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A STUDY OF THE CORRELATION BETWEEN GROWTH RATE AND RETURN ON MARKET IN TÜRKİYE

MA THESIS

By
Asma BORJI

Thesis Advisor
Prof. Dr. Arman Teksin TEVFİK

ISTANBUL
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THESIS ETHICS STATEMENT

I declare that I have completed this study titled ' A Study Of The Correlation Between Growth Rate And Return On Market In Türkiye', which I submitted as an MA thesis under the responsibility of my advisor Prof. Dr. Arman Teksin Tevfik from the beginning to end, that I have collected the respective data/examples myself, that I have done/had the experiments/analysis done in the relevant laboratories and that I have fully indicated the information I received from other sources in the text and in the references, I have acted in accordance with the scientific research and ethics rules during the working process, and that I accept all legal consequences in the contrary case.

Asma BORJI

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June, 2022 Asma BORJI

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ABBREVIATIONS

ARDL : Autoregressive Distributed Lag
AR : Auto Regressive
ADF : Augmented Dicky Fuller
BIST : Borsa Istanbul Index
GDP : Gross Domestic Product
HQ : Hannan-Quinn Information criterion
LR : Sequential Modified LR Test Statistic
SC : Schwarz Information Criterion
VAR : Vector Auto Regressive
VECM : Vector Error Correction Model

SYMBOLS

C : Private Consumption

d_i : Difference in Paired ranks

I : Gross Product Investment

G : Government Investment

g : Annual Growth Rate

M : Imports

n : Number of cases

X : Exports

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ÖZET

TÜRKİYE'DE BÜYÜME HIZI İLE PAZAR GERİ DÖNÜŞÜ ARASINDAKİ İLİŞKİNİN İNCELENMESİ

Çalışma kapsamında Türkiye'de GSYİH büyüme oranları ile piyasa getirisi arasındaki ilişki analiz edilmiştir. 2008 - 2020 döneminde GSYİH büyüme oranı ve BİST 100 Endeksi getirisi *Pearson* korelasyon katsayısı, *Spearman* korelasyon katsayısı ve vektör otoregresif (VAR) modeli ile incelenerek iki değişken arasındaki ilişki ve birbirlerini nasıl etkiledikleri belirlenmiştir. Sonuçlara göre iki değişken arasında korelasyonun olmadığı gözlenmiştir. Ayrıca GSYİH büyüme oranındaki değişikliklerin, BİST 100 getirisinde değişikliğe neden olmadığı belirlenmiştir. Ancak BIST 100 getirisinin GSYİH büyüme oranlarını etkilediği Granger nedensellik testi ile ortaya konmuştur.

Anahtar Kelimeler: *GSYİH büyüme oranı, Piyasa getirisi, VAR analizi, Korelasyon*

ABSTRACT

A STUDY OF THE CORRELATION BETWEEN GROWTH RATE AND RETURN ON MARKET IN TÜRKİYE

Within the scope of the study the correlation between GDP growth rates and return on market in Türkiye was analyzed. GDP growth rate and BIST 100 index return were studied in 2008-2020 time period through the *Pearson* correlation coefficients, *Spearman* correlation coefficient, and the vector autoregressive (VAR) model to determine the relation between the two variables and how they affect each other. According to the results there is an absence of correlation between the two variables. In addition, changes in the GDP growth rate do not cause changes in the BIST 100 return. However, it was proved through the Granger causality test that BIST 100 return affect the GDP growth rates.

Keywords: *GDP growth rate, Market return, VAR analysis, Correlation*

1. INTRODUCTION

Generating profit is a key necessity for any investor. To accomplish this, numerous data is generated, and various calculations are made to prepare a portfolio of investment with potential success results. Accordingly, one of the most used indexes to pair success with return on market is growth rate. Growth rates are what describe an economy the best in terms of performance. In this context investors tend to focus their studies and place their assets in countries promising long term growth rates. Indeed, the relation between an economy's growth rate and the market return was always raised in the field of finance. In fact, several attempts were made by several researchers in the field to help decipher how the two variables correlate.

1.1. Research Problem

The issue that this study sheds light on, is the need to come to an understanding of how two important macroeconomic variables such as GDP growth rate and return on market affect each other. These two variables in fact represent a country or an economy's performance to the world. The problem often raised is determining if these variables share a relation or not. To conduct this study, we will select the GDP as the independent variable and the BIST100 return as the dependent one as we will try to prove the following hypothesis right:

H_0: GDP growth rates do not affect the Return on Market in Türkiye.

1.2. Importance of the Problem

The importance of the problem this research handles lays behind the importance of the variables in question themselves. For instance, the gross domestic product of a country represents a core value defining the economic performance of the nation. It gives insight of how an economy is positioned in the global market and how the domestic production is processed. In addition, the return on market reflects the image of the country shaped in front of potential investors. Market return indeed

decides the scale of success for investment on the territory of that named country. Combined the two variables may decide upon the country's development race.

Accordingly, acknowledging the correlation between the mentioned variables represents a significant issue, as a combination created from the GDP and return on market represents a subject of interest for future investment portfolio. The relationship in fact should be thoroughly investigated to minimize the risk of wrong investment and to help economists as well as finance advocates in the process of decision making in relation to placing assets.

Since investment placing is usually associated with high growth rates, it is important to test the degree of truth of this assumption. For instance, developing countries suffer from lack of foreign investment and means to attract investors since gross domestic product rates are usually weak and based on the above assumption, not appealing. Türkiye as a developing country leading the way in prosperity and innovation is still suffering from unstable GDP rates.

This could be explained with various macroeconomic as well as political motives rather than being a hostile host for investors. In this respect understanding how GDP growth rates and return on market correlate would help build a better layout of measurements and policies that need to be taken to encourage investment.

1.3. Terms and Variables

Within the scope of the study two main variables are treated and analyzed the gross domestic product growth rate of Türkiye and the Return on Market index BIST 100. The GDP is what defines an economy and represent the total domestic production realized and produced within the borders of that country. The GDP rate speaks for an economy as a whole.

BIST 100 return appear for the Borsa Istanbul as the main index. It automatically covers the BIST30 and the BIST 50. The index lists one hundred stocks being traded on the Turkish stock market. This index shapes the value of profit generated from stocks and assets placement.

1.4. Theoretical Framework

This study has six chapters. In the first chapter, the topic, scope, and the aim of this study are explained. The second chapter, literature review, summarizes the previous literature in relation to the topic understudy while giving insight about key concepts such as, GDP and the Turkish economy.

The third chapter is covering the methodology in use to assess the hypothesis and obtain the suitable results.

In the next chapter, results and findings are deployed and described relatively to the statistical calculations made.

In the fifth chapter, discussion, these findings are evaluated and discussed while hinting about limitations found.

Lastly, the sixth chapter concludes the study with summarizing the facts observed and analyzed as well as providing recommendations for future research.

2. LITERATURE REVIEW

The main aim of this portion of work is to give an understanding about growth rate as a concept, return on Market, as well as their correlation when combined. Again, this part helps explain the Turkish economy which represents the sole of this study in addition to giving insights about previous studies related to the issue presented.

2.1. Economic Growth

Economic growth has and will always be the central core subject of any economic driven study. Throughout history, the concept of economy represented a controversial topic as many theories rose through centuries and nations started to accord their economies accordingly.

When talking about the concept of economy one cannot neglect the father of economists Adam Smith. His theories, although made centuries ago, are still relevant up to this day. In his book 'The wealth of nations' (1776), Smith gave to the world an economic understanding of the poor and rich controversy by paving the way to Capitalism and 'laissez-faire' policy which shaped the new world's economy and trading business. For instance, Smith's ideas shaped the way of how nations measure their value in the world. It is simply by valuing products created on the territory of a country.

Again, the history of economy explained well the antibiosis of rich countries and poor countries. No matter if the difference was based on specialization or labor drive, the results are still the same. This economic division created in fact a visible split we perceive nowadays between developed countries and developing ones. As relatively poor countries with small or slow growth rate keep being marked as anti-investment parts of the world.

