

# Examining the relationship between financial ratios and stock returns: An application on BIST 30 index

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## Abstract

Investors trading in capital markets aim to maximize the returns they will obtain from this market. For this reason, determining the factors affecting stock returns is important for investors. The aim of this study is to examine the relationship between financial ratios and stock returns of companies that are listed on the BIST 30 Index as of 2024 and traded on the stock exchange uninterruptedly between the 2016Q2-2023Q4 periods. The financial ratios used in the research include the current ratio, return on equity ratio, asset turnover ratio, inventory turnover ratio, debt/equity ratio, and debt/asset ratio. Stock returns are measured by the rate of return. The relationship between the return rates of stocks of companies listed on the BIST 30 index and the financial ratios of these companies will be examined through the panel data analysis method. In the analysis results; According to the analysis results, the relationship between the current ratio and inventory turnover ratios and the return rate of stocks is significant and negative. The relationship between return on equity ratio, asset turnover ratio and debt/equity ratio and stock returns is significant and positive. The relationship between debt/asset ratio and return rate is meaningless.

**Keywords:** Financial Ratios, Stock Returns, Panel Data Analysis, BIST 30 Index, Driscoll-Kraay Robust Standard Estimator

**JEL codes:** C10, C50, G11, G20,

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## 1. INTRODUCTION

Investors trading in capital markets aim to maximize profit by using their funds effectively. To achieve this goal, they can invest in some capital market instruments such as stocks. Investors may want to gain two types of profits when investing in stocks. These include dividends and capital gains. Dividend is the profit share that investors receive from the businesses in which they are partners, proportion to their capital. The positive difference between the selling price and the buying price of any financial asset is called a capital gain. Investors in the market can increase capital gains by investing in stocks with appreciation potential. In this case, factors affecting the price of stocks can be significant for investors.

When the financial literature is examined, it is seen that there are many factors that have significant effects on stock returns. The financial performance of businesses whose stocks are traded in capital markets may affect the market price of their stocks. The market price of shares of a business with good financial performance is likely to increase. Additionally, current economic conditions in the country may also affect the market prices of stocks. For example, an increase in deposit interest rates may cause funds in capital markets to turn towards money markets. This may reduce the market price of the stocks. Political factors in the country can also affect the market price of stocks. In general, if there are positive expectations about the future of the country, the market price of stocks may increase. By taking such factors into consideration, investors can increase their profits from capital markets.

The aim of this study is to determine the financial ratios that are effective on stock returns. For this purpose, the data of 23 different companies registered in the BIST 30 Index as of 2024 and continuously traded on the stock exchange between 2016Q2-2023Q4 periods are analysed. BIST 30 Index consists of 30 firms with the highest trading volume and market capitalisation traded in Borsa Istanbul. Since it is thought that the results of the analyses to be made with the data of the companies in this index will be more meaningful, it is preferred in the study. Since all data of the companies traded in BIST 50 and BIST 100 Indices are not available, these indices are not preferred in the study. In the study, firstly, a literature review consisting of studies examining the relationship between stock returns and financial ratios is presented. Then, the scope of the study, hypotheses, method of analysis and research findings are presented. Finally, in the conclusion section, the results and recommendations obtained as a result of the research are given.

## 2. LITERATURE REVIEW

When the literature was examined, it was seen that there were many studies examining the relationship between financial ratios and stock returns. One of the first studies on the subject was conducted by Senchack and Martin in 1987. Senchack and Martin (1987) analysed the relationship between financial ratios and stock returns using the data of 450 firms listed on AMEX and NYSE. According to the results of the analysis, financial ratios have an effect on stock returns.

Martikainen (1989) analysed the relationship between 12 different financial ratios and stock prices. According to the results of the study, profitability and capital structure ratios have significant effects on stock returns.

Fama and French (1992) examined the relationship between stock returns and financial ratios using data on firms traded on NYSE, AMEX and NASDAQ stock exchanges. According to the results of the study, market to book ratio is significant in explaining stock returns.

Lev and Thiagarajan (1993) examined the relationship between 12 different financial performance measures and stock returns. Some variables such as inventories, gross sales profit, accounts receivable were used in the study. According to the results of the study, there are high correlations between financial performance measures and stock returns.

