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The effects of microeconomic factors on the stock market: A panel for the stock exchange in Istanbul ARDL analysis

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Abstract. *In this study, microeconomic factors affecting the average returns of stocks traded in Stock Exchange Istanbul (BIST) were analyzed by panel ARDL method. For this purpose, 25 microeconomic variables owned by 130 companies which operate in the manufacturing sector and being processed continuous trade on stock exchange in the 2000:Q1 – 2017:Q3 period and 4 dummy variables belonging to Turkey's economy were used and there were established 23 different econometric models to investigate the relationships between these variables. In this study, of time series analysis methods Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Hadri (2000) Panel unit root tests and Panel ARDL methods were used with Carrion-i Silvestre et al. (2009) multiple structural fractured unit root tests. As a result of the analyzes made, it was found that the rise in stock turnover rate and net profit to total assets ratio affected positively share earnings both in the short term and in the long term and it was seen that the effect in the short term was higher. It was designated that total sales increased share earnings of growth of increase rate and increases in the growth of total assets in the long term. It was determined that increases of on current ratio, on the ratio of equity capital ratio to tangible assets, on the ratio of own capital to assets, on accounts receivables turnover rate, net profits, on the ratio of equity, the marketing values of companies, on the ratio of book value increased share earnings in a short term and increases of on the ratio of debt to tangible assets and asset turnover decreased share earnings in a short term significantly.*

Keywords: stock exchange, microeconomic factors, liquidity ratios, multiple structural breakdown unit root test, panel ARDL.

JEL Classification: E44, G12, G32, M40.

1. Introduction

The stock market is a common and easy-to-use investment tool that everyone can easily access and evaluate their savings. In this respect, it has always attracted the attention of both companies and individuals and it has always found a wide space in printed and visual prints. However, it is very important to choose the correct equality issues and designate buying – selling periods of stocks when operating in the stock market. In this study, what were the factors of microeconomic (unique) effecting share earnings and while creating portfolio of investors, from these factors most of which are required to pay attention, 25 microeconomic variables owned by 130 companies which operate in the manufacturing sector in Turkey and being processed continuous trade on stock exchange in the 2000:Q1 – 2017:Q3 period and 4 dummy variables belonging to Turkey's economy were used, was established 23 different econometric model to investigate the relationships between these variables. Because the number of variables is so large, there is no way to use all the variables in a single model. For this reason, the variables that should be constantly included in the models were determined by the help of the collage matrix, and the other variables were added and removed as the control variables one by one.

During Analysis, crises closely related to Turkey and the world economy, international developments and political events which have taken place make think that this period may be present structural breaks affecting the stock market. In such cases, it is useful to include these effects in analyzes with dummy variables. Rather than visually determining the structural breakage dates required for this process, it was preferred to use the BIST 100 index at the center of the study, the multi-structural fractured unit root test of Carrion-i Silvestre et al. (2009) one of the time series analysis method. Thus, the dates of economic shocks which occurred and affected the stock market were determined by a scientific method, not based on observations.

In the second part following the entry of the work, information about expectations about the issue of stock return was given. In the third chapter; the studies in the literature on macroeconomic factors affecting stock returns were examined. In the fourth chapter; econometric analyzes were carried out. In the study; it was broken new ground on literature by using a combination of structural break-through time series analysis and panel data analysis. This study will contribute to the literature even if it is small because of the breadth of the data set used and the econometric analyzes made. It is also expected that by presenting essential information, findings obtained from this study will provide a small contribution to individual investors who deal with the stock market, to the representatives of the financial intermediary institutions and to the economy management.

2. Expectations related to stock return

The return of equity traded on financial markets is divided into two parts: the first of them is the expected return on equity investment under normal circumstances; this return is the return which the investor expects to obtain as an estimate and depends on the investor's

knowledge of the stock. The second part of the equity is an uncertain (risky) return and is due to unexpected information explained. Depending on these explanations, the return of equity is as following (Ross et al., 1999):

$$R = E(R) + u \quad (1) \qquad (1)$$

R in this equation shows true return, E (R) shows the expected part of return, and u shows the unexpected part of return. Real return (R) can be different from expected return (E (R)) due to future surprises. Unexpected return for any year may be positive or negative, but when a given period is considered, the average of u will be zero and it will not have an effect to a real return. In other words, the recognized return will be equal to the average expected return. Whereas, a real risk of any investment is due to the unpredictable part of the return, that is, the part that comes into play as a result of surprises. If the expected return is achieved as planned, this investment is a fully predictable or risk-free investment. When examining the risk of each entity, it can be seen that there are two types of risks: systematic and non-systematic risks. While systematic risk affects all assets in the economy leastwise, non-systematic risk affects a small number of assets at a high level. From here, the basic principle of diversified portfolios contain virtually no systematic risk is deduced. If there is no complete positive correlation between the individual stocks constituting the portfolio, the risk of diversification and portfolio can be reduced below the weighted average of the risks of all stocks. However, since most stocks have a positive correlation with returns on the market, it is not possible to completely remove the portfolio risk. As general economic conditions improve, the return of a majority of stocks will be on the rise. Besides these, every stock has its own differentiations in terms of return rates. That is, apart from the economic factors affecting all stocks, only the factors that affect a certain stock will play a role in determining the return rates. Hence, all stocks carry two types of risks: systematic (inevitable) and non-systematic (avoidable) risks (Tükenmez, 1999). In other words, systematic risk is the portion of macroeconomic factors, such as interest and inflation that is the total change in the value of a share. Shortly, this risk is the risk created by all factors such as purchasing power risk, interest rate risk, market risk, foreign exchange risk and political risk affecting the market (Aktaş and Akdağ, 2005).

3. Literature review

A brief summary of the studies aimed at revealing the determinants of the returns of stocks traded on the stock exchange is presented below by date.

Lewellen (2004) investigated the power to predict stock returns of the ratio of dividend yield, MV/BV and P/E by using a comprehensive data set between 1946 and 2000. Lewellen stated that the financial ratios could be used as a strong explanatory factor in anticipation of stock returns in that period and considered the effects of the variables used in the research as long term and short term. As a result of the study, it is argued that although with the MV/BV rate long term returns can be estimated, short term returns

cannot be estimated. He pointed out the best financial ratios were the dividend yield describing the long term returns and the F/K ratio describing the short term returns.