2.1.1. Gross Domestic Product (GDP)

Gross domestic product or GDP represents one of the most important indicators to an economy's value. It is "the monetary market value of all final goods and services produced in a country over a period of a year" (Bergh, 2009, p.1). In fact, this indicator has been paired with wellness throughout history as it shows directly how a country manages its goods and services within its own boundary. Hence, GDP gives a hint about how well an economy is operating. Although it was widely criticized for being an insufficient indicator to judge an economy's performance GDP rates are still taken into consideration especially from investors as a key component to include in their investment portfolios.

2.1.2. GDP Calculation Methods

Growth domestic product is calculated through combining the total output of goods and services produced in a country for a determined period of a year.
The formula for calculating the GDP is simple and as follows:

$$GDP = C + I + G + (X - M) \quad (2.1)$$

Gross domestic product formula

Where:

C = Private consumption

I = Gross product investment

G = Government investment

X = Exports

M = Imports

A nation's statistical office usually calculates GDP values. As explained above, economists as well as social writers view the GDP as the most obvious hint for a country's progress.

However, in literature, GDP was often criticized with the assumption that it is not enough which in fact created from it a paradox (Bergh, 2009). These critics might be true if and only if this indicator could not keep winning over from different economies, researchers, and sociologists as the number one figure showing in every country's official statistic.

Apart from calculating the GDP on yearly basis, other formulas are used to calculate the difference in growth between one year and its succeeding one. The calculation can be made through two methods, quarterly or annually, where GDP value is adjusted for inflation as to assure the true change in value. Quarter on quarter method consists of first transforming the real GDP into a quarter figure through this formula:

$$\left(GDP_Q - GDP_{Q-1}\right) \Big/ GDP_{Q-1} \quad \textbf{(2.2)}$$

Quarter on Quarter GDP formula

Where:

GDP Q = GDP in quarter Q

GDP Q-1 = GDP in the previous quarter

Second the value obtained should be annualized to find the percentage of growth:

$$g_{(annual)} = \left(1 + g_{(quarterly)}\right)^4 - 1 \quad \textbf{(2.3)}$$

Annual growth rate formula

Where we refer to Annual growth rate by g

And quarter on quarter GDP by g quarterly

This formula is valid if the GDP kept growing at the same quarterly rate for three more quarters.

The next method is calculating the GDP directly annually through this formula:

$$\left(GDP_{Q} - GDP_{Q-4}\right) \Big/ GDP_{Q-4} \quad \textbf{(2.4)}$$

Year on year GDP growth rate formula

Although quarterly calculations might seem more accurate, year on year annual rate calculations are more used especially with the first one being subject to volatility and seasonal changes.

No matter how calculated GDP remains an important index to show an economy to the world. Yet, the question here is not how well a GDP represent a country in terms of development but is GDP a relevant value to depend direct foreign investment on.

2.2. Understanding the Turkish Economy

2.2.1. Türkiye's Economic Growth Rate

The study in hand is taking the Turkish economy as a recipient for evaluating the theory presented above. Being an intriguing economy, the latter succeeded in multiple times to attract various economists around the world. They kept searching for an understanding of the enigma of Türkiye. Possessing great natural resources and an industrious patriotic population, the country, unfortunately is still considered a developing country.

The enigma could be perceived in the fact that Türkiye when seen by the eyes of Third World countries it represents a well-developed country however developed countries are still seeing the nation struggling behind for prosperity.

Türkiye has a strategical geographical emplacement due to its closeness to two continents Asia and Europe and its openness on the middle east side. The population in Türkiye amounts to eighty-four million for the year of 2021. With this number of labor potential, the country still suffers from labor shortage. For instance, the value of labor force working in agriculture is 34% but only 12% contribute to the GDP (OECD, 2004). The Turkish economy's main sectors of industry are the manufacture sector

occupying the value of 28% of the GDP and the agricultural sector that accounts 67% of the GDP yet the service sector contributes the most in the growth of the economy with 54% of GDP (OECD, 2004).

In opposition to assumptions although the country is most known for being the new touristic destination, the tourism sector accounts only 4% of the GDP. However, it represents one of the most primordial sectors for the country for being a source of foreign currency. The Turkish economy falls under the label of a free market which makes it open to foreign trading. It computes 61% of the gross domestic product. The economy trades generally in automobile industries and petroleum oils products

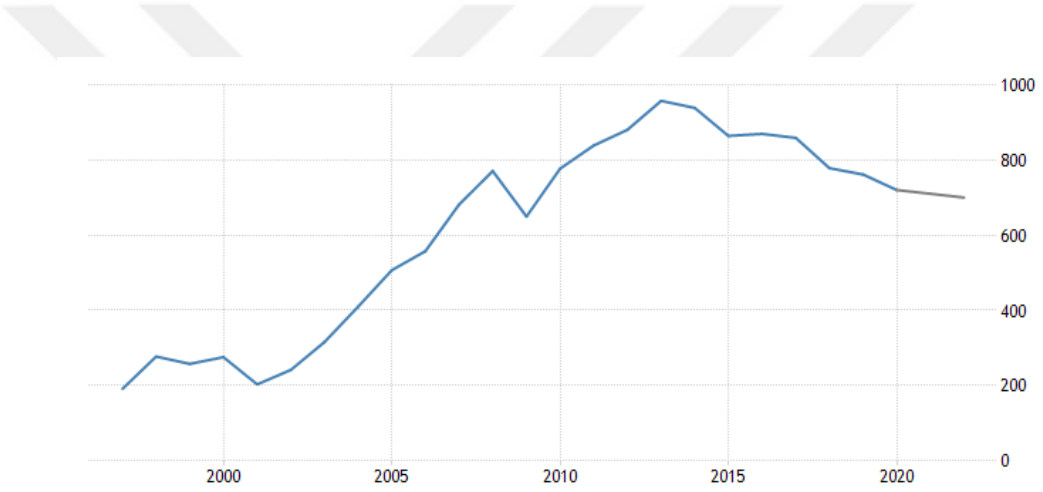

Figure 2.1 Gross Domestic Product growth for Türkiye 2000-2020
World Bank, (2020)

As the graph explains, the value of GDP recovered from the serious decline that happened in the start of the 2000s. This can be explained by the country's new regulations and the adoption of free-market policies that made room for the trading sector to save the economy.

Although, GDP rates are considered high in the late years, the country is still suffering from a deficit in balance of exports and imports with a value of 37.9 billion USD (World Bank,2020). This deficit is a result of the wide import of energy products that are characterized by instability in prices.

Additionally, one of the main challenges for the Turkish economy is this serious decrease of its monetary value, the Lira in opposition to the Dollar and Euro. The Lira went through historical lowness especially in the recent years scoring serious drops that lead to high inflation percentages in the country as well as crucial rise in prices. As the Lira lost its value against the Dollar, purchases in companies started to be made with the foreign currency. This in fact created a type of discouragement in the investor's mind.