Haugen and Baker (1996); examined the data of American companies traded in the Russell 3000 Index for the period 1979-1993. According to the research results, there are positive and significant relationships between stock returns and profitability.

Dhatt et al. (1999) investigated the relationship between financial performance and stock returns of companies listed on the Korea Stock Exchange. The research used data of these companies for the years 1982-1992. Dhatt et al. found significant relationships between Book value/market value ratio, debt/equity ratio and total sales/market value ratio and stock return.

Omran and Ragap (2004) examined the data of a total of 46 companies operating in Egypt for the period 1996-2000. In the research; the relationship between liquidity, leverage, activity and profitability ratios and stock returns was examined. Omran and Ragap argued that there are non-linear relationships between some financial ratios and stock returns.

Kalaycı and Karataş (2005) investigated the relationship between stock returns and some financial ratios by examining the data of firm traded on the Borsa Istanbul. Six-month financial statements for the period 1996-1997 were used in the research. According to the results obtained in the research; significant relationships were found between business profitability, stock market performance and productivity rates and stock returns.

Alexakis et al. (2010) examined data from 47 different companies registered on the Athens Stock Market. In the research, the financial performances of these companies and the returns of their stocks were analyzed. In the research, companies' data for the years 1993-2006 were examined. According to the research results; the relationships between profitability, asset turnover, price/earnings, market value/book value and current ratio and stock return are significant.

Kheradya et al. (2011) analyzed the data of 960 companies registered on the Malaysian Stock Exchange between 2000 and 2009 to examine relationship between firm value, price/earnings and market value/book value ratios and stock returns. Analysis results; it has been shown that the relationship between firm value, price/earnings and market value/book value ratios and stock returns is significant.

Arkan (2016) investigated the financial ratios that are considered to have an impact on stock returns through data obtained from 15 companies operating in three different sectors registered in the Kuwait Stock Exchange between 2005 and 2014. In his analyses, Arkan (2016) concluded that the relationship between firms' financial performance and stock returns differs according to the line of business in which the firms operate.

Allozi and Obeidat (2016) analysed relationship between stock returns and financial ratios using data of 65 firms traded on the JSE between 2001 and 2011. Leverage and profitability ratios of companies were used as independent variables in the research. The results obtained by Allozi and Obeidat showed that the return on equity ratio can affect stock returns.

Sarı and Kırkık (2019) examined the relationship between some financial ratios and stock returns using data from 2006-2015 period of 20 companies registered in Borsa Istanbul and operating in the manufacturing sector. According to the analysis results, there are positive and significant relationships between stock returns and activity, liquidity and profitability ratios. Another result obtained from Sarı and Kırkık's research is that debt ratios do not affect stock returns.

Patin et al. (2020) using data from 1961 US companies for the period 2001-2015, it examined the relationship between stock return and total asset turnover ratio. According to the results obtained in the research, there are positive significant relationships between stock return and total asset turnover ratio.

Uyar and Sarak (2020) investigated whether some financial ratios have an effect on stock returns, using data from the period 2008-2018 of a total of 81 companies traded on Borsa Istanbul and the London Stock Exchange. According to the research results, the ratio that has the highest power to explain the returns of stocks traded on Borsa Istanbul is the current asset turnover rate, and the rate that has the highest power to explain the returns of stocks traded on the London Stock Exchange is the return on equity ratio.

Apan and Öztel (2021) aimed to define relationship between stock return and financial performance of banks by using 2015-2019 data of deposit banks registered in the BIST-Bank Index. According to the results obtained by

Apan and Öztel, financial performance of banks does not affect stock returns.

Tekin and Bastak (2022) used data from the 2010-2018 period of companies traded in the BIST 100 Index to determine the internal factors affecting stock returns. According to the results of the research, negative relationships were found between leverage ratio, liquidity ratio, current asset turnover rate and stock return. In addition, in the analysis results; Positive relationships were found between current ratio, return on equity, asset turnover rate and stock return.