Çıtak (2004) investigated whether share earnings belonged to 1986: M01-2003 M06 periods have relations with P/E ratios and BIST 100 index. Monthly returns of the BIST 100 index and the end of month values of P/E ratio of the index for the P/E ratios were used to represent share earnings. The regression equations were used to estimate the relationship between P/E rates at the beginning of the period and 3, 6-month, 1, 2, 3, 4 and 5-year retention periods. As a result of the analysis, significant correlations were found for holding periods except for 3-month holding period and the strongest correlation between P/E ratios and holding period returns was observed in 2-year holding period. As a result of the study, since the retention periods used have been intertwined and there has not yet been a consensus about this situation's effect on return rates about the estimation results in the literature, it was deduced that it was necessary to investigate results and the relations occurred between the P/E ratios and returns of ISE 100 index were not certain, they were only suggestive.

Campbell and Yogo (2006) found that stock returns are predictable, but it is difficult to determine without using effective statistical tests carefully, and they claimed that traditional tests used to predict stock returns lead to false conclusions. For this reason, a new test has been developed that explains stock returns by being used variables such as dividend yield and P/E ratio, and with the P/E ratio variable in the result of the study, stock returns can be estimated monthly and yearly, they designated that with also the variable of dividend yield by only using yearly data, share earnings could be estimated.

Şamiloğlu (2006) examined the relationship between earnings per share and with share prices belonged to 1999-2002 period of 58 companies operating in the leather and food sector, whose stocks are traded at BIST, earnings, cash flows, earnings per share and book value per share. The data used in the study in which three separate multiple regression models were used were obtained from the ISE and the financial statements of the companies. Financial tables of the companies covered by the research have been adjusted according to inflation to mitigate the effects of high inflation on financial tables. According to the research findings, there was generally no significant relationship between stock returns based on 1999-2002 of 58 companies operating in the food and leather sectors and cash flows, operating profits and annual growth, but it was found that there was a significant correlation between the share prices of the same companies and their earnings per share and book value per share when partial correlation coefficients, r^2, F test, t test results were taken into consideration.

Aktaş (2008) examined the relationship between stock returns and financial ratios by determining the financial ratios associated with stock returns in BIST. In two separate analysis periods, 1995 and 1999 and 2003 and 2006, 91 and 158 companies were tested by using the Logistic Regression Analysis Method, respectively. The periodic average annual turnover of the shares and the annual financial ratios of the shares (dividing the yearly aggregate of the yearly earnings per year by the number of years and dividing the

yearly financial ratios of the current year by the number of years) and the corrected monthly stocks data from the ISE website were used. The average annual returns of the companies were calculated firstly by taking the average of the annual adjusted returns for each period, then the average of these annual returns. As a result of analysis; in the period 1995-1999, while as the financial ratios associated with the mid-term share earnings were found cash flow/capital stock from the acid test and activities, gross profit/sales and net profit/sales were found in the 2003-2006 period.

Barnhart and Giannetti (2009) attempted to estimate the future stock returns by calculating the price/earnings ratios of the companies in the S & P 500 index. As a result of the study, it was stated that P/E ratio could be used for estimating the increase of future gains and returns. According to the results of the estimation by using the vector error correction model in the study in which the companies split into two subgroups with positive and negative gains (winners and losers), the group with negative winner was ascertained to have higher prediction power than the group with positive winner.

Nargelecekenler (2011) investigated whether there is a significant correlation between P/E ratio and stock prices on sectorial basis by using series of 24 sub-sectors covering the period 2000-2008. The stock price and P/E ratios in the study were formed by year-end closing prices of the companies taken on sector basis and price earning ratios. Two different P/E ratios were used in the study; The P/E ratio, which is defined as PE1, represents the net profit-loss sum of the market value of the last two six-month of the share and Fk2 represents the net profit-loss sum of the market value of the last four quarters of the market value. According findings of analysis, while for banks price earning ratio was significant in financial leasing and clothing sectors only in terms of six monthly turnover, it was found to be significant for real estate investment trusts, telecommunications and holding sectors in both six-month and three-month periods; and for mine and metal goods sectors, only for three-month periods. Therefore, as the significance of the P/E ratios calculated differs by six months or three months depending on the sector's behavior, it was inferred that while investing, it is necessary to consider which is significant for the relevant sector.

Güngör and Kaygın (2015), in their study in which they investigated the macroeconomic factors affecting stock price in 2005-2011 period, used as macroeconomic factors; exchange rate, inflation rate, money supply, interest rate, GDP, gold prices, oil prices, foreign trade balance and industrial production index. In the results of study; while a positive relationship was found between exchange rate, money supply, oil prices and industrial production index and stock price. there was designated a negative relationship between inflation rate, interest rate, GDP, gold prices, foreign trade balance and stock price.

In their study, Alper and Kara (2017) investigated the effects of data of interest rate, exchange rate, gold prices, inflation rate, money supply, oil prices, foreign trade balance and industrial production index data on stocks in Istanbul Stock Exchange in the context of BIST Industrial Index, in the study that they examined for 2003:Q01 – 2017:Q02

period, they found that real equity stocks are mostly influenced by their lagged values, and that gold prices, trade balance, industrial production index and interest rate are also influential on real stock returns.

Rjoub, Civcir and Reşatoğlu (2017) attempted to identify variables affecting stock prices by using data belonged to the Turkish banking sector. In the study in which 1995:Q3 – 2015:Q4 period data was used, the factors associated with stock prices were asset quality, management quality, profitability, size, money supply and interest rates. Moreover, it was also determined that bank stocks had a negative reaction to economic crises.

4. Methodology

4.1. Data set

In the study as a dependent variable; stocks' return (RETURN) variable was used by quarterly periods. In order to create this variable, daily closing prices data of stocks taken from Finnet were used.

$$\text{Return}_{i,t} = \left(\frac{F_{it} - F_{i,t-1}}{F_{i,t-1}}\right) x100 \quad (2)$$

In the equation, $F_{i,t;}i.$ represents the closing price of the firm's stock at the end of day t on the day; $F_{i,t-1;}i.$ represents firm's share of the closing price at the end of day in $t - 1$ period. Macroeconomic independence (explanatory) variables used in the study and symbols representing these variables in the analysis are shown in Table 1 in aggregate form.