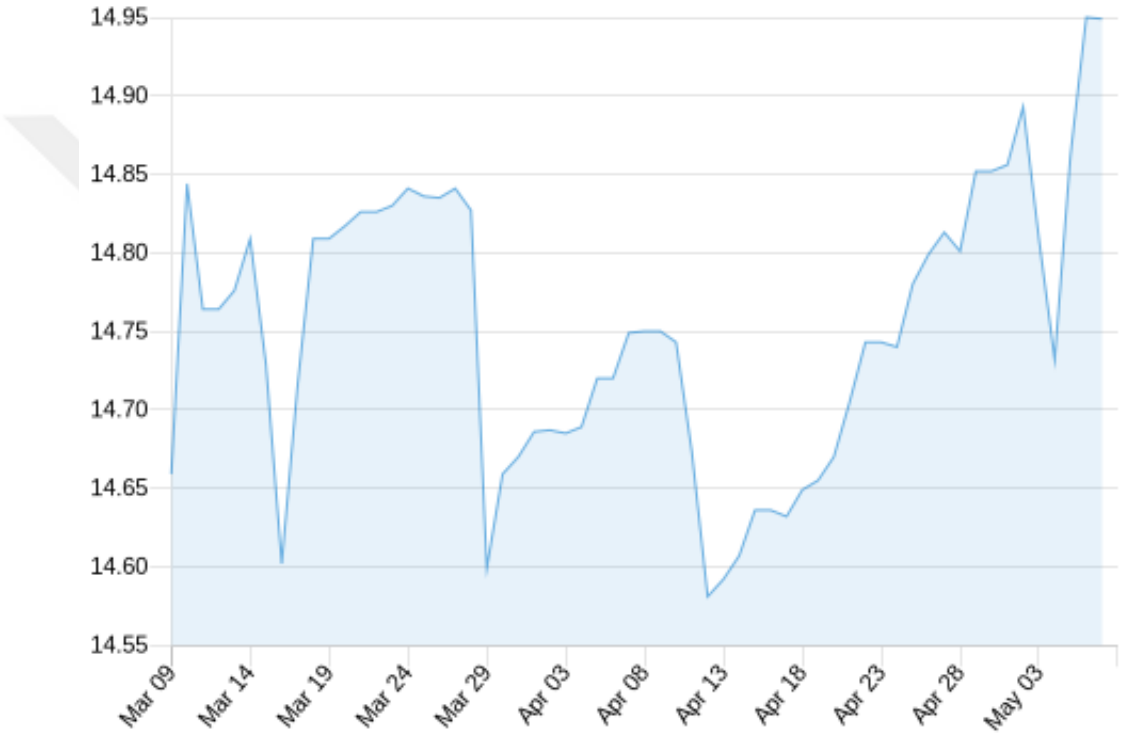

Figure 1.2 Value of TRY compared to USD

World Bank, (2021)

As we can see in the graph the obvious drop-down of the Lira caused serious economic problems in the country especially for locals who lost the purchasing power in the shadow of the huge prices increase.

2.3. The Turkish Stock Market

Borsa Istanbul which started operating in 1986 represents an emerging market for a developing country such as Türkiye Balaban (1995). The Borsa Istanbul establishment allowed Türkiye to connect with the world capital market. The number of companies listed in Borsa Istanbul raised from forty-two when the market was first established in 1986 to 541 in 2022 Balaban (1995).

Borsa Istanbul witnessed slow but perceivable development since the day it started operating and became the "fifth largest exchange market in terms of total value of bonds traded in2006" (Kosman, Tarun, 2007).

The domestic market capitalization counts a value of 135. US$14 billion approximately 1.8 trillion Turkish Lira that increased from US$26.28 billion since 2009. The growth of the Borsa Istanbul in terms of companies listed as well as market capitalization made from Türkiye an attractive destination for investors especially foreign ones.

After accounting liberalization and free market policies in 1989, the Turkish stock market gained an appreciation from foreign investors due to its flexible and lenient strategies. However, such policies made the market open to vulnerability and shocks due to inflation and volatility following the World financial crises.

The focus of the study is to analyze the relationship between growth rate and return on equity market in Türkiye. The Borsa Istanbul features several indices BIST 30, BIST 50, and BIST 100. The study chose BIST 100 as a reference variable since it represents the main index in Borsa Istanbul equity market. BIST 100 covers one hundred of the highest stocks from selected companies trading on the Turkish stock market. The index includes the BIST 30 and BIST 50 as well. (Borsa Istanbul, 2020). The purpose of stock market indices is to evaluate and measure the value of stocks traded on the market.

2.4. Previous Studies

The following content is divided into two parts with the first one examining the literature supporting the negative correlation between stock markets return and growth rate. The second part is presenting the research made in favor of growth rate and return on equity interfering positively into each other.

2.4.1. Higher Growth Rate is No Guarantee for Higher Return on Equity

Literature covering the issue related to stock market versus economic growth is vast and wide throughout the years various researchers examined the subject and provided divided results. On one hand, some proved the existence of a positive relationship between stock performance and growth rate on the other hand others argue the opposite.

The milestone theory came from Siegel (2013) introduced in his book 'Stock for the Long Run'. In his study the author showed that investing in developed markets with higher growth rate does not guarantee superior return on stocks. Siegel included in his book seventeen developed countries using their growth rate returns to compare it respectively with stock returns. Examples from the countries understudy are Canada, France, Singapore, Japan, and the United States. Apart he included eighteen emerging countries as well such as Venezuela, Indonesia, Pakistan, Türkiye, and South Africa.

The study in question covered the data obtained from a period of 27 years. Findings indicated clearly that the correlation between the growth of the economy and the stock rate was if not weak, negative. For the case of developed countries, the correlation was -0.32. Evidence from emerging countries analysis demonstrated that for the case of Venezuela although the economic growth had a value of -0.2% stock returns marked as 16.6% value.

Dimson et al (2002) in their book 'Triumph of the Optimist' took over Siegel's theory and adopted it to prove the same findings in their study. They attempted to delve deeper in the analysis while focusing on just sixteen countries yet with a more time length period starting from the 20th century until the 21st one. The study was argued to be more relevant as it introduced a new variable to work with extracted from GDP which is GDP per capita. This new variable would leave less room for error as it eliminates the assumption that higher GDP rates can be explained by higher population growth. Although the model of calculation is diverged Dimson et.al (2002) still obtained the same results as Siegel. Accordingly, from the period of 1900-1951 the correlation was -0.27 and -0.03 for the period starting from 1951- 2000. In fact, the study provided to the world straightforward evidence that for a country such as the US with the growth rate of 7% return on equity was only 2%. This evidence was enough to solidify the main theory Siegel started; higher growth rate does not subsequently mean higher return on assets.

One of the strongest defendants behind the hypothesis stating that GDP and stock returns correlate negatively is Ritter (2004). In his study he ran statistical calculations using data from 1900 until 2002 for specifically sixteen countries. As the correlation turned out to be negative, the author strongly argue that developed countries with higher growth rate are not the best choice for investment and do not grant higher stock returns rate.

On the other hand, Carnell (2010) studied the rate of return in developed countries such as the USA. Carnell (2010) made use of theoretical as well as empirical models to show that investors should not expect more than 4% and growth for stock returns. He argues that factors such as dilution in earnings-per-share would slow down the rate of growth and stocks even while existing in a developed country with remarkable economic growth percentage.

Wu (2012) targeted the US market in his study again. Being one of the biggest economies in the world, the US would always be considered the number one target economy for its promising economic growth rates. The study collected data from the period starting in 1968 to 2010 using the World Bank resources. Wu (2012) adopted supply side models to investigate the relationship between stock market returns and GDP through analyzing the data for 42 years with including the S & P 500 index in a regression manner. Wu (2012) showed the absence of a linkage between the economic growth rate and US market's returns on equity.

De Sousa et. al (2018) sought to determine the relationship between macroeconomic indicators and the stock market return in Latin America. To conduct the study, the researchers collected data from 2010 until 2017 and analyzed it through the generalized methods of moments (GMM). Results showed that GDP growth rates and return market share a negative correlation.

Furthermore, Maga (2019) studied the relationship between economic output and stock return in Indonesia covering a period of 28 years from 1990 until 2018. Maga (2019) implemented the vector auto regressive model (VAR) to determine the nature of the relationship, along with the Granger causality test. The use of these models demonstrated that the two variables are independent from each other which means that both variables do not affect each other.

2.4.2. Affirmations about the Positive Relationship between Growth Rate and Return on Equity

Although considerable numbers of authors and researchers proved the lack of positive influence from both variables, some studies managed to demonstrate the opposite through new models.

In their study of the causal relationship between market growth and economic growth rate Abushamalla et. al (2015) sought to examine and assess the casualty between GDP and market growth value in three different countries with distinctive characteristics. They selected the USA, Malaysia, and Jordan as three samples of three different economic labels. The data was collected for a period starting from 1994 until 2010. Abushamalla et. al (2015) in their study admitted the existence of a causal relationship between the two variables in question yet as a plus they attempted to prove that this relationship is affected by each country's different multilevel circumstances. The study showed that in a Third World country like Jordan neither the growth of the market affects the economic growth nor does the economic growth affect the other. However, in a developing country such as Malaysia the growth of returns affects the GDP rates but not vice versa. In opposition to the USA a developed country, the results demonstrated that the growth of both market and economy affect each other.