### 3. RESEARCH METHODOLOGY

The aim of this study is to determine some financial ratios that are thought to have an impact on the stock returns of enterprises. In this study, it is aimed to analyse the relationship between some financial ratios of the companies registered in the BIST 30 Index as of 2024 and continuously traded on the stock exchange between 2016Q2-2023Q4 periods and the stock returns of these enterprises. Panel data analysis method was used in the study. In order to create a balanced panel data set, the period 2016Q2-2023Q4 was selected in the study. In case of going beyond the period 2016Q2-2023Q4, there may be missing data in some variables. Additionally, data from companies operating in the financial sector were not included in the research. In this context, the data set of the research consists of 23 companies. In the research, from the financial ratios of the companies in question current ratio, return on equity, debt/ equity ratio, debt/asset ratio, asset turnover ratio and inventory turnover ratios were used. Stock returns are measured by the rate of return. The data used in the research was obtained from [www.fintables.com](http://www.fintables.com) and [www.finnet2000.com](http://www.finnet2000.com).

The hypotheses of this study, which was conducted to examine the relationship between financial ratios and stock returns, are as follows:

$H_1$  : There are significant relationship between current ratios and stock returns of the companies registered in the BIST 30 index

$H_2$  : There are significant relationship between return on equity ratios and stock returns of the companies registered in the BIST 30 index

$H_3$  : There are significant relationship between debt/equity ratios and stock returns of the companies registered in the BIST 30 index

$H_4$  : There are significant relationship between debt/asset ratios and stock returns of the companies registered in the BIST 30 index

$H_5$  : There are significant relationship between asset turnover ratios and stock returns of the companies registered in the BIST 30 index

$H_6$  : There are significant relationship between inventory turnover ratios ratios and stock returns of the companies registered in the BIST 30 index.

The variables to be used for testing the research hypotheses are as follows:

**Rate of Return (RoR):** The dependent variable of the research is the rate of return of stocks. In the calculation of the rates of return, the following formula was utilised (Hallerbach, 2005; Ünü et al., 2009):

$$RoR_t = \ln(P_t / P_{t-1}) \quad (1)$$

$RoR_t$  = Rate of return

$\ln$  = Natural Logarithm

P = Stocks Prices

t = time

**Current Ratio (CR):** The first independent variable of the research is the current ratio. The ratio is used to measure the ability of the business to pay its short-term debts on time. Companies need to keep the current ratio high in order to pay their short-term debts on time. The ratio is calculated as in the formula (Daryanto and Nurfadilah, 2018:13):

$$CR_{t-1} = (\text{Current Assets}_{t-1} / \text{Current Liabilities}_{t-1}) \quad (2)$$

**Return on Equity (ROE):** Return on equity is a ratio that shows the extent to which the capital contributed by the shareholders to the company is used effectively. The expectations of company shareholders may be in favour of a high return on equity ratio. ROE formula (Daryanto and Nurfadilah, 2018:13):

$$ROE_{t-1} = (\text{Net Income}_{t-1} / \text{Shareholders' Equity}_{t-1}) \quad (3)$$

**Debt/Equity Ratio (D/E):** The D/E ratio, which shows the ability of companies to pay their debts, also shows the business risk. D/E ratio formula (Colline, 2022:81):

$$D/E_{t-1} = (\text{Total Debt}_{t-1} / \text{Total Equity}_{t-1}) \quad (4)$$

**Debt / Asset Ratio (D/A):** This ratio is a ratio that shows how much of the assets owned by the business are purchased with debts. A high ratio may increase the risk of the business not being able to pay its debts. D/A ratio formula (Doğan, 2013:181):

$$D/A_{t-1} = (\text{Total Debt}_{t-1} / \text{Total Assets}_{t-1}) \quad (5)$$

**Asset Turnover Ratio (ATO):** It is calculated as the ratio of the sales revenue realised by an enterprise in a certain period to the value of the enterprise assets in the same period. A high ratio indicates that the performance of the enterprise is good. ATO ratio formula (Utami, 2017:27):

$$ATO_{t-1} = (\text{Sales}_{t-1} / \text{Total Assets}_{t-1}) \quad (6)$$

**Inventory Turnover Ratio (ITO):** It is a performance measure that shows how many times the inventories owned by an enterprise are sold and renewed within a period. Shareholders may want this ratio to be above the sector average. ITO ratio formula (Daryanto and Nurfadilah, 2018:13):

$$ITO_{t-1} = (\text{Cost of Goods Sold}_{t-1} / \text{Average Inventory}_{t-1}) \quad (7)$$

The dependent variable of the research is the RoR. The independent variables are CR, ROE, D/E, D/A, ATO and ITO. Panel data analysis method will be used to obtain research findings.