Table 1. *Microeconomic variables used in analysis*

LIQUIDITY RATIOS
Current Ratio (CR)
Cash Ratio (CR1)
Acid-Test Ratio (ATR)
REMOVAL RATIOS
Total of Foreign Assets/Total Assets (TFA_TA(1))
Total of Foreign Assets/Total Assets (TFA_TA(2))
Tangible Assets/Equity (TA_E(3))
Equity/Assets (E_A)
Total Debt/Total Equity Ratio (TD_TE)
ACTIVITY RATIOS
Accounts Receivable Turnover (ART)
Asset Turnover (AT)
Stock Turnover Rate (STR)
RATIO OF PROFITABILITY
Net Profit/Equity Ratio (NP_ER)
Net Profit/Total Assets Ratio (NP_TAR)
Net Profit/Net Sales Ratio (NP_NSR)*
EXCHANGE PERFORMANCE RATES
Market Value/Book Value (MV_BV)
GROWTH RATE
Increase Rate of Total Sales (IRTS)
Growth Rate of Total Assets (GRTA)
OTHER SIZE
Return (R)
Transaction Volume (TV)8

Transaction Amount (TA)
Company Age (CA)
Stock Exchange Duration (SED) Processing Time (BIGS)
Profit Per Share (PPS)
Rate Of Open To Public(ROP)

Note: The sources of these variables, the transformations and corrections made to the variables, and the anticipations about these variables as a result of the analysis are in the author's thesis.

4.2. Method

Since there are a number of explanatory variables in this study, in order to decide which of these variables will be included in all models in the first phase of the analysis and which will be used as the control variable, the correlation between the dependent variable and the independent variables was investigated. In the second phase; Carrion-i Silvestre et al. (2009), multi-structural fractured unit root tests were performed to the BIS100 index data to determine the dates of economic and political shocks affecting the stock market and dummy variables related to these dates were established. In the third phase; economic models to be used in analyzes were established. In the fourth stage; Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Hadri (2000) panel unit root tests were applied to the series taking part in models. In the fifth stage; the co-integration test for the existence of co-integration relations among the series in the models, long-term and short-term analyzes was carried out with the panel ARDL method.

5. Correlation analysis and findings

At this stage of the study; correlation coefficients between dependent variable and macro-economic variables were determined. Correlation coefficients show a measure of the degree of the two variables co-movement. These coefficients vary in the range [-1, + 1] and the value approaches -1 or +1, which means that the correlation is large (Köse, 2015). Correlation coefficients were calculated in the study, the absolute value was sorted from large to small, and the findings were presented in Table 2.

Table 2. *Correlation between dependent variable and microeconomic variables*

	RETURN
RETURN	1
Transaction volume (LogTV)	0.176
Transaction Amount (LogTA)	0.124
Market Value/Book Value (MV/BV)	0.108
Growth Rate of Total Assets (GRTA)	0.062
Growth Rate of Total Sales (IRTS)	0.029
Company Age (CA)	-0.029
Stock Exchange Duration (SED)	-0.027
Profit Ratio 2 (NP_TAR)	0.025
Equity Capital Multiplier (E_A)	-0.023
Acid Test Ratio (ATR)	-0.019
Equity Capital Productivity Ratio (NP_ER)	0.019
Current Ratio (CR)	-0.018
Cash Ratio (CR1)	-0.016
Leverage Ratio 3 (TA_E(3))	-0.012
Profit Per Share (PPS)	0.012
Leverage Rate 2 (TFA_TA(2))	-0.012
Accounts Receivable Turnover (ART)	0.011

Rate Of Open To Public(ROP)	0.010
Profitability Ratio 1 (NP_NSR)	-0.010
Financing Rate (TD_TE)	-0.009
Asset Turnover (AT)	0.006
Stock Turnover Rate (STR)	-0.001
Leverage Ratio 1 (TFA_TA)	0.001

According to the findings in Table 2, the variable having the closest relationship with the RETURN variable is the trading volume of stocks (LogTV). For this reason, it has been decided that this variable should be included in all models.

5.1. Composing dummy variables

In the Analysis period, Turkey's economy experienced events such as the February 2001 banking and currency crises, September 15, 2008 global financial crisis and July 15, 2016 coup attempt that may affect the stock market closely. In the study, the effects of these events are desired to reflect models with dummy variables. For this purpose; Carrion-i Silvestre et al. (2009) multi-structural fracture unit root test was performed to BIST100 index day end closing values series (BIS100), and the obtained structural fracture histories were included in analyzes with dummy variables. It is not appropriate to determine the structural break dates based on observations because events in the economy take time to reflect economic growths and different series may react to the same shock in different delays and in different periods. Here, the truest way to determine the dates of structural breaks in the series examined is using scientific means. For this purpose, multiple structural fractured Carrion-i Silvestre et al. (2009) unit root test was applied to BIST100 series, which is the basis of the study, and the structural break dates were determined. The reason of preference of Carrion-i Silvestre et al. (2009)[(1)] method in the unit root test is that this method is able to determine the structural breaks up to 5 in the series internally.

Table 3. *Results of Carrion-i-Silvestre et al. (2009) multiple structural breakdown unit root test*

	PT Test Statistic	MPT Test Statistic	MZA Test Statistic	MSB Test Statistic	MZT Test Statistic	Structural Breakdown Dates
LogBIST100	17.28 (7.64)	16.04 (7.64)	-18.37 (-38.10)	0.16 (0.11)	-3.02 (-4.36)	2001:Q3; 2009:Q1; 2013:Q1; 2015:Q4

In the result of Carrion-i-Sivestre et al. (2009) multiple structural fracture unit root test in Table 3, one of the dates obtained in the BIST100 index of structural fracture, 2001:Q3 includes the effects of the banking and foreign exchange crisis experienced in February 2001 and the effects of the Strong Economy Transition Program announced on 15 April 2001.

2009:Q1 – points to February 2009, when unemployment rose to 16.2% due to the 2008 global financial crisis.

2013:Q1 emphasizes the period of the US Central Bank FED announced that it would end its quantitative expansion (expansionary monetary policy) implementation which it started to apply after the 2008 global economic crisis, and afterwards the dollar exchange rate started to rise rapidly.