Similarly, Oskooe (2010) in his study untitled 'Emerging Stock Market Performance and Economic Growth' concentrated on the Iranian economy as an attempt to comprehend and test again the existence of a co-integration relationship between market performance and economic growth. The study includes different models in order to prove and test the hypothesis right. Oskooe (2010) collected data for the period from 1997 until 2008. First the data was classified through unit root tests then the author examined the cointegration of the data through the Johansen co-integration analysis. Subsequently he used the vector error correction model (VECM) to investigate the long run relationship between to the two variables.

At the end through applying the Granger causality test the direction of causality between growth rate and stock prices was searched for. The results of this complex study indicated that for the Iranian market in the long run economic activity drives stock market prices however in the short run stock market returns occupies the main role in leading the economic growth.

Tursay and Faisal (2016) studied the causality between GDP and stock prices in Türkiye employing quarterly data from 1989-2014. They applied the ARDL model to test the interrelationship between the variables in question. Results implied the existence of a strong relationship between the variables eventually. Apart from that they used the Granger causal test to prove that in the short run there is a unidirectional causality linking GDP and stock prices.

Antonious (2010) in his study about the German market shows again the causal relationship between stock markets and economic growth. He used the vector correction error model to examine the interrelationship between the two variables on the long run, in addition to the Johansen co-integration analysis to evaluate unit roots. The study resulted in showing a causal correlation between stock market development and GDP rates with the stock market being the variable directly influencing the growth in the German economy.

Paramati and Gupta (2011) analyzed similarly the causal relationship between stock markets return and GDP rates. The analysis was made using data from 1996 until 2009 taking India as a sample country. They employed the use of the index of industrial production (IIP) and quarterly gross domestic product. The study implied different models to test the hypothesis starting from the unit root test (ADF, PP and KPSS), Granger causality test, co-integration test to the error correction model. As the study tackled the issue from different sides various results were found. According to Pramati and Gupta (2011) the most relevant finding was the absence of a relationship between GDP and BSE (Bombay stock exchange) on a quarterly based calculation.

However, GDP rates were proved to drive the NSE (national stock exchange) performance. Again, results from the Engle-Granger residual-based co-integration test showed the existence of a long run relationship between stock market performance and economic growth.

Jiang (2019) chose to conduct a comparative study of the co-movement relation between the GDP and market return between USA and China. The study covered the period from 1992 until 2017 using quarterly data. To define the relationship, correlation as well as time varying copula models were applied. The empirical results demonstrated that for the USA the GDP and the market return had a strong co-movement but fluctuant. Whereas in China the co-movement was showed to be week yet stable.

Kalam (2020) researched the effects macroeconomic variables such as GDP have on stock market return. The study analyzed second source variables from the period starting in 2000 until 2019 targeting the Malaysian economy. Kalam (2020) made use of different models to determine the relationship between the variables and market returns. The models in use were the multiple regression analysis and the ARDL to assess the short and long run coefficient. Results indicated that in the long run GDP values had a positive effect on the stock market return.

The study from Nasir et.al (2013) targeted again the Malaysian market to investigate and test the relationship between return on market and macroeconomic variables such as the GDP. The Johansen co-integration test, vector error correction model and the Granger causality test were implied to investigate the data retrieved from the period of 1996 until 2011. Results suggested that for the GDP and stock market index (KLCI) there is a unidirectional causality which makes the GDP an important variable for determining KLCI return in the Malaysian economy.

Pooja and Arun (2017) investigated the impact of key macroeconomic variables as well on the Indian market. The study covered a period from 1979 to 2014 using annual data. The study made use of the ARDL model to analyze the data, in addition to VECM test. Results indicated that for the Indian market the GDP growth rate had a strong impact on the stock market indices.

Adjasi and Biekpe (2006) studied the influence stock market return has on GDP growth selecting 14 African country such as Nigeria, Ghana, Egypt, Tunisia, and Kenya. The data in use covered approximately 26 years. While implementing the finance-growth linkage results on investigating the data, results demonstrated that there is a positive relationship between stock market return and GDP growth.

Levine and zervas (1996) sought to examine whether there is a connection between economic growth and stock market development. The study intended to determine if on the long run stock return would positively influence GDP growth rates. Using the cross-country growth regression models the authors proved that both variables correlate positively and influence each other.

In his analysis of the economic output and its influence on the Nigerian market return, Olurnleke (2014) examined a set of data extracted from 1986 to 2012. The researcher included the usage of ordinary least squares (OLS) as well as co-integration test and Granger causality in the study.

Findings demonstrated that GDP growth rate and return on market move together in the long run. In fact, economic output has a strong influence on the stock market performance.

Sapkota (2019) analyzed the impact of various macroeconomic variables on stock return in twenty-five different countries from the period starting in 1996 until 2016. The study adopted three major test including co-integration analysis, regression analysis and casualty tests. Again, results described a long run consistency between the two variables examined.

To sum up, the general conceptualization of the relationship between the GDP growth rate and market return was always seen in different ways. As the results of the mentioned authors were varied, we can understand that the two variables tend to be affected by other factors. In addition, the use of different analytical method created the opposition of results as each model has separate characteristics.

3. METHODOLOGY

This part of the study explains the main goal behind the research as well as the target country the study focused on. Moreover, data collection and data analysis methods and tools are presented in addition to precising the study's limitations.

3.1. Purpose of the Research

The study aims at disclosing and examining the relationship between the gross domestic product growth rate of Türkiye and return on stock market index BIST 100. The issue was raised several times in literature as economist as well as finance researchers attempted to reveal what relate or which variable would affect the other. In this respect this relation was analyzed as the following:

-Examining the data statistically to resolve their statistical feature.

-Analyzing the correlation of the variables to determine if there is a relationship that relate them.

-Analyzing the causality of the relationship to understand which variable affect the other.

There are some studies that examined this relationship via different methods. Yet there is no study found in the literature that analyzed at the same time the correlation as well as the causality of the BIST 100 return GDP and in Türkiye. In this respect the study in hand will contribute by adding evidence based on a deep investigation.

3.2. Target Population

The study's primary focus is GDP growth rate and market return in Türkiye. Therefore, the universe of the research is the Turkish stock exchange or Borsa Istanbul with concentrating on the BIST 100 index as well as the gross domestic product rates of the Turkish economy.

3.3. Data Collection

The study implemented secondary data retrieved from the Turkish Statistical Institute (TÜIK) and the world Bank website. This research covered the years from 2008 Q1 until 2020 Q4 using quarterly data in the form of GDP and BIST 100 return.

3.4. Models Estimated

The main purpose of this study is to analyze the correlation of growth rate and return on market. To understand the nature of this relation a series of calculations should be made. Again, as a quantitative study making use of numerical data, statistical methods would be put into practice.

3.4.1. Statistical Analysis

The first step of the analysis is treating the data statistically in order to understand the statistical features it has. GDP and BIST100 are investigated in terms of Mean, Median, Range, Standard Deviation, Skewness, and sample Kurtosis to build an understanding of how the data is dispersed statistically.

3.4.2. The Pearson Correlation Coefficient Model

The Pearson coefficient model will be implemented to determine the correlation between GDP and the BIST 100.

The value that would be generated from calculating through this model would be either positive or negative or zero. Each has an explanation about the nature of the relation between the two different variables that are going to be processed.

The formula in use is as following:

$$\beta = \frac{Cov\,(R_x, Ry)}{Var(R_x)}$$

$$Cov(R_y, R_x) = 1/n \sum (R_y - \bar{R}_y) * (R_x - \bar{R}_x)$$

$$r_x = \frac{Cov(R_y, R_X)}{s_y * s_x}$$

(3.1)

Pearson correlation coefficient formula

3.4.3. The Spearman Rank Correlation Model

The Spearman rank correlation coefficient is used to determine the correlation between a ranked data set. The correlation coefficient in this case is applied to the ranks value of the variables to examine the monotonicity of the data set. The formula for the Spearman correlation is as follows:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

(3.2)

Spearman correlation formula

Where d_i: difference in paired ranks

n: number of cases

3.4.4. Victor Autoregressive Model (VAR)

The victor Auto Regressive model is implemented to prepare for the Granger causality analysis, the model requires four tests, each has a different purpose to help treat the data in use. The VAR model is put in practice through the EViews Statistical software.