The regression model constructed to analyse the relationship between the stock returns of the companies and the independent variables is as follows:

$$RoR_{it} = \alpha + \beta_1 CR_{it-1} + \beta_2 ROE_{it-1} + \beta_3 D/E_{it-1} + \beta_4 D/A_{it-1} + \beta_5 ATO_{it-1} + \beta_6 ITO_{it-1} + \varepsilon_{it} \quad (8)$$

$$i = 1, \dots, 23$$

$$t = 1, \dots, 30$$

The  $i$  in the model represent the cross-sectional units, the  $t$  represent the time series in the panel data,  $\alpha$  is the constant term,  $\beta$  is the coefficients of the independent variables, and  $\varepsilon$  is the error term in terms of periods and units.

The data used in the research include time series and more than one horizontal cross-section unit. For this reason, it can be said that the data set has the characteristics of panel data. Panel data is a type of data in which different data belonging to more than one unit are presented together for different periods. In other words, panel data consists of  $n$  number of units and  $t$  number of observations corresponding to each unit (Tatoğlu, 2016: 2). In panel data, if there is a time series of equal length for each cross-sectional unit, there is a balanced panel; if there is no time series of equal length for each cross-sectional unit, there is an unbalanced panel (Çetin and Ecevit, 2010: 172).

It can be said that there are three different panel data models. These models can be listed as classical model, fixed effects model and random effects model. In the classical model, both constant and slope parameters are assumed to be homogeneous across units and time. In the fixed effects model, while the slope parameters are the same for all cross-sectional units, the constant term takes a different value for each cross-sectional unit. In other words, in the fixed effects model, unit effects are transferred to the model through the constant term. In the random effects model, differences between units are expressed with error terms. In the random effects model, the error term consists of two different components. These are residual errors and unit errors (Tatoğlu, 2018: 37-103). The features, assumptions and estimation methods of each panel data model are different. For this reason, choosing the right model and estimation method is important for the reliability of the analysis results.

#### 4. RESEARCH FINDINGS

In this section of the study, the relationship between some financial ratios (CR, ROE, D/E, D/A, ATO, ITO) of 23 different companies included in the study and the stock returns of these companies will be analysed and the results of the analysis will be interpreted. Under this heading, first descriptive statistics regarding the variables will be included. Then, the correlation matrix that reveals the correlation relationship between the independent and dependent variables of the regression model will be presented. Then, the findings regarding the panel data analysis applied to the research data set will be included. Descriptive statistics of CR, ROE, D/E, D/A, ATO, ITO variables are as in Table 1.

**Table 1.** Descriptive Statistics

Variable	Observation	Average	Standard deviation	Minimum	Maximum
<b>RoR</b>	690	0.240886	0.152041	-0.230258	0.672085
<b>CR</b>	690	1.820696	2.009182	0.35	14.91
<b>ROE</b>	690	25.42965	31.96496	-85.34	199.49
<b>D/E</b>	690	58.19362	20.39296	7.82	93.06
<b>D/A</b>	690	29.83046	18.38473	0	70.6
<b>ATO</b>	690	1.015014	0.9768557	0.04	8.01
<b>ITO</b>	690	17.97203	32.9553	1.39	222.38

Table 1, shows that the number of observations is 690 for all variables. This shows that the panel data set is balanced. The table shows that the standard deviations of the CR, ROE and ITO variables are higher than their average values. Based on this result, it can be said that the companies included in the research differ significantly in terms of CR, ROE and ITO variables.

After the descriptive statistics of CR, ROE, D/E, D/A, ATO, ITO variables, the correlation matrix for these variables will be presented. The correlation relationship between variables can provide information about the multicollinearity problem. The correlation relationship between CR, ROE, D/E, D/A, ATO, ITO variables and the significance level of these correlation relationships are presented in Table 2. The correlation coefficient between the independent variables of the study can provide information about the problem of multicollinearity.