2015:Q4 points to the period for FED's accelerating interest rate hikes. Four different dummy variables (K_{2001}, K_{2009}, K_{2013} and K_{2015}) were created for these dates. Equation (11) is used to construct the dummy variables.

$$K_t = \begin{cases} 1, & t = T_B if \\ 0, & t \neq T_B \ if \end{cases} \quad (3)$$

Here, T_D refers to the date of structural break. The econometric models used in the study are listed below.

$$Model\ 1: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 K_{2001} + \alpha_3 K_{2009} + \\ + \alpha_4 K_{2013} + \alpha_5 K_{2015} + u_{it} \quad (4)$$

$$Model\ 2: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTA_{it} + \alpha_2 K_{2001} + \alpha_3 K_{2009} + \\ + \alpha_4 K_{2013} + \alpha_5 K_{2015} + u_{it} \quad (5)$$

$$Model\ 3: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 MV_{BV\,it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (6)$$

$$Model\ 4: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 GRTA_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (7)$$

$$Model\ 5: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 IRTS_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (8)$$

$$Model\ 6: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 CA_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (9)$$

$$Model\ 7: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 SED_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (10)$$

$$Model\ 8: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 NP\_TAR + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (11)$$

$$Model\ 9: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 E\_A_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (12)$$

$$Model\ 10: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ATR_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (13)$$

$$Model\ 11: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 NP\_ER_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (14)$$

$$Model\ 12: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 CR_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (15)$$

$$Model\ 13: RETURN_{i,t} = \alpha_0 + \alpha_1 LnTV_{it} + \alpha_2 CR1_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (16)$$

$$Model\ 14: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 TA\_E_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (17)$$

$$Model\ 15: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 PPS_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (18)$$

$$Model\ 16: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 \text{TFA\_TA}(2))_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (19)$$

$$Model\ 17: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ART_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (20)$$

$$Model\ 18: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ROP_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (21)$$

$$Model\ 19: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 NP\_NS_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (22)$$

$$Model\ 20: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 TD\_TE_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (23)$$

$$Model\ 21: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ART_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (24)$$

$$Model\ 22: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 STR_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (25)$$

$$Model\ 23: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 \text{TFA\_TA}(1))_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (26)$$

Because the transaction size and transaction volume variables were closely related to each other, they were used in separate models so that they do not cause multiple linear connection problems if they are used in the same model. When the rate variables used in the models were created by using similar quantities and because more than one rate variable was used in the same econometric model, the control variable was added to the transaction volume variable at each time at these models as it was difficult to find the effects of these variables on dependent variable. Thus, the real effects of the independent variables on the dependent variable are tried to be revealed.

5.2. Panel unit root tests

In order for the prediction results of created models to be reliable, the series must be stationary or co-integrated (Engle and Granger, 1987). For this reason, panel unit root tests were done. In the panel unit root tests, it was tried to determine how the value of the series at time *t* was affected by the value at time *t-1*.

Equation (27) is used for this purpose:

$$y_{it} = \rho_i y_{it-1} + X_{it}\delta_i + \epsilon_{it} \quad (27)$$

Here i = 1, 2, ..., N refers to horizontal sections (firms), t = 1, 2, ..., T refers to time dimension, X_{it} refers to external variables, ρ_i refers to autoregressive unit root parameter and ε_{it} refers to the series of error terms which have the power of white noise process (problem-free in terms of econometric). Since the autocorrelation problem can often be encountered in Equation (27), it can be extended by adding delayed values of the dependent variable to the model:

$$y_{i,t} = \rho_i y_{i,t-1} + \sum_{j=1}^{m_i} \beta_{ij}\Delta Y_{i,t-j} + X_{it}\delta_i + \epsilon_{it} \quad (28)$$

From the panel unit root tests, Levin, Lin, Chu (2002) (LLC) assume that ρ_i s which are the unit root parameters are homogeneous in all horizontal sections forming the panel and H_0 hypothesis is in the form of $|\rho| = 1$ series are not stable. In Im, Pesaran and Shin (2003) (IPS) test, it is accepted that the unit root parameter ρ_i s may vary among horizontal sections and H_0 hypothesis is in the form of $|\rho_i| = 1$ series are not stable. Hadri (2000) hypotheses of the panel unit root test are opposite to those of LLC and IPS tests. With this aspect, it is a test by way of examining the LLC and IPS tests. That is, H_0 is in the form of $|\rho_i| < 1$ *is the serial stop.* In the study, LLC, IPS and Hadri (2000) tests were conducted and the results were presented in Table 4.

Table 4. *Results of panel unit root tests*

	LLC		IPS		Hadri		Decision
	Level Values	First Differences	Level Values	First Differences	Level Values	First Differences	
RETURN	0.998	0.000***	0.099	0.000***	0.024	1.000***	I(1)
LnTV	0.000***	-	0.000***	-	0.000	0.106***	I(0)
LnTA	0.000***	-	0.000***	-	0.000	0.989***	I(0)
MV/BV	0.000***	-	0.000***	-	0.446***	-	I(0)
GRTA	0.000***	-	0.000***	-	0.000	0.967	I(0)
IRTS	1.000		0.000***	-	0.000	0.999	I(1)
CA	0.000***	-	0.000***	-	0.659***	-	I(0)
SED	0.000***	-	0.000***	-	0.149***	-	I(0)
NP_TAR	0.000***	-	0.000***	-	0.000	0.070*	I(0)
E_A	0.001***	-	0.000***	-	0.000	0.129***	I(0)
ATR	0.611	0.000***	0.000***	-	0.000	0.999***	I(1)
NP_ER	1.000	0.000***	0.000***	-	0.014**	-	I(0)
CR	0.000***	-	0.000***	-	0.000	0.998	I(0)
CR1	0.000***	-	0.000***	-	0.000	0.999***	I(0)
TA_E(3)	0.267	0.000***	0.000***	-	0.000	0.366	I(1)
PPS	0.099	0.000***	0.000***	-	0.000	0.192***	I(0)
TFA_TA(2)	0.503	0.000***	0.000***	-	0.000	0.998***	I(1)

ART	0.999	0.000***	0.000***	-	0.000	0.988***	I(1)
ROP	0.000***	-	0.000***	-	0.000	0.657***	I(0)
NP_NSR	0.000***	-	0.000***	-	0.000	0.999***	I(0)
TD_TE	0.000***	-	0.000***	-	0.000	0.989***	I(0)
AT	0.000***	-	0.000***	-	0.000	0.297***	I(0)
STR	0.998	0.000***	0.000***	-	0.000	0.999***	I(1)
TFA_AT(1)	0.000***	-	0.000***	-	0.000	0.216***	I(0)

Note: The results in the table are probability values belonged to the relevant test statistic. *, **, and *** mean that the relevant series are stable at the level of significance of 10%, 5% and 1%, respectively. For the series that are stationary at the level, there were not conducted stationarity tests in the first difference.