3.5. Limitations

As any other research this study as well has limitations. As the paper only analysis the effect of GDP on the stock market return, it eliminates the effect that other variables might have and which can interfere in the stock market return such as inflation, return on equity and consumer price. Furthermore, the study was limited on the number of data that covers only 12 years. In addition to this, the fact that the study covers only Türkiye makes it unreliable to generalize the findings as each economy applies different strategies and possess variant features.

4. FINDINGS

4.1. Descriptive Analysis

The data collected was first analyzed and arranged statistically to understand how it is distributed.

Table 4.1 Quarterly GDP Growth (%) 2008-2022

Mean	1.16
Standard Error	0.47
Median	1.50
Mode	1.40
Number of Observations	52
Range	27.20
Sample Variance	11.63
Sample Standard Deviation	3.41
Sample Skewness	0.67
Sample Kurtosis	9.65

The first set of data in the form of quarterly GDP was examined. As we can see the sample size of the data equals 52 observations which represent a large sample and would give better understanding about how the data is distributed. The center of the data can be presented by the value of the mean which equals to 1.16. This means that all the data is centered around this value.

The standard deviation is one of the most used method of dispersion. It tells us how closely the value of the data set is clustered around the mean. For this data set, the standard deviation is 3.41. This value represents a relatively large value therefore

we can understand that the values contained in the data set are spread over a relatively large range around mean. The sample skewness is also an important parameter that describes how the data distribution ranges. A value of skewness (greater than +1 or -1) means that the distribution is highly skewed. A value of skewness (between -1, -0,5 or 1, 0,5) means that the distribution is moderately skewed. A value of skewness (between -0,5 and 0,5) it means that the distribution is highly skewed. A value of skewness (between -1, -0,5 or 1, 0,5) means that the distribution is moderately skewed. A value of skewness (between -0,5 and 0,5) it means that the distribution is highly skewed.

In our case the sample skewness = 0.67 therefore the data distribution is moderately skewed. Also, as the skewness of the sample equals 0.67 then we can say that the data distribution is skewed to the right.

Another parameter that describes the shape of the curve highlighting the data set is the sample Kurtosis. In general, if the sample Kurtosis is greater than +1 then the data is said to be too peaked. Whereas if the sample Kurtosis is less than -1 then the data is too flat.

In the case for GDP, the sample Kurtosis equals 9.65 which is greater than +1 therefore the data set is too peaked.

Table 4.2 Quarterly Market Return (%) 2008-2022

Mean	**2.84**
Standard Error	1.95
Median	1.95
Mode	#N/A
Number of Observations	52
Range	73.16
Sample Variance	196.88
Sample Standard Deviation	14.03
Sample Skewness	0.37
Sample Kurtosis	0.85

The same analysis is performed for the second data set which is the market return index BIST 100. The size of the sample is the same as the previous one as the data is analyzed in a continuous way N= 52.

The center of the data is the mean which equal to 2.84. The sample standard deviation is equal to 14.03 which represents a large value; hence we can admit that the values included in this data set to spread over a broad range around the mean. Again, we can understand from the simple skewness = 0.37 that the data is approximately symmetric. Furthermore, the Sample Kurtosis which equals 0,85 indicates that the data set is approximately peaked as $0,85 \approx 1$.

4.2. Pearson Correlation Coefficient Model

The Pearson correlation coefficient models represents one of the famous correlation analyses used for determining potential correlation between variables, in the financial economic field. The test is often paired with robustness as it gives exact significance levels no matter how the data is distributed, Good (2009). The correlation coefficient is denoted by r and can occupy a value between $1<0<1$. A statistical test of the linear relationship between BIST100 Return and GDP can be conducted by testing the following hypothesis:

Null hypothesis H_0: Correlation coefficient equals 0

Alternate hypothesis H_l: Correlation coefficient does not equal 0.

The level of significance of this test is 5%. When applying the Pearson Correlation Coefficient on GDP and BIST 100 return results turned out to be the following:

Table 4.3 Pearson Correlation test results summary

Constant	1,1543
ß	-0,0042
R2	0,0003
Correlation Coefficient	-0,0174
Number of observations N	52
Degree of Freedom	50
t-value: table	2,0086
t-value: calculated	-0,1233

As we can see from the table above, the correlation coefficient r = -0,0174 and the t-value = -0, 1233.Accordingly, we can accept the null hypothesis as $r \approx 0$ and with the t-value being too low. Hence, we can safely say the test run on the GDP and BIST 100 Return shows that there is an absence of a strong correlation relating the two variables.

4.3. The Spearman Rank Correlation Coefficient Model

In statistical analysis, the Spearman rank correlation is often used as a mono parametric method that determines the correlation between two ranked variables, Zar (2005). The analysis requires that the two variables be ranked first from the highest to the lowest. The purpose of this model is to investigate the monotonicity of the variables included in the data set. The existence of a monotonic relationship between two variables means that if a variable increases or decreases the second variable will follow.

The first stage for performing the analysis is ranking the data set from the highest to the lowest. In our case the data is ranked through Excel software directly.

Table 4.4 GDP and BIST 100 Ranked

GDP	BIST100	Rank for GDP	Rank for BIST100
2,1	-29,75	35	1
-3,5	-10,06	3	7
-1,8	2,73	7	28
-2,5	-25,48	6	2
-5,7	-4,08	2	15
4	43,41	49	50
2,4	29,67	38	48
2	10,25	34	38
-0,3	7,03	11	34
3,8	-3,01	48	17
2,8	19,94	43	46
3	0,34	47	24
2,3	-2,37	36	18
2,7	-1,81	41	20
2,7	-5,65	41	13
1,4	-14,1	19	5
-0,9	21,76	10	47
1,7	0,19	29	23
1,8	6,17	30	33
1,6	17,79	28	45
2,9	9,84	44	37
2,9	-11,18	44	6
1,5	-2,36	24	19
0,2	-8,96	13	9
2,9	2,84	44	30
-1,6	12,54	8	40
2,5	-4,52	40	14
1,3	14,39	18	43

Table 4.5 GDP and BIST 100 Ranked (continued)

1,9	-5,68	31	12
1,5	1,74	24	25
1,4	-9,77	19	8
1,2	-3,34	17	16
0,4	16,08	14	44
1,4	-7,75	19	11
-2,9	-0,43	5	21
5,5	2,16	50	26
1,4	13,83	19	42
2,3	12,92	36	41
1,5	2,45	24	27
1,9	12,07	31	39
1,5	-0,34	24	22
0,7	-16,01	16	4
-1,6	3,56	8	32
-3,2	-8,69	4	10
1,9	2,75	31	29
2,4	2,88	38	31
0,1	9,08	12	36
1,4	8,94	19	35
0,4	-21,65	14	3
-10,8	29,98	1	49
-10,8	29,98	1	49
-10,8	29,98	1	49

The rates for GDP and BIST100 return are ranked separately in two different rows. The highest is labelled by 1 and the lowest by 49 for GDP and by 50 for BIST 100. After ranking the values, the analysis can be performed. The Spearman rank correlation allows us to test the correlation of the ranked value through the Null hypothesis:

H_0: there is no association between BIST100 return and GDP growth rate

H_1: there is an association between BIST100 return and GDP growth rate

To reject the null hypothesis, the r_s value of correlation should equal to +1 or -1. A value of r_s that equals 0 or is close to 0 means that we should accept the null hypothesis. In our case, the r_s value for the Spearman rank correlation is $0.007 \approx 0$. Therefore, we accept the Null hypothesis and admit that following the Spearman rank correlation analysis, no relationship associates the GDP rates and BIST100 return.

4.4. VAR Analysis

While studying the field of finance science one ought to adopt complex and multidirectional equations as a form of analysis, as single equation models proved themselves to be inadequate to determine the relationship between variables. In this context, the vector autoregressive model VAR is introduced as a tool to conduct the statistical analysis related to the subject.

VAR model was presented to the word in 1980 through Sims. It was described as one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. The versatility and complexity relating the variables, made it mandatory to conduct the study through the VAR analysis which will pave the way for the Granger causality test to be applied.

In fact, VAR models are used to study various variables linked together over time. In opposition to structural and single equation models the vector autoregressive model examines the lags in all the variables that are interrelated in a system. Furthermore, the VAR models are significantly viewed to be strong tools to help forecast future values due to the enclosed lag variables which are internal.