**Table 2.** Correlation Matrix Between Variables and VIF Value

Variables	RoR	CR	ROE	D/E	D/A	ATO	ITO	VIF
RoR	1							-
CR	-0.2334*	1						1.87
ROE	0.4068*	-0.0099	1					1.27
D/E	0.3104*	-0.6791*	0.0343	1				2.74
D/A	0.0740**	-0.4460*	-0.1155*	0.6586*	1			2.03
ATO	0.3891*	-0.1269*	0.4477*	0.1432*	-0.0762**	1		1.32
ITO	0.2497*	-0.1085*	-0.0794**	0.2395*	0.3658*	-0.0220	1	1.16

Note: \* 1%, \*\* 5%, \*\*\* 10% indicate the significance level.

When the correlation coefficients between the independent variables to be used in the analysis are examined, it is seen that they are below the critical value (0.8) recommended by Gujarati and Porter (2009). Since there is no high correlation between all variables, the multicollinearity problem is expected not to distort the results (Tuan and Borak, 2020: 388). In addition, VIF values of the independent variables used in the study are given in the Table 2. If the VIF value is greater than 10, it can be said that there is a multicollinearity problem between independent variables (Büyükuysal and Öz, 2016:111; Topaloğlu, 2018:294; Alkan and Abar, 2019:7; Shrestha, 2020:40). When the table is analysed, it is seen that the VIF values of the independent variables used in the research are less than 10. For this reason, it can be said that there is no multicollinearity problem between the variables.

In panel data analysis, it is very important to perform some diagnostic tests to identify the correct estimator. The first diagnostic test applied to the data set of the research is the F test. As a result of the F test, the test statistic was found to be 30.82 at the 0.0000 significance level. When this value is compared with F(22,661) degrees of freedom in the F distribution table, the  $H_0$  hypothesis of the F test is rejected.

Another test that should be applied to the data set of the study in order to determine the correct panel data model is the LM test. The LM test applied to the data set of this research was found to be 1185.15 at the 0.0000 significance level. When this value is compared with the chi-square table, the  $H_0$  hypothesis of the LM test is rejected.

As a result of both tests, the  $H_0$  hypotheses of the said tests were rejected. Therefore, the Hausman test was needed to select the panel data model suitable for the research data set. The Hausman test applied to determine the appropriate panel data model for the data set of the study yielded a test statistic of 14.48 at a significance level of 0.0257. Considering the obtained test statistics and significance value, the  $H_0$  hypothesis of the Hausman test was not accepted. As a result of the diagnostic tests applied to the data set, it was concluded that the fixed effects model was appropriate.

The fixed effects model has some assumptions. Assumptions need to be tested to determine the correct estimator. One of the assumptions of the fixed effects model is homoskedasticity. Modified Wald Test is used to test this assumption. As a result of the Modified Wald Test, the test statistic was 403.31 at the 0.0000 significance level. This result obtained as a result of the analysis shows that the  $H_0$  hypothesis of the test is not accepted. Based on this, it can be said that the model to be used in the research is heteroskedastic.

Baltagi-Wu Locally Best Invariant Test was used to test the non-autocorrelation assumption. As a result of the test, Modified Bhargava et al. Durbin-Watson test statistic was found to be 0.3585 and Baltagi - Wu LBI statistic was 0.5054. According to this result, the research model contains autocorrelation. Pesaran's cross-sectional dependence test was used to test the assumption of inter-unit correlation. As a result of the test, the test statistic was 47.723 at the 0.0000 significance level. The test statistic is above the critical value stated by Pesaran (2004). According to this result, there is a correlation between units in the research model. The test results to determine the panel data estimator applied to the research data set are given in the Table 3.