While the results in Table 4 were evaluated, the most overlapping results from 3 tests were accepted. According to this, it was found that LnTV, LnTA, MV/BV, GRTA, CA, SED, NP_TAR, E_A, NP_ER, CR, CR1, PPS, ROP, NP_NSR, TD_TE, AT and TFA_TA (1)series were stationary in other words I (0) in the level values. Whereas, RETURN, IRTS ATR, TA_E(3), TFA_TA(2), ART and STR series were not stationary in the level values but they were found to become stationary in other words I(1) when the first differences were taken. Since all of the series are not I (0), there is a risk of encountering a false regression problem in the regression analysis to be performed with the level values of these data. For this reason, the existence of a co-integration relationship between the series in each model should be investigated.

5.3. Panel co-integration test, long and short term analysis

According to the co-integration theory developed by Engle and Granger (1987); if the series which are stationary at the same level are co-integrated (if they are acting together in the long term), analyzes to be made with the level values of these series will not contain the problem of false regression. This theory was later further developed by Johansen (1988), Johansen and Juselius (1990) and others. Panel co-integration tests were also been created with studies such as Johansen (1995), Kao (1999) and Pedroni (2004), as well as being suitable tests for the time series analysis of the first developed co-integration tests. A prerequisite for applying both the time series co-integration tests, such as Engle and Granger (1987) and Johansen (1988); and panel co-integration tests such as Johansen (1995), Kao (1999) and Pedroni (2004) is that all series are stable at the same level. In this study, these methods can not be used because some of the series are I (0) and some are I (1). Panel ARDL approach developed by Pesaran, Shin and Smith (1999) is suitable to test the existence of co-integration relation between the series which are stationary at different levels and to detect long and short term relationships between these series.

Table 5. *Panel ARDL analysis results*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	1.937*** (0.000)	5.235*** (0.000)	-	-	0.087 (0.488)	3.961*** (0.000)	2.105*** (0.000)	5.153*** (0.000)	1.999*** (0.000)	5.190*** (0.000)	2.420*** (0.000)	4.978*** (0.000)
K_{2001}	50.407*** (0.000)	-71.613*** (0.000)	-34.926*** (0.000)	-68.254*** (0.000)	48.850*** (0.000)	-55.523*** (0.000)	46.608*** (0.000)	-71.060*** (0.000)	47.804*** (0.000)	-69.918*** (0.000)	46.066*** (0.000)	-69.400***
K_{2009}	49.097***	-36.574***	8.956***	-42.514***	32.809***	-28.000***	51.562***	-37.248***	50.217***	-41.497***	48.557***	-36.639***

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
K_{2013}	-13.827*** (0.000)	9.749*** (0.000)	-2.124 (0.463)	11.527*** (0.000)	-11.854*** (0.000)	6.279*** (0.000)	-13.724*** (0.000)	9.321*** (0.000)	-12.978*** (0.000)	9.579*** (0.000)	-11.261*** (0.000)	8.590*** (0.000)
K_{2015}	0.250* (0.085)	5.620*** (0.000)	1.645 (0.573)	2.149 (0.249)	-3.902* (0.068)	9.601*** (0.000)	0.838 (0.773)	5.737*** (0.000)	1.308 (0.651)	5.365*** (0.000)	4.901 (0.102)	3.408** (0.010)
Error Adjustment Coefficient (ϕ_i)	-	-0.952*** (0.000)	-	-0.971*** (0.000)	-	-0.942*** (0.000)	-	-0.944*** (0.000)	-	-0.958*** (0.000)	-	-0.960*** (0.000)
LnTA	-	-	1.042*** (0.000)	4.284*** (0.000)	-	-	-	-	-	-	-	-
MV/BV	-	-			-0.002 (0.154)	31.693*** (0.000)	-	-	-	-	-	-
GRTA	-	-	-	-	-	-	0.251*** (0.000)	-0.101*** (0.000)	-	-	-	-
IRTS	-	-	-	-	-	-	-	-	0.019*** (0.000)	0.024 (0.119)	-	-
CA	-	-	-	-	-	-	-	-	-	-	-0.349*** (0.000)	19.057*** (0.000)
R^2	0.042		0.029		0.042		0.045		0.044		0.043	
$\bar{R}^2$	0.042		0.028		0.042		0.044		0.043		0.043	
F Statistic	82.555 (0.000)		54.708 (0.000)		68.846 (0.000)		72.547 (0.000)		70.836 (0.000)		70.278 (0.000)	
DW	1.999		2.048		1.999		2.004		2.000		1.998	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

Table 5 (Continued)

	Model 7		Model 8		Model 9		Model 10		Model 11		Model 12	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	2.420*** (0.000)	4.978*** (0.000)	1.886*** (0.000)	5.337*** (0.000)	1.984*** (0.000)	5.229*** (0.000)	1.927*** (0.000)	5.293*** (0.000)	1.897*** (0.000)	5.292*** (0.000)	1.962*** (0.000)	5.250*** (0.000)
K_{2001}	46.066*** (0.000)	-69.400*** (0.000)	49.804*** (0.000)	-71.568*** (0.000)	49.903*** (0.000)	-70.015*** (0.000)	50.336*** (0.000)	-71.559*** (0.000)	48.601*** (0.000)	-338.293 (0.203)	50.242*** (0.000)	-71.219*** (0.000)
K_{2009}	48.557*** (0.000)	-36.639*** (0.000)	49.104*** (0.000)	-36.297*** (0.000)	48.075*** (0.000)	-35.335*** (0.000)	48.893*** (0.000)	-35.905*** (0.000)	49.465*** (0.000)	-36.395*** (0.000)	49.740*** (0.000)	-36.386*** (0.000)
K_{2013}	-11.26*** (0.000)	8.590*** (0.000)	-13.565*** (0.000)	10.255*** (0.000)	-12.848*** (0.000)	9.384*** (0.000)	-13.733*** (0.000)	9.451*** (0.000)	-13.84*** (0.000)	10.410*** (0.000)	-13.374*** (0.000)	9.446*** (0.000)
K_{2015}	4.901 (0.102)	3.408** (0.001)	0.612 (0.834)	4.598*** (0.001)	-1.079 (0.710)	4.724*** (0.001)	0.785 (0.788)	5.271*** (0.000)	0.277 (0.924)	4.863*** (0.000)	0.510 (0.861)	5.233*** (0.000)
Error Adjustment Coefficient (ϕ_i)	-	-0.960*** (0.000)	-	-0.950*** (0.000)	-	-0.955*** (0.000)	-	-0.949*** (0.000)	-	-0.948*** (0.000)	-	-0.949*** (0.000)
SED	-0.349*** (0.000)	-10.943*** (0.000)	-	-	-	-	-	-	-	-	-	-
NP_TAR	-	-	9.184*** (0.000)	38.968*** (0.000)	-	-	-	-	-	-	-	-
E_A	-	-	-		0.011 (0.560)	0.561*** (0.000)	-	-	-	-	-	-
ATR	-	-	-	-	-	-	-0.042 (0.000)	1.647 (0.428)	-	-	-	-
NP_ER	-	-	-	-	-	-			0.009 (0.650)	21.923*** (0.000)	-	-

