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EKONOMİK BÜYÜMENİN BORSA ÜZERİNDEKİ ETKİLERİ[1][2]

THE EFFECT OF ECONOMIC GROWTH ON STOCK EXCHANGE

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Öz

Ekonomik büyüme ekonomik aktivitelerdeki büyümeyi ölçmektedir. Ekonomik büyüme ülkeler için önemlidir çünkü sıklıkla daha iyi sosyal ve ekonomik şartları beraberinde getirmektedir. Borsa performansı ekonomi içerisindeki bazı önemli şirketlerin ekonomik performansının göstergesi olması nedeniyle sıklıkla ekononmik büyüme için önemli bir göstergedir. Bu çalışmadaki yapılmış olan ampirik analizin amacı ekonomik büyüme ile borsa arsındaki ilişkinin ölçülmesidir. Gayri Safi Yurtiçi Hasıla (GSYİH) üzerinde yaşanan yüzdelik değişimler ve BİST100 çalışmanın değişkenlerini oluşturmaktadır. Analiz 2003-2022 ve 2013- 2022 dönemlerini kapsayan iki farklı data seti üzerinden gerçekleştirilmiştir. Gerçekleştirilen analizler sırasıyla Hata Düzeltme Modeli, Vektör Auto Regresyon Modeli, Granger Nedensellik, Etki Tepki ve Varyans Ayrıştırmadır. 2013-2022 dönemleri için eşbütünleşme testinde uzun dönemli ilişki tespit edilmiş fakat hata düzeltme modelinde kısa dönemli ilişki tespit edilmemiştir. Ekonomik büyümedeki değişikliklerin %30'u borsa performansı ile açıklanabilirken, borsa performansındaki değişimlerin sadece %5'i ekonomik büyüme ile açıklanabilmektedir. BİST100 ekonomik büyümenin Granger Nedenidir. 2003-2022 dönemi için, hem kısa hem de uzun dönemli ilişki tespit edilmiştir. Uzun dönemli şokların %24'ü ortadan kalkmaktadır. Sonuçlara göre; borsa performansı ekonomik büyümenin bir göstergesi olarak kullanılabilir. Literatürdeki çalışmalar da borsa ile GSYİH arasında anlamlı ilişkinin hem yerel hem de uluslararası çalışmalarda olduğunu göstermektedir. Bulguların akademik, politik ve uygulama yönünden önemli sonuçları bulunmaktadır.

Anahtar Kelimeler: Ekonomik Büyüme, Borsa, Nedensellik

JEL Kodları: A13, C58, F21

Abstract

Economic growth measures growth in economic activities. Economic growth is important for countries, because it often brings better economic and social standards. Stock exchange performance is often a good indicator of the economy since it shows the performance of some of the important companies in the economy. The empirical analysis in this article aims to investigate the relationship between economic growth and stock exchange performance. Percentage change in GDP of Turkey and BIST100 are used as variables for this purpose. Two different data sets; 2003-2022 and 2013-2022 are available in the research. The analysis include error correction model, vector auto regression, Granger causality, impulse response, and variance decomposition. For the period 2013-2022, cointegration long run relationship is determined but there is no short run relationship as explained by error correction model. 30% of changes in economic growth can be explained by stock exchange performance and only 5% of changes in stock exchange performance can be explained by economic growth. BIST100 Granger causes economic growth. For the period 2003-2022, both short run and long run relationships are detected. Shocks in the long run disappear by 24%. The results indicate that the stock exchange performance can be used as an indicator of economic growth. Works in the literature also show significant relationship between stock markets and GDP both in local and international studies. The findings have important academic, policy and practical implications.

Keywords: Economic growth, Stock Exchange, Causality

JEL Classification: A13, C58, F21

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1. Introduction

Economic growth in the context of this research is the percentage increase in the national income (GDP) of a country. It measures general growth in economic activities and can be used as an indicator of economic health in a country. Economic growth can be studied together with factors such as increase in production, employment, increase in consumption and investment.

Higher economic growth generally means, more employment, increasing income levels, increase in consumption, and increase in life standards. It is important to note that for a sustainable economic growth, environmental concerns, income distribution, fighting poverty and inequality, and increasing social welfare should be considered.

Stock exchanges are known as good indicators of economic activities. Stock exchanges allow investors to trade quoted stocks available in the exchange. They serve other important functions such as providing liquidity and resources for the economy, allowing individuals to invest in large companies and allowing disclosures.