**Table 3.** Analysis Results for Identifying the Correct Estimator

Tests for Model Selection	Analysis Results
F Test	30.82*
LM Test	1185.15*
Hausman Test	403.31**
<b>Autocorrelation Test</b>	
Modified Bhargava et al. Durbin -Watson test statistic	0.3585
Baltagi - Wu LBI test statistic	0.5054
<b>Heteroscedasticity Test</b>	
Modified Wald Test Statistics	403.31*
<b>Cross Section Dependency Test</b>	
Pesaran CD Test statistics	47,723*

Note: \* 1%, \*\* 5%, \*\*\* 10% indicate the significance level.

According to the test results for model selection, the panel data model suitable for the research data set is the fixed effects model. According to the analysis results that tested the assumptions of the fixed effects model, the research model includes heteroscedasticity, autocorrelation and cross-sectional dependence. According to the analysis results, the Driscoll-Kraay robust standard estimator is suitable for analysis. Driscoll-Kraay robust standard estimator results are given in the Table 4.

**Table 4.** Regression Analysis Results

Independent variables	Coefficient	Driscoll – Kraay Standard Errors	Probability Value
CR	-0.043575	0.0154034	0.008
ROE	0.0021111	0.0002538	0.000
D/E	0.0020991	0.0007063	0.006
D/A	0.0012576	0.0008171	0.135
ATO	0.0403132	0.0918383	0.000
ITO	-0.0007157	0.0003609	0.057
Constant Term	0.0788147	0.0659417	0.242
R <sup>2</sup> -value	0.3978	Number of Observations	690
F-value	0.0000	Number of Companies	23

According to the analysis results, the F-value was found to be 0.0000. This result shows that the applied regression model is significant. In the analysis results, the R<sup>2</sup> value was found to be 0.3978. According to the regression analysis results, the relationship between the independent variables CR, ROE, D/E, ATO, ITO and the dependent variable RoR is statistically significant. The relationship between the independent variables CR and ITO and dependent variables is negative. According to the results of the analyses, investors who invest in the stocks of enterprises with low current ratio and inventory turnover rate can earn high returns. The relationship between ROE, D/E, ATO and RoR is positive. According to the results of the analyses, the stock returns of enterprises with high return on equity, debt/equity and asset turnover ratios are also high. It is likely that the market price of the stocks of enterprises with high profitability is high. Because, high profitability can be perceived as a positive signal by investors. According to the net income approach, which is one of the capital structure policies, the higher the debt/equity ratio, the higher the firm value. The results obtained in the study are consistent with the net income approach. Additionally, an increase in the asset turnover rate may be perceived as a positive signal by capital markets. This may increase stock returns. According to the analysis results the H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, H<sub>5</sub> and H<sub>6</sub> hypotheses of the study have not been rejected.



## 5. CONCLUSION

The aim of individuals trading in capital markets is to maximize their personal wealth. Individuals carry out buying and selling activities in financial markets for this purpose. Investors trading in the stock market can earn two types of profits. These are dividends and capital gains. Not all investors in the capital markets can control dividend earnings. However, it can increase capital gains by applying the right trading strategies. For this reason, factors affecting stock returns are important for investors.

In this study, which was conducted to examine the returns between stock returns and financial ratios, the data of companies registered in the BIST 30 Index as of 2024 and traded on the stock exchange without interruption between the periods of 2016Q2-2023Q4 were examined. Additionally, companies operating in the financial sector were not included in the data set of the research. In the research, the effects of CR, ROE, D/E and D/A ratio, ATO and ITO on stocks returns were examined. Panel data analysis method was used to examine the data of the companies included in the research. According to the analysis results applied to the research data set, the relationship between CO, ROE, D/A, ATO, ITO and rate of return is statistically significant. This result supports the results obtained by Haugen and Baker (1996), Dhatt et al. (1999), Omran and Ragap (2004), Kalaycı and Karataş (2005), Alexakis et al. (2010), Allozi and Obeidat (2016), Sarı and Kırkık (2019) and Tekin and Bastak (2022). The results obtained from the research show that financial ratios have an effect on stock returns. In subsequent studies, it can be examined whether the relationship between stock returns and financial ratios differs during the economic crisis. The relationship between liquidity ratios, operating ratios, borrowing ratios and profitability ratios of enterprises and stock returns can be analysed on enterprises operating in different sectors. Thus, it can be determined whether the relationship between these variables differs across sectors.

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