CR			-	-	-	-					-0009 (0.347)	3.793** (0.045)
R^2	0.051		0.043		0.043		0.042		0.042		0.042	
$\overline{R}^2$	0.050		0.042		0.042		0.042		0.042		0.042	
F Statistic	82.788 (0.000)		66.126 (0.000)		69.181 (0.000)		68.907 (0.000)		68.800 (0.000)		68.977 (0.000)	
DW	1.992		1.997		1.998		1.999		1.999		1.999	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

Table 5 (Continued)

	Model 13		Model 14		Model 15		Model 16		Model 17		Model 18	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	1.919* (0.000)	5.298*** (0.000)	1.885*** (0.000)	5.275*** (0.000)	1.855*** (0.000)	5.178*** (0.000)	1.968*** (0.000)	5.195*** (0.000)	1.910*** (0.000)	5.173*** (0.000)	1.896*** (0.000)	5.227*** (0.000)
K_{2001}	50.286*** (0.000)	-71.391*** (0.000)	49.495*** (0.000)	-71.275*** (0.000)	48.552*** (0.000)	-70.587*** (0.000)	49.506*** (0.000)	-70.493*** (0.000)	49.946*** (0.000)	-71.287*** (0.000)	50.292*** (0.000)	-71.893*** (0.000)
K_{2009}	48.593*** (0.000)	-36.036*** (0.000)	48.798*** (0.000)	-35.947*** (0.000)	51.908*** (0.000)	-37.374*** (0.000)	48.596*** (0.000)	-35.898*** (0.000)	48.707*** (0.000)	-36.790*** (0.000)	49.002*** (0.000)	-36.570*** (0.000)
K_{2013}	-13.625*** (0.000)	9.535*** (0.000)	-13.172*** (0.000)	9.241*** (0.000)	-13.392*** (0.000)	9.298*** (0.000)	-13.364*** (0.000)	9.725*** (0.000)	-13.14*** (0.000)	9.735*** (0.000)	-13.897*** (0.000)	9.987*** (0.000)
K_{2015}	0.360 (0.902)	6.024*** (0.000)	0.410 (0.886)	4.812*** (0.000)	-0.377 (0.896)	5.764*** (0.000)	0.290 (0.920)	4.877*** (0.000)	0.313 (0.913)	5.297*** (0.000)	0.185 (0.949)	5.572*** (0.000)
Error Adjustment Coefficient (ϕ_i)	-	-0.950*** (0.000)	-	-0.956*** (0.000)	-	-0.952*** (0.000)	-	-0.952*** (0.000)	-	-0.958*** (0.000)	-	-0.952*** (0.000)
NO	-0.0004 (0.697)	0.043 (0.290)	-	-	-	-	-	-	-	-	-	-
TA_E(3)	-	-	-0.023 (0.000)	12.152*** (0.000)	-	-	-	-	-	-	-	-
PPS	-	-	-	-	0.132 (0.000)	10.155*** (0.000)	-	-	-	-	-	-
TFA_TA(2)	-	-	-	-	-	-	0.096 (0.923)	-33.490*** (0.000)	-	-	-	-
ART	-	-	-	-	-	-	-	-	0.001 (0.284)	2.730** (0.015)	-	-
ROP	-	-	-	-	-	-	-	-	-	-	0.008 (0.696)	-0.677 (0.342)
R^2	0.042		0.043		0.042		0.043		0.042		0.043	
$\overline{R}^2$	0.042		0.042		0.042		0.042		0.042		0.042	
F Statistic	68.963 (0.000)		69.147 (0.000)		68.873 (0.000)		69.509 (0.000)		68.912 (0.000)		69.336 (0.000)	
DW	1.999		1.999		1.999		1.998		1.999		1.998	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

Table 5 (Continued)

	Model 19	Model 20	Model 21	Model 22	Model 23

	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	1.920*** (0.000)	5.330*** (0.000)	1.995*** (0.000)	5.292*** (0.000)	2.064*** (0.000)	5.143*** (0.000)	1.915*** (0.000)	5.208*** (0.000)	2.013*** (0.000)	5.225*** (0.000)
K_{2001}	50.149*** (0.000)	-75.372*** (0.000)	50.228*** (0.000)	-70.661*** (0.000)	51.314*** (0.000)	-72.067*** (0.000)	49.124*** (0.000)	-70.771*** (0.000)	49.887*** (0.000)	-70.121*** (0.000)
K_{2009}	49.804*** (0.000)	-36.490*** (0.000)	48.202*** (0.000)	-35.175*** (0.000)	49.922*** (0.000)	-36.959*** (0.000)	50.214*** (0.000)	-37.282*** (0.000)	47.639*** (0.000)	-34.931*** (0.000)
K_{2013}	-14.804*** (0.000)	9.855*** (0.000)	-13.125*** (0.000)	9.253*** (0.000)	-12.935*** (0.000)	9.646*** (0.000)	-12.790*** (0.000)	8.961*** (0.000)	-12.61*** (0.000)	9.426*** (0.000)
K_{2015}	-0.060 (0.983)	5.736*** (0.000)	-0.673 (0.816)	5.025*** (0.000)	1.475 (0.611)	5.216*** (0.000)	0.425 (0.882)	5.676*** (0.000)	-0.951 (0.742)	4.943*** (0.000)
Error Adjustment Coefficient (ϕ_i)	-	-0.950*** (0.000)	-	-0.954*** (0.000)	-	-0.951*** (0.000)	-	-0.960*** (0.000)	-	-0.955*** (0.000)
NP_NSR	0.144 (0.450)	-6.802 (0.126)	-	-	-	-	-	-	-	-
TD_TE	-	-	-0.006 (0.941)	11.863*** (0.000)	-	-	-	-	-	-
AT	-	-	-	-	1.958*** (0.000)	-11.022* (0.089)	-	-	-	-
STR	-	-	-	-	-	-	0.004*** (0.000)	2.680*** (0.001)	-	-
TFA_TA(1)	-	-	-	-	-	-	-	-	0.384 (0.738)	-51.740*** (0.000)
R^2	0.042		0.042		0.043		0.044		0.043	
$\overline{R}^2$	0.042		0.042		0.043		0.043		0.042	
F Statistic	68.914 (0.000)		68.643 (0.000)		70.233 (0.000)		71.563 (0.000)		69.364 (0.000)	
DW	1.999		2.000		1.999		1.998		1.998	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