In this study the relationship between economic growth (GDP) and stock exchange performance in Turkey, Borsa Istanbul (BIST100) is analyzed. Two different data sets; 2003-2022 and 2013-2022 are used for a comparative analysis.

The remainder of this article is organized as follows. The following section is a summary of some of the important works in the literature. The third section gives an introduction to the data and methodology used in the research. The details of the results and discussions are available in section 4. Finally, closing remarks are available in section 5.

2. Literature Review

Some of the works in the literature are presented in Table 1. The works analyze the relationship between stock exchange and GDP. There are some studies which analyze Turkish markets and some others study international markets.

Table 2: Works in the Literature

Author	**Period**	**Result**
Ake, B. (2010).	1995-2008	Positive Relationship between economic growth and stock exchange performance.
Elitas et al. 2018	2000-2017	No significant relationship between economic growth and stock exchange performance
GC, S. B. (2006).	1988-2005	Two way causality between stock exchange performance and GDP
Kaya, E., & Ugurlu, S. (2016).	1998-2013	Two way causality between stock exchange performance and GDP
Kazaz and Demireli, (2022)	2005- 2020	Asymmetrical relationship between stock exchange and GDP.
Oskooe, SA (2010).	1997-2008	Short-run relationship between GDP and stock exchange performance.
Oz and Uslu (2020)	1986-2019	Causality between GDP and performance of stocks
Pekmezci and Karayel, (2018)	1998-2015	Positive Relationship between economic growth and stock exchange performance.

Tirasoglu and Tirasoglu, (2015).	1998-2013	One way causality between economic growth and stock exchange performance
Vurur, S., S., (2020).	2010-2019	Two way causality between stock exchange performance and GDP
Yilmaz, K., (2022)	2007-2022	Non-linear and symmetrical relationship between stock exchange and GDP.

3. Data and Methodology

Closing price of Borsa Istanbul 100 (BIST100) and percentage change of GDP in Turkey are used in this study. Exchange data is obtained from investing.com and GDP data is obtained from central bank of Turkey's data system. The research period is 2003 -2022. Quarterly data is used for the analysis. For BIST100, this means the closing price at the end of each quarter. Since no inflation correction is applied for BIST100, nominal GDP is used for a constent study. The variables and descriptions are given in Table 2.

Table 2: Variables and Descriptions

Variables	Description
BIST100	The index of 100 most traded stocks in the exchange
GDP	Percentage change of GDP

Summary statistics for the variables used in the study in Table 3. Two data sets are used to test the relationship between stock exchange performance and economic growth in Turkey. Quarterly data for the period 2013-2022 is used in the first data set, and that for the period 2003-2022 is used in the second data set.

Table 3: Summary Statistics for the Variables

Variable	Mean	Std. Dev.	Min	Max
		2013-20232 Period		
bist100	974.315	257.461	625.53	1809.65
GDP	5.414	11.65	-13.036	36.395
		2003-2022 Period		
bist100	54299.605	32821.657	1190.7	118126.73
GDP	5.555	11.889	-18.329	36.482

4. Results and Discussion

The first model to be analyzed is 2013-2022. The variables are checked for stationarity -ADF in Table 4. Accordingly both of the series are not stationary in level but they are stationary in first difference.

Table 4: ADF Unit Root Test Results

Variable	Level			First Difference		
	Constant	Constant and Trend	No Constant and Trend	Constant	Constant and Trend	No Constant and Trend
$bist100$	0.898 (0.994)	-1.036 (0.926)	1.704 (0.976)	-5.878 (0.000)	-6.549 (0.000)	-5.559 (0.000)

$gsyh$	-1.581 (0.479)	-2.475 (0.337)	0.956 (0.906)	-8.247 (0.000)	-8.490 (0.000)	-8.178 (0.000)

Since the variables are not stationary in level but they are stationary in the same degree Engle-Granger cointegration is used. First the following model is analyzed and residuals are obtained.

$$GDP_t = \beta_0 + \beta_1 BIST100_t + u_t$$

ADF Unit root test is applied for the residuals. (u_t) The residuals are given in Table 5. Accordingly GDP and BIST100 are cointegrated.

Table 5: ADF Unit Root Test Result

No Constant and Trend	
u_t	-1.866 (0.060)

To test the relationship between the series in the short run, error correction model is predicted and the results are given in Table 6. Accordingly there is no short term relationship between BIST100 and GDP.