The VAR analysis is divided into four stages. First estimating the *properties* of the variables through the estimation output test. Second, assessing the *stationarity* of the variables via unit root test. Third, determining the *lag lengths* of the variables and last performing the *impact response* analysis.

4.4.1. Augmented Dickey Fuller Stationary Test

For a VAR analysis to be performed, the time series under examination should be stationary which means that the value of mean, and variance of the data set should not change over time. The Augmented Dickey Fuller (ADF) test allows us to test the stationarity of each variable through the null hypothesis.

H_0: the series has a unit root; the series is not stationary.

H_1: the series does not have a unit root; the series is stationary.

Table 4.6 Panel Unit Root Test for BIST100 Return time series

Null Hypothesis: BIST_RETURN has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.932920	0.0000
Test critical values:	1% level	-3.565430	
	5% level	-2.919952	
	10% level	-2.597905	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BIST_RETURN)
Method: Least Squares
Date: 05/18/22 Time: 14:13
Sample (adjusted): 2008Q2 2020Q4
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BIST_RETURN(-1)	-0.969154	0.139790	-6.932920	0.0000
C	3.405113	1.920137	1.773370	0.0824

R-squared	0.495186	Mean dependent var	1.150784
Adjusted R-squared	0.484883	S.D. dependent var	18.82983

Table 4.7 Panel Unit Root Test for BIST100 Return time series (continued)

S.E. of regression	13.51447	Akaike info criterion	8.083825
Sum squared resid	8949.407	Schwarz criterion	8.159583
Log likelihood	-204.1375	Hannan-Quinn criter.	8.112775
F-statistic	48.06539	Durbin-Watson stat	2.004762
Prob(F-statistic)	0.000000		

The BIST 100 index return was tested to see if it has a unit route through the ADF model. For a variable to be considered non-stationary, the null hypothesis should be accepted.

To interpret the results showed in the table above we focus on the value of probability and t statistic. A P value less than 5%, which represent the critical value included in the test, means we can reject the null hypothesis and conclude that the variable is stationary.

In our case, the P value for the test run on the BIST 100 return is 0.0000 and the t statistic equals to -6.932920, the H_0 is rejected, and we conclude that the variable is stationary.

Table 4.8 Panel Unit Root Test for GDP rate time series

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.978799	0.0000
Test critical values:	1% level	-3.565430	
	5% level	-2.919952	
	10% level	-2.597905	

*MacKinnon (1996) one-sided p-values.

Table 4.9 Panel Unit Root Test for GDP rate time series (continued)

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 05/18/22 Time: 14:17
Sample (adjusted): 2008Q2 2020Q4
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
				0.0000
GDP(-1)	-1.243226	0.138462	-8.978799	
C	1.422079	0.498446	2.853026	0.0063

R-squared	0.621969	Mean dependent var	-0.013725
Adjusted R-squared	0.614254	S.D. dependent var	5.428334
S.E. of regression	3.371456	Akaike info criterion	5.306993
Sum squared resid	556.9691	Schwarz criterion	5.382750

The quarterly domestic product growth rate of Türkiye is tested with the Augmented Dickey Fuller Test. The t statistic in value of -8.978799 and the P value of 0.0000 allows us to reject the H_0 and admit that the variable is stationary.

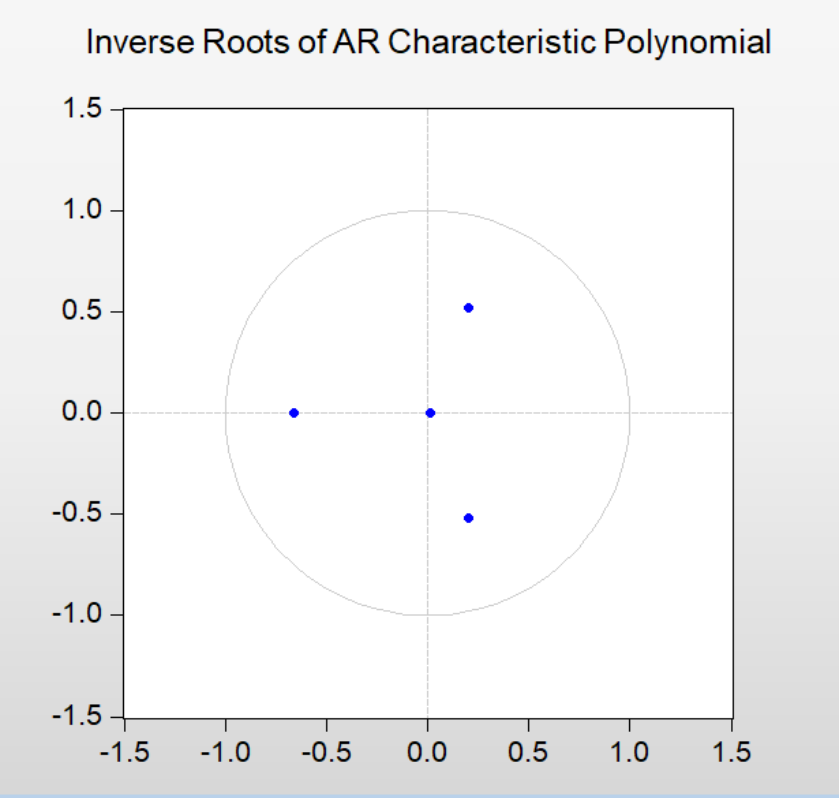

Figure 4.3 The Position of the Inverse Roots of the Characteristic Polynomial AR on the Unit Circle

The figure clearly shows that all the inverse root of the AR characteristic polynomial resides within the unit circle. We can safely verify that the VAR model created is stable.

4.4.2. Model Estimation Output

The following table shows two lag lengths with their appropriate lag lengths and respected VAR model to be established. The variables with () brackets represent standard error while the ones with [] brackets constitute the t statistic.

Table 4.10 Model Estimation Output

Vector Autoregression Estimates
Sample (adjusted): 2008Q3 2020Q4
Included observations: 50 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	BIST_RETURN	GDP
BIST_RETURN(-1)	-0.005026	0.139918
	(0.14458)	(0.03175)
	[-0.03476]	[4.40749]
BIST_RETURN(-2)	-0.038122	-0.004315
	(0.16883)	(0.03707)
	[-0.22580]	[-0.11641]
GDP(-1)	0.520769	-0.232661
	(0.70751)	(0.15535)
	[0.73606]	[-1.49767]
GDP(-2)	-1.376323	-0.069577
	(0.75438)	(0.16564)
	[-1.82445]	[-0.42005]
C	4.432548	1.152608
	(2.18082)	(0.47885)
	[2.03251]	[2.40704]
R-squared	0.114913	0.343434
Adj. R-squared	0.036239	0.285073
Sum sq. resids	7763.441	374.2899
S.E. equation	13.13472	2.884017
F-statistic	1.460616	5.884613
Log likelihood	-197.0759	-121.2721
Akaike AIC	8.083035	5.050885
Schwarz SC	8.274237	5.242087
Mean dependent	3.747600	1.234000
S.D. dependent	13.37938	3.410884
Determinant resid covariance (dof adj.)		1434.863
Determinant resid covariance		1162.239
Log likelihood		-318.3464
Akaike information criterion		13.13386

Table 4.11 Model Estimation Output (continued)

Schwarz criterion	13.51626
Number of coefficients	10

4.4.3. Optimal Lag Length Test

For a VAR analysis, determining the lag length is primordial to perform the study. The importance of lag length test lays under the fact that selecting the right optimal period of the delay would prevent from auto correlated errors happening due to sequential internal correlation Lütkepoh (1993).