When generally viewing the model estimates in Table 5, it was found that from models R^2 and corrected R^2 values were slightly lower. It is considered that this was due to the use of a large number of dummy variables in the models. In addition, the horizontal dimension of the panel was very higher than the time dimension, which was also influential on the lowering of the R^2 values (Gujarati, 2003). It was seen that the F statistics of the models were high and the probability values of the F statistics were less than 0.05. In this case; it can be said that the independent variables in the models affect the dependent variable collectively at a significant level. The Durbin-Watson test statistics of the models are quite good. This situation suggests that there is no autocorrelation problem in the models, in other words the estimation results are reliable.

Error correcting terms of all models were found to be negative and statistically significant. This situation shows that there is a long-term relationship between the series in the models, that is, the series are co-integrated. Therefore, false regression problems will not be encountered in the regression analysis and the estimation results are reliable. At the same time as error correction terms are negative and statistically significant, among the series acting together in the long term, the short-term drifts disappear and the series are again close to long-term equilibrium values. This proves that the results of the

model predictions made are reliable. Based on the fact that the error correction terms are negative and statistically significant, it can be said that there are causality relations from the independent variables included in the models to the RETURN variable, which supports the idea that the variables taken in the model are mutually related variables and that the establishment of the models is correct.

In Model 1 – it was determined that the effect of the stock trading volume on stock return was positive and significant both in the long term and short term and the short term effect was higher. This result is in line with our theoretical expectations because the effects of news and data on the stock market are usually short-lived; investors are long-term positions according to new expectations and new news.

In Model 2 – similar to Model 1, it was seen that the effect of trading volume stock return was also positive and significant both in the long run and short term, the short term effect was higher.

In Model 3 – it was seen that increases in the market value of the companies and in the ratio of their book values increased share stocks considerably in the short term. But this effect disappears in the long term. This result obtained is consistent with our theoretical expectation. This is because the increasing market value indicates that the profitability of the company also increases, and the interest of the investors will increase in such shares, which will increase the stock returns. It was determined that the effect of the stock trading volume on the stock return was positive and meaningful in the short term and there was no meaningful effect in the long term.

In Model 4 – it was seen that increases in the trading volume of stocks positively and significantly affected the stock return in the short term as well as the long term, but the stock return was higher in the short term. It was realized that the increases in total assets (GRTA) decreased stock returns in short term but decreased in the long term. The cause of this situation is estimated that stock investors are dissatisfied with this situation in the short term, especially on the situations when paying the company's debts or investing in new investments, rather than distributing the profits of the companies as dividends, but the stocks of the companies whose asset structures become stronger in this way are more demanded in the long term.

In Model 5 – it was seen that again increases in the trading volume of stocks positively and significantly affected the stock return in the short term as well as the long term, but the stock return was higher in the short term. It was seen that the crises of 2001 and 2009 significantly reduced short-term equity stock gains, but increased in the long run which reminded the base effect of the economy. The increases in the IRTS variable, which was calculated with the increase in sales, were found to have a positive effect on stock returns in both periods, meaningless in the short term.

In Model 6 – it was seen that the firm age affects the stock return in a short period positively, meaningfully and at a quite high level, and this result was in line with our theoretical expectations. Because firms that continue to exist in the market for a longer

period are more resilient to institutionalization and economic shocks. This effect turned to negative in the long term. This result indicates that when investors making long-term investment decisions, they consider different criteria rather than just firm age.

In Model 7 – it was observed that the share of the company stocks decreased in the short term as well as in the long term when the firm's trading period in the stock market increased. This result is the opposite of our theoretical expectation. Normally, it is expected that the returns of stocks trading on the stock market for a longer period will be more. Behind this result; it is thought that companies that have already traded on the stock market will start to move away from advertising, promotional activities and new developments that will attract investor's interest in time and excite them.

In Model 8 – it was seen that the increases in the profitability ratio (NP_TAR which was obtained by dividing the net profit by the total assets, increased in both periods, but the stock returns were much more in the short term, and this increase was statistically significant. This result obtained is in line with our theoretical expectations. However, the increase in profitability and the increase in stock return are already terms related to each other. The conclusion to be drawn from this analysis is that it is important to remember that investors consider/need to consider the relationship between net profits and assets while creating portfolios of investors.

In Model 9 – it was seen that increases in equity multiplier affected the stock returns positively and meaningfully in the short-term, and this effect was meaningless in the long term. This result obtained is a totally rational result and is compatible with our theoretical expectations. Because the increase in the equity capital within the assets will increase the firmness of the firms against the crises and this situation will direct the interest of the investor towards this firm. The results which are seen generally in the ratio analysis are that the effects are significant in the short term. This is also normal, because investors use the data about disclosures of companies' financial statements only to identify their short-term positions. More different micro and macro variables will be effective on long-term investor decisions.

In Model 10 – it was determined that increases in the acid test ratio did not have a significant effect on stock returns. In that case, it is not necessary for companies to consider the acid test rate data when forming the portfolios of stock market investors.

In Model 11 – it was seen that the equity efficiency ratio had a short-term positive and significant effect on stock returns, but it lost this effect's statistical significance in the long run. In this case, it would be more rational for investors to use the data of equity efficiency ratio only to determine their short-term positions.

In Model 12 – it was observed that the increases in the current ratio affected the stock returns positively and significantly in the short term but there was an insignificant effect in the long term. In this case, it is logical for investors to use current rate data only to determine their short-term positions.