Table 6: Error Correction Model Results

Variable	**Coefficient**	**Std. Error**	**t-Stat**	**Prob.**
BIST100	0.008976	0.007640	1.174834	0.2487
u_{t-1}	-0.120059	0.173726	-0.691082	0.4945
C	-2.959815	7.735697	-0.382618	0.7045

For the period 2013-2023 VAR model is developed. Lag is determined as 4 according to AIC criteria. Stability of VAR (4) is checked with unit circle and the result is presented in Figure 1. Accordingly, all the roots are within the circle.

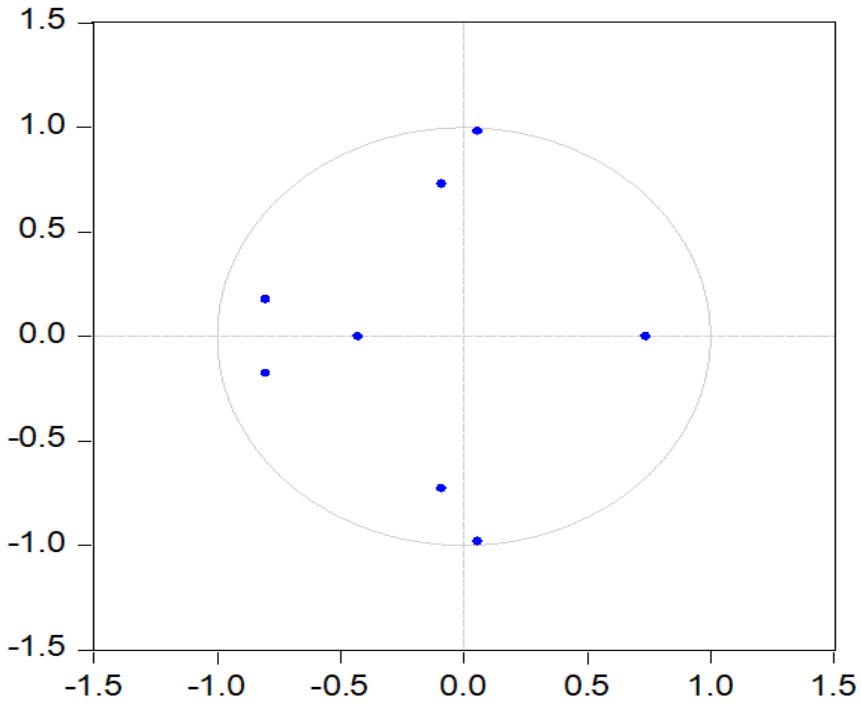

Figure 1: Unit circle for Roots

Autocorrelation condition is also analyzed and the result is given in Table 7. The results indicate no autocorrelation.

Table 7: Autocorrelation Test Results

Null hypothesis: No serial correlation at lag h						
Lag	**LRE* stat**	**df**	**Prob.**	**Rao F-stat**	**df**	**Prob.**
1	13.42228	4	0.0094	3.902656	(4, 38.0)	0.0094
2	4.690120	4	0.3206	1.214000	(4, 38.0)	0.3209
3	2.360208	4	0.6698	0.592675	(4, 38.0)	0.6700
4	2.857101	4	0.5820	0.722087	(4, 38.0)	0.5823
5	7.760488	4	0.1008	2.091576	(4, 38.0)	0.1010

Finally heteroscedasticity check is given in Table 8. Accordingly there is no heteroscedasticity. Therefore the model is stable.

Table 8: Heteroscedasticity Test

Chi-sq.	**df**	**Prob.**
58.94708	48	0.1337

Granger causality results for the period 2013-2023 is given in Table 9. Accordingly GDP does not granger cause BIST100. But BIST100 Granger causes GDP.

Table 1: Granger Causality Test Results

Null Hypothesis	**Chi-Square**	**Prob**
BIST100 does not Granger Cause GDP	11.94080	0.0178
GDP does not Granger Cause BIST100	5.510042	0.2388

Shocks in error term in the model may have effect on other variables. The impulse response functions are given in Figure 2. The results indicate that 3 periods are required for a shock to become stable.