Table 4.12 VAR Optimum Lag Test Results

VAR Lag Order Selection Criteria
Endogenous variables: BIST_RETURN GDP
Exogenous variables: C
Date: 05/18/22 Time: 14:18
Sample: 2008Q1 2020Q4
Included observations: 48

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-316.7700	NA	2010.906	13.28208	13.36005	13.31155
1	-305.5316	21.07196*	1487.803	12.98048	13.21438*	13.06887*
2	-300.4414	9.120007	1423.423	12.93506	13.32489	13.08238
3	-295.9626	7.651177	1399.044	12.91511	13.46088	13.12136
4	-291.4614	7.314451	1376.709*	12.89423*	13.59593	13.15940

* Indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The examination of the table shows that LR, SC and HQ criteria are in the same direction. Accordingly, the three criteria share the greatest number of (*) and therefore are validated. Consequently the 1-period delay will be considered as the appropriate

and optimal lag length. Therefore, we can admit that if a change occurs in one variable, the other variable will respond after 1-period.

4.4.4. Granger Causality/External Block Wald Test

The Granger causality test is a statistical method introduced by Granger in 1969. The test presented a new and different approach for dealing with the cause effect relationship. For, Granger causality test, when applied on a time series data, can give statistically significant information about the future value of a variable caused by the value of another variable.

As the VAR analysis does not differentiate between endogenous and exogenous variables, the Granger causality/External Block Wald test would be a suitable method to determine the co-integration of variables.

Table 4.13 Granger Causality/External Block Wald test

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 05/18/22 Time: 14:23
Sample: 2008Q1 2020Q4
Included observations: 50

Dependent variable: BIST_RETURN

Excluded	Chi-sq	Df	Prob.
GDP	5.745938	2	0.0565
All	5.745938	2	0.0565

Dependent variable: GDP

Excluded	Chi-sq	Df	Prob.
BIST_RETURN	19.45428	2	0.0001
All	19.45428	2	0.0001

The results presented in the table shows that for the BIST100 return as a dependent variable, the Prob is 0.0565 and according to the Granger causality block Wald test, if the prob value is above 5% than the model is considered not statistically significant. Since 0.0565> 0.05 we can conclude that the model which contains the BIST 100 return as a dependent variable is not statistically significant.

For the gross domestic product rate, the prob is 0.0001 which is less than 5% therefore the model is considered as statistically significant.

According to Granger (1969) for a variable to be accepted as the Granger cause of another variable, the probability value should be less than 0.05, with the 5% significance level, or the F statistical value should be greater than 2.

Hence, it is observed that the BIST 100 return has a statistically unidirectional effect on the gross domestic product growth rates in the related period in Türkiye.

4.4.5. Impulse Response Analysis

The impulse response analyses' main core principle is to determine the relationship between variables and reflect whether it is positive or negative He (2020).

Figure 2.4 Responses of BIST100 return to a Standard Error Shock Given to GDP

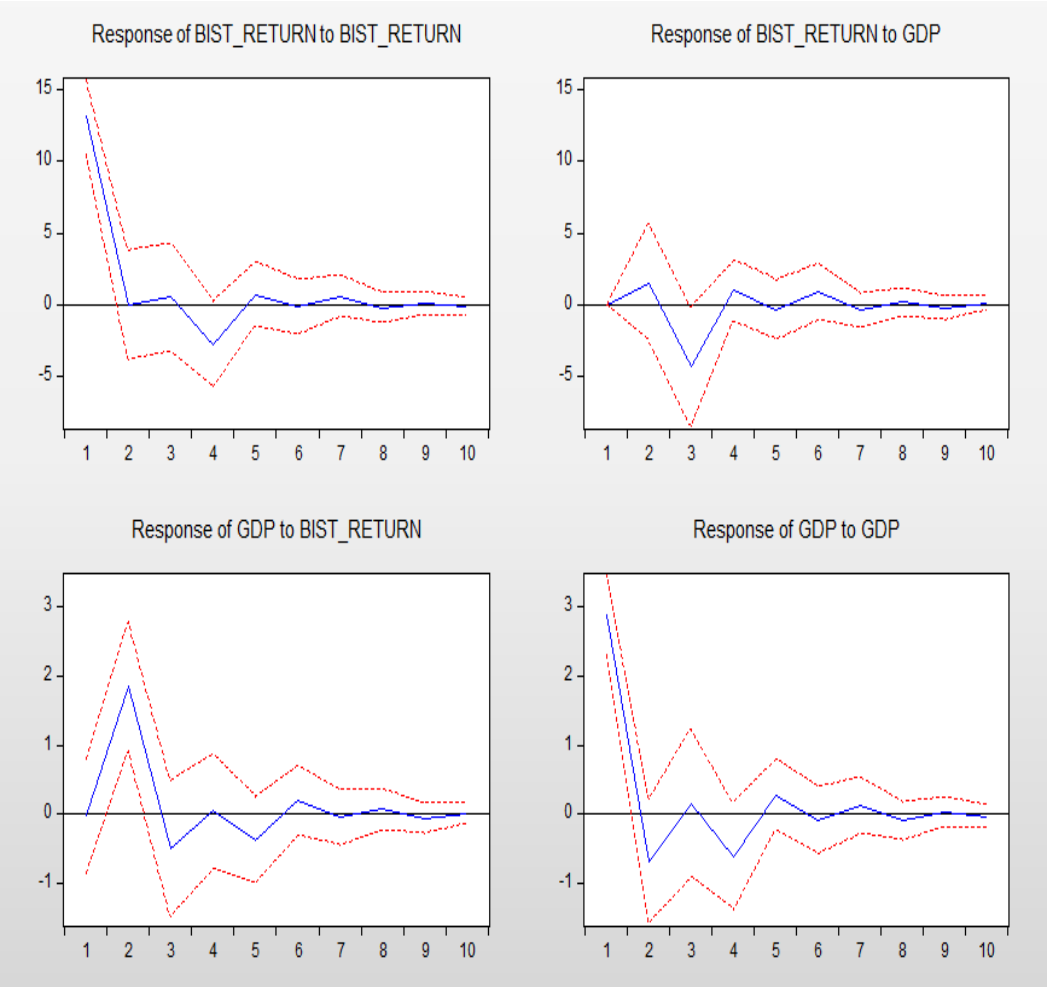

Table 4.14 Responses of BIST100 Return to a Standard Error Shock Given to GDP

Response of BIST_RETURN: Period	BIST_RETURN	GDP
1	13.13472	0.000000
	(1.31347)	(0.00000)
2	-0.077836	1.501859
	(1.91017)	(2.04592)
3	0.490728	-4.326189
	(1.90387)	(2.10386)
4	-2.793837	0.974207
	(1.49654)	(1.07087)
5	0.705443	-0.382237
	(1.10913)	(1.03403)
6	-0.167470	0.943426
	(0.95971)	(0.98289)
7	0.586072	-0.423474
	(0.70926)	(0.61492)
8	-0.286393	0.147881
	(0.51483)	(0.48585)
9	0.083460	-0.213655
	(0.39083)	(0.40511)
10	-0.129659	0.134965
	(0.28911)	(0.28103)
Response of GDP: Period	**BIST_RETURN**	**GDP**
1	-0.022702	2.883927
	(0.40786)	(0.28839)
2	1.843070	-0.670978
	(0.46552)	(0.45301)
3	-0.494802	0.165593
	(0.49148)	(0.52724)
4	0.055883	-0.603636
	(0.41069)	(0.38950)
5	-0.371601	0.283899
	(0.31094)	(0.25616)
6	0.193329	-0.081739
	(0.25060)	(0.23878)
7	-0.045602	0.132917

Table 4.15 Responses of BIST100 Return to a Standard Error Shock Given to GDP (continued)

	(0.19780)	(0.20154)
8	0.079883	-0.088560
	(0.14808)	(0.13817)
9	-0.058014	0.033875
	(0.10752)	(0.10302)
10	0.020853	-0.032252
	(0.07921)	(0.08335)

Cholesky Ordering: BIST_RETURN GDP

Standard Errors: Analytic

The results of the impulse response analysis showed that the BIST 100 return reacted negatively periodically once each two periods to the shock applied on the GDP the values are as following:

-0.077836 for the second period

-2.793837 for the fourth period

-0.167470 for the sixth period

-0.286393 for the eighth period

-0.129659 for the tenth period

It is visible that the strong reaction was observed in the fourth period. The reaction of BIST 100 persisted for five periods. It is worth noting that for the other five periods the variable did not show any reaction. The same results were observed for the response of the gross domestic product to the shock on BIST100 return.

