** (0.183)	0.025 (0.082)	0.305 (0.274)
L. Money Supply to GDP	0.109 (0.120)	0.217* (0.118)	0.267 (0.307)	0.498** (0.247)	0.091 (0.078)	0.752 (0.593)
L. Inflation	-0.682 (2.505)	-5.709** (2.498)	2.033 (1.637)	1.987 (2.620)	-3.783* (2.057)	-0.176 (2.157)
Covid*Budget Deficits to GDP	-0.544 (0.848)	1.247 (1.237)	-0.117 (0.588)	0.003 (0.535)	0.057 (0.845)	1.823 (2.014)
Granger Causality Test						
Budget Deficits to GDP	3.525* (0.060)	5.200** (0.023)	0.979 (0.323)	1.488 (0.223)	5.390** (0.020)	1.904 (0.168)
GDP Growth	0.164 (0.685)	0.386 (0.535)	1.744 (0.187)	8.105*** (0.004)	0.091 (0.763)	1.235 (0.266)
Money Supply to GDP	0.832 (0.362)	3.353* (0.067)	0.758 (0.384)	4.062** (0.044)	1.366 (0.242)	1.608 (0.205)
Inflation	0.074 (0.785)	5.220** (0.022)	1.541 (0.214)	0.686 (0.448)	3.382* (0.066)	0.007 (0.935)

Notes: COVID is a dummy variable equal to one when the sample period is between 2020Q1 and 2020Q4 and zero otherwise. Standard errors (in Panel A) and p-values (in Panel B) are in parenthesis. *, **, and *** show statistical significance at the 10, 5, and 1 percent levels, respectively.

4. Conclusion

This paper explores the link between budget deficits and stock returns in emerging markets. The results show a positive and significant impact of a decline in budget deficits on stock returns, which is valid for the low and middle financial development groups and European countries. We also find no evidence for countries with high financial development, such as BRICS and ASEAN. Furthermore, the positive effect of a decline in budget deficits no longer exists in the COVID-19 pandemic period.

According to the Efficient Market Hypothesis (EMH), stock prices fully reflect all available information, implying that it is impossible to consistently outperform the market through informed trading strategies, as all relevant information is already incorporated into stock prices. However, the observation that budget deficits consistently influence stock returns in certain financial development groups or regions suggests that market participants may not be fully effective in incorporating this information into stock prices. Therefore, the results indicating a significant impact of budget deficits on stock returns call into question the strong form of the EMH, which posits that stock prices reflect all available information, including insider information. This raises the possibility of market inefficiencies in the affected regions or groups, where investors may be able to generate abnormal returns by exploiting the relationship between budget deficits and stock returns. Our study aligns with existing literature, showing that reducing budget deficits positively affects stock returns in countries with low and middle levels of financial development (Darrat, 1998; Darrat and Brocato, 1994). Additionally, Adrangi and Allender (1998) found that while reducing budget deficits negatively affected stock prices in the USA, no

such effect was observed in other countries. This finding is consistent with our study, which observes no significant impact in highly financially developed countries, as well as in BRICS and ASEAN countries. Tekeli (2007) found no long-term relationship between budget deficits and stock prices in Türkiye. Similarly, Güler and Haykır (2023) reported a positive short-term effect of budget deficits on stock prices in Türkiye but no statistically significant long-term relationship. Our study underscores the positive impact of budget deficit reductions in countries with low and middle levels of financial development, suggesting a similar dynamic may be present in emerging markets like Türkiye. The study also highlights the extensive impact of the pandemic on economic dynamics and the changing role of traditional fiscal policies on market responses during this period. The pandemic era should be considered an exceptional period that requires a re-evaluation of conventional economic relationships.

In conclusion, the impact of budget deficits on stock returns is a complex and multifaceted issue. Country-specific factors, financial development levels, and temporal conditions are crucial in this relationship. This study provides significant insights into emerging markets. It makes invaluable contributions to the existing literature and emphasizes the importance of financial development levels when assessing the influence of fiscal policy on stock markets. Overall, governments determine their priorities regarding budget deficits and stock returns nexus according to the level of financial development. Countries with lower financial development should employ austerity policies to decrease their budget deficits, whereas those with higher financial development should continue to support their financial systems since the stock returns include all publicly available information in these countries.

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