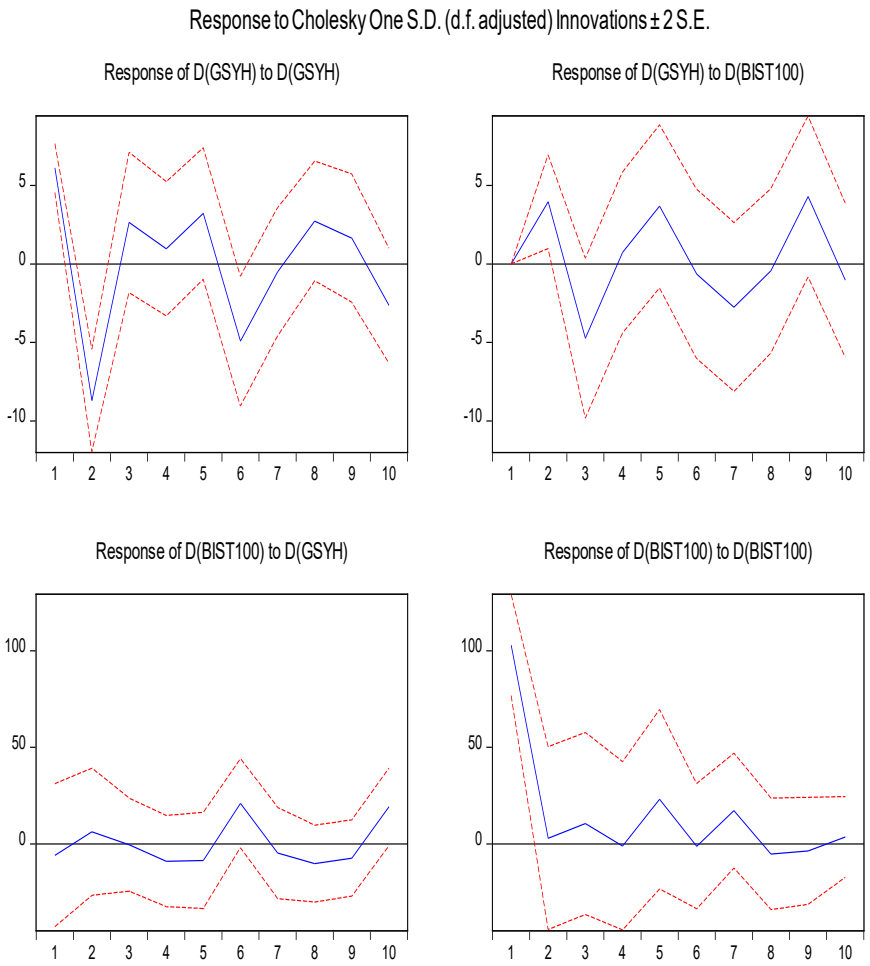

Figure 2: Impulse Response Functions

Variance decomposition shows the effect of one series on the other. The results are given in Figure 3. Accordingly 30% of changes in GDP is explained by BIST100. But only 5% of changes in BIST100 is explained by GDP.

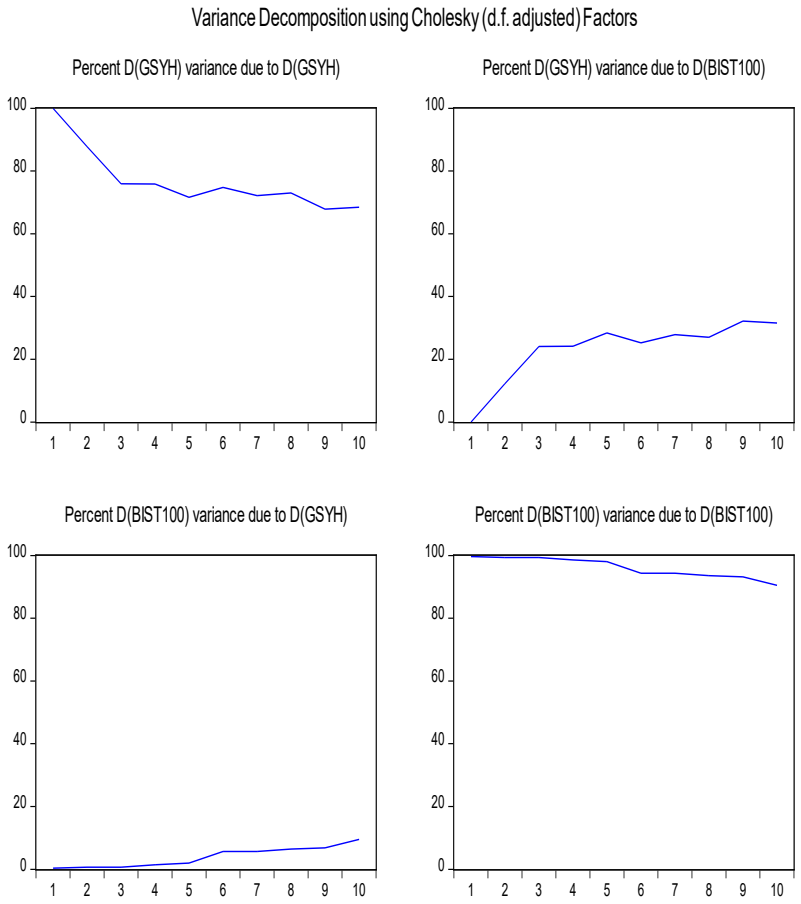

Figure 3: Variance Decomposition

For the period 2003-2022, ADF results are given in Table 10. Similar to the previous model, the variables are not stationary in level but they are stationary in first difference.