-0.022702 in the first period

-0.494802 for the third period

-0.371601 for the fifth period

-0.045602 for the seventh period

-0.058014 for the ninth period

Again, the GDP reacted for five periods with the second period being the strongest.

4.4.6. Granger Causality Test

Granger causality test will be applied to investigate the short run relationship between the variables. As both variables were approved to be stationary the test can be carried out.

The Granger causality test examines the cause-effect relationship between two stationary variables through the null hypothesis.

H_0: variable1 does not Granger cause variable2.

In Our case 2 H_0 hypothesis would be generated:

First H_0: GDP does not Granger cause BIST 100.

Second H_0: BIST 100 does not Granger cause GDP.

To accept the null hypothesis, the value should be more than the conventional level of P value that is 0.05. Accordingly, we reject the null hypothesis if P value < 0.05.

Table 4.16 Granger Causality Test

Pairwise Granger Causality Tests
Date: 05/18/22 Time: 14:34
Sample: 2008Q1 2020Q4
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP does not Granger Cause BIST_RETURN	50	2.87297	0.0670
BIST_RETURN does not Granger Cause GDP		9.72714	0.0003

For the first null hypothesis, GDP does not Granger cause BIST 100 return, the prob for this hypothesis is 0.0670>0.05, therefore we admit that gross domestic product does not Granger cause the market return in Türkiye. However, for the second H_0 100 does not Granger cause GDP the P value is 0.0003< 0.05 consequently we reject this hypothesis and conclude that the BIST 100 index return Granger cause GDP growth rate in Türkiye. After conducting the Granger causality analysis, results

indicates that there is a unidirectional Granger cause relationship between GDP and BIST100 return running from the market index.

5. DISCUSSION

The association between gross domestic product growth rate and return on market in a country represents a pressing concern often investigated in the literature. In this study and taking Türkiye as a recipient country, the GDP growth rate and the BIST 100 return were analyzed in an attempt to prove the hypothesis stipulating that growth rates don't affect return on market thus return on investment.

The study first collected data in form of quarterly GDP and BIST100. The analysis was deeply performed via the use of the VAR methods along with Spearman and Pearson correlation models. Results clearly supported the hypothesis which the work is based on.

In fact, both Spearman and Pearson correlation coefficients analysis demonstrated the absence of a clear correlation between the two variables. Thus, neither GDP growth rates nor market return affect the growth or decline of the other. This lack of association supports previous researcher's work like Siegel (2013) and Ritter (2004) who defended the claim that a country's GDP cannot enter as a factor in deciding for investment placement.

In addition, findings generated from the VAR analysis again proved the formed hypothesis right. Both Granger causality test indicated that GDP do not result in an alteration in return on market rates. Combined these results prove that basing investment decision on a country's growth rate can be misleading as thorough analysis demonstrated the opposite.

Aligning with the claims Ritter and Siegel presented, a common mistake investors and finance advocates tend to make is targeting developed countries with expected high growth rate to place assets.

This weak argument created different issues among them the economic division generated in the world along with the phenomena of rich countries getting richer and poor countries poorer. In our case Türkiye is a developing country struggling with several economic issues such as unstable GDP growth rates. Türkiye, even with the serious policies undertaken to encourage foreign direct investment, still

didn't receive the deserved share of investments. This goes back to the behavioral assumption stated above. In fact, a minor analysis when performed in this country showed the absence of a room for truth for such speculations. This study strongly defends that other factor such as demographic, geographical, and political play a more decisive role in generating profit from investment than growth rates. Furthermore, growth rates may represent an economy's internal performance, yet it can be subject to influence by other external variables which lessen from the reliability it gives.

It is worth mentioning that within the scope of this analysis the Granger causality test demonstrated that contrary to the norms BIST 100 return rates affect GDP growth rates in Türkiye. As a matter of fact, we found ourselves in a paradoxical situation. GDP rates are influenced by return on market and this influence could be either positive or negative. In short, market return in Türkiye plays a key role in making the country either attractive for investment or a hostile environment. This would cause the country to enter in a vicious circle based on claims undertaken by wrong decision makers.

The reason behind this cause-effect relationship is the fact that when investors decide to purchase assets in the Turkish stock market, they must convert the money into Turkish Lira. The money spent would enter into the budget of the country and be employed in the process of import which in its turn contributes in the GDP.

The Findings showing the absence of a clear relationship between the two variables, especially demonstrating that GDP does not influence stock market return, should introduce a new perspective when searching for adequate investment environment with high profit guarantee. The lack of association can be explained by the fact that return on market rates tend to change by different other primordial factors such as invest rates, dividends, yields, exchange rate and political upheaval rather than economy's growth.

To sum up, the study analyzed the relationship between growth rate and return on market in Türkiye based on the hypothesis that GDP does not affect the BIST 100 return. Results showed that we should accept the mentioned hypothesis and emphasize on changing the common belief associating long-run profit on market investment with GDP rates.

6. CONCLUSION AND RECOMMONDATIONS

Over a period of 12 years from 2008-2020 the correlation between GDP growth rates and BIST 100 index return was analyzed. The urge of studying the above correlation lays behind the constant pairing of profit on investment with high growth rates. This created a division in the economic world and lead countries with higher potential for welcoming investment left as second choices and labeled ineligible for future investment.

Türkiye falls under this description with being a developing country with unstable growth rates. In the study the correlation as well as the causality between the two variables was analyzed.

As a result, no clear correlation or causality was found between GDP and BIST100 return. Only a unidirectional cause effect relationship was demonstrated, which runs from the market return index. This causality in fact supports the idea that return on market helps the growth in GDP and not the opposite.

Within the scope of the study, it was made clear that it argues in favor of the inexistent relationship between these two macroeconomic variables. The subtle point is to signal that GDP is not an adequate indicator for measuring the welfare of investments. Increasing expertise in the subject as well as creating innovative policies should enter in consideration when deciding upon strategies to encourage investment. Investors from their part should abandon common assumptions based on behavioral actions when preparing investment portfolios.

The Turkish economy is a set example of how inferior and unfair for a country to be disregarded in terms of profit based on GDP numbers while that country could be a better host than presumed common economies like China or the USA.

To remedy to this issue investors and finance advocates should consider widening the borders of their research and reconcile with the idea that GDP growth rates do not necessarily mean high profit generated from return on equity investments.

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APPENDIX A

	GDP	BIST Return
2008Q1	2,1	-29,75
2008Q2	-3,5	-10,06
2008Q3	-1,8	2,73
2008Q4	-2,5	-25,48
2009Q1	-5,7	-4,08
2009Q2	4	43,41
2009Q3	2,4	29,67
2009Q4	2	10,25
2010Q1	-0,3	7,03
2010Q2	3,8	-3,01
2010Q3	2,8	19,94
2010Q4	3	0,34
2011Q1	2,3	-2,37
2011Q2	2,7	-1,81
2011Q3	2,7	-5,65
2011Q4	1,4	-14,1
2012Q1	-0,9	21,76
2012Q2	1,7	0,19
2012Q3	1,8	6,17
2012Q4	1,6	17,79
2013Q1	2,9	9,84
2013Q2	2,9	-11,18
2013Q3	1,5	-2,36
2013Q4	0,2	-8,96
2014Q1	2,9	2,84
2014Q2	-1,6	12,54

2014Q3	2,5	-4,52
2014Q4	1,3	14,39
2015Q1	1,9	-5,68
2015Q2	1,5	1,74
2015Q3	1,4	-9,77
2015Q4	1,2	-3,34
2016Q1	0,4	16,08
2016Q2	1,4	-7,75
2016Q3	-2,9	-0,43
2016Q4	5,5	2,16
2017Q1	1,4	13,83
2017Q2	2,3	12,92
2017Q3	1,5	2,45
2017Q4	1,9	12,07
2018Q1	1,5	-0,34
2018Q2	0,7	-16,01
2018Q3	-1,6	3,56
2018Q4	-3,2	-8,69
2019Q1	1,9	2,75
2019Q2	2,4	2,88
2019Q3	0,1	9,08
2019Q4	1,4	8,94
2020Q1	0,4	-21,65
2020Q2	-10,8	29,98
2020Q3	16,4	-1,71
2020Q4	1,4	28,94

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