Table 2: ADF Unit Root Test

Variable	**Level**			**First Difference**		
	Constant	**Constant and Trend**	**No Constant and Trend**	**Constant**	**Constant and Trend**	**No Constant and Trend**
$bist100$	-2.189 (0.212)	-1.851 (0.670)	-1.100 (0.244)	-5.474 (0.000)	-5.615 (0.000)	-5.509 (0.000)
gdp	0.262 (0.975)	0.583 (0.977)	0.938 (0.906)	-27.784 (0.000)	-28.412 (0.000)	-27.781 (0.000)

The Engle-Granger cointegration is modelled as follows.

$$\Delta GSYH_t = \beta_0 + \beta_1 \Delta BIST100_t + u_t$$

The residuals are obtained (u_t) for 2003-2022 and test results are given in Table 11. The results show that GDP and BIST100 are cointegrated.

Table 3: ADF Unit Root Test Results

No Constant and Trend	
u_t	-3.091 (0.003)

For the short run analysis, error correction model is predicted. The results are available in Table 12. Accordingly, there is a short run relationship between GDP and BIST100.

Table 4: Prediction Results

Variable	**Coefficient**	**Std. Error**	**t-Stat**	**Prob.**
ΔBIST100	-0.000285	0.000184	-1.552002	0.1249
u_{t-1}	-0.240553	0.111611	-2.155282	0.0343
C	-0.027251	1.828800	-0.014901	0.9882

5. Conclusion

Economic growth is the general advancement in the economic activities of a country. Economic growth in the context of this study is measured by GDP. A rising GDP is a sign of growth whereas a declining GDP is a sign of recession. High levels of economic growth often bring employment, rising income levels, consumption and life standards.

There are different approaches to increase economic growth. Some of these include, investing in infrastructure, education, health industry, technological infrastructure, and entrepreneurship. International trade is also an important factor to be considered. In a modern economy, other issues such as environment, income distribution, poverty, and social welfare should be a concern. These are attempts to provide sustainability and social welfare.

There is a relationship between the Turkish economy and stock exchange. (BIST) The relationship may not sometimes be the most obvious. The factors that lead to this relationship are macroeconomic stability, foreign investments, economy policies and global liquidity. A well performing economy often provides safe investment opportunities and sound stock exchange performance. The growth of Turkish economy is obtained by well performing companies. Most of the large companies are listed in the stock exchange. On the other hand, a growing economy often leads to larger revenues and profits for the companies. This is expected to increase the value of stocks.

Foreign investments constitute the majority of the capital market investment in Turkey. The motivation is to benefit from the growth potential of stocks. Economic policies, political news and global risk appetite also affect stock

exchange performance. These factors determine the dynamics of the relationship between Turkish economy and stock exchange performance. In other words, the nature of the relationship is complex and can't be explained by a single factor.

In this article, economic growth is represented by GDP and BIST100, the index of 100 bluechip stocks in Borsa Istanbul- stock exchange of Turkey located in Istanbul (BIST100) is used to represent stock exchange performance. The first part of the empirical analysis is the period 2013-2022. Accordingly, cointegration – long run relationship is determined but no short run relationship is available between GDP and stock exchange performance.

Vector autoregressive model reveals 30% of changes in economic growth can be explained by BIST100, and 5% of changes in BIST100 can be explained by economic growth. Granger causality test shows that BIST100 Granger causes economic growth.

Other analysis available in the research is the period 2003-2022. For this period both short run and long run relationships are detected between economic growth and stock exchange performance. Shocks in the long run can be demolished by 24%.

Literature review includes some of the important works in the field. The findings in the literature show a significant relationship between economic growth and GDP in both national and international works. The findings of this research are consistent with the literature. The findings of this article show that stock exchange performance can be used as an indicator for the economy. Beside the academic importance, the findings are important for both policy makers and practitioners in the field.

Additional policies for a sustainable economic growth is controlling inflation. Well-designed structural reforms that target long term improvement is suggested as economic policy. This would lead to stability, which is also the key for direct and indirect foreign investments. In such an environment, both economic and stock exchange performance is expected to increase.

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