In Model 13 – it was determined that the changes in the cash ratio had no significant effect on the returns of the stocks. In that case, companies do not need to consider the cash rate data while forming the portfolios of stock market investors.

In Model 14 – it was seen that the increases in leverage ratio (MDR_OK) obtained by dividing tangible assets into equity capital ratios affects the short term returns of equities positively; effect in the long-term turned to negative and was insignificant. It will then be useful for companies to consider the leverage ratio while forming short-term portfolios of stock market investors.

In Model 15 – it was seen that the increases in the amount of profits per share affected the short-term returns of the stocks positively but it had not a significant effect in the long term. It was then useful for companies to consider the amount of profit per share while forming the short term portfolios of stock market investors.

In Model 16 – it was determined that increases in total leverage ratio (TFA_TA(2)) obtained by dividing total short-term liabilities into total liabilities affected the short-term returns of stocks negatively and statistically significantly, they had an insignificant effect in long term by increasing the riskiness of the firm. This is in line with our theoretical expectations. Because the increasing amount of foreign debt will reduce the firm's resilience to external economic shocks, which will move investors away from that company's stocks. Therefore, while forming short-term portfolios of stock market investors, it will be useful for companies to consider the ratio of short-term liabilities to total liabilities in terms of a more accurate selection.

In Model 17 – it was determined that the increase in the turnover rate increased shareholder returns in the short term and didn't have a significant effect in the long term. It will be beneficial for the stock market investors to consider this data while making short-term investment decisions.

In Model 18 – it was seen that the effect of increases in the free float ratio of the companies on the stock return were insignificant both in the short term and in the long run. This result means that investors in the stock market did not consider the variable of free float ratio of the companies when making their portfolio decisions. In Section 5.1.2, where the microeconomic data set was introduced, it was stated in advance that there was no precise expectation about this variable and the net effect of this variable on the return of stocks would be determined according to the values resulting from the analysis. So, the free float ratio had no significant effect on the return of stocks.

In Model 19 – it was designated that NP_NSR variable obtained by dividing net profits of companies into net sales had no significant effect on stock returns both in the short term and long term. Therefore, it would not be a problem for the individuals and intermediary institutions who want to trade in the stock exchange to ignore this variable in the selection of firm.

In Model 20 – increases in the financing rate (TD_TE), which is obtained by dividing the total debts into total own funds, increased the average short term returns of the companies. This result is not consistent with our theoretical expectation. Because it is expected that the increased amount of debt will increase the riskiness of the companies and thus reduce their income. There is such a negative relationship between long-term funding rate and return, but this is not statistically significant. Therefore, it is considered that the average return of stocks traded in BIST is independent from the financing rate and influenced by other factors.

In Model 21 – it was seen that increases in the asset turnover rate affected the stock returns negatively in the short term and in the long term positively. When considering that the short-term effect is reliable at the level of 10% significance, it can be said that investors will only need to consider this variable while forming long-term portfolios.

In Model 22 – it was seen that the increases in the stock turnover rate affected the average return of stocks both in the short term and the long term positively and significantly, the short term effect was higher. This result is in line with our theoretical expectation. However, the increase in the stock turnover rate means that the production and sales are accelerated in the firms, which will lead the investors to the shares of these companies and increase the return of the related shares. It is then useful for the people who will be operating on the stock exchange to consider the stock turnover rates of businesses, especially when they are making short-term portfolio decisions.

In Model 23 – it is seen that the increases in the leverage ratio (TFA_TA(1)) obtained by proportioning the long term debts of companies to their own resources reduced share earnings significantly in the short term, and this result is in line with our theoretical expectations. Because the increased leverage ratio will increase the riskiness of companies in the face of crises, which will remove investors from the stocks of these firms. For this reason, while choosing a firm it useful for investors to consider particularly the leverage ratio variable. In the long term, the effect of the leverage ratio on the stock returns was found insignificant.

6. Conclusions

In this study, it was aimed to determine what may be macroeconomic variables affecting stock returns and to provide investors with findings that could help in this matter. In this context, the macroeconomic factors affecting the average returns of the stocks operating in BIST were analyzed econometrically. For this purpose, stock returns belonged to 130 companies which operated in the manufacturing sector and was offered to public before 2000, being processed continuous trade on stock exchange in the 2000:Q1 – 2017:Q3 period and 25 microeconomic variables and 4 dummy variables belonging to Turkey and other countries were used and there were established 23 different econometric models.

As a result of the analysis made to determine the microeconomic factors affecting the shareholder returns, it was determined that the increases of current ratio from liquidity

rates affected the stock returns positively and significantly in a short period but it did not have a significant effect in the long term and changes in cash rate and acid test ratio did not have a significant effect on stock returns.

From leverage ratios, it was seen that the increases in the ratio of total foreign sources (debts) to the total assets decreased share earnings in the short term significantly. By increasing the riskiness of the firm, increases in the ratio of short term foreign sources to the total liabilities affected the stocks returns negatively and statistically significantly in short term and did not have a significant effect in the long term. The increases in the ratio of tangible assets to own funds affected the short-term stock returns positively and in the long-term the effect turned to negative and it was seen as insignificant. It was seen that increases in the ratio of capital stock to assets affected stock returns positively and significantly in the short term and this effect was insignificant in the long term. Increases in the ratio of total debts to total own funds increased the average short-term returns of companies.

In analyzes made about activity ratios, it was determined that the increase in the accounts receivables turnover rate increased the stock returns in the short term and there was no significant effect in the long term. It was seen that increases in the asset turnover rate affected the stock returns in the short term negatively, in the long term positively. It was seen that the increases in the stock turnover rate affected the average turnover of the stocks positively and significantly in the short term as well as in the long term and the short term effect was higher.

In analyzes made for profitability ratios, it was seen that there is a positive and significant effect of short-term net profits on increases in shareholders equity ratio and but in the long run this effect lost its statistical significance. It was found that increases in the ratio of net profit to total assets increased stocks returns in both periods but mostly in short term and it was seen that this increase was also statistically significant. It was designated that the increase in the ratio of net profit to net sales did not have a significant effect on stock returns both in the short term and long term.

The stock market performance ratio was based on the ratio of the market value of companies' to book value, and it was seen that the increases in this ratio increased the stock returns in a very short period of time considerably, but this effect removed in the long term.

When considering the effects of growth rates related to companies on stocks returns, it was seen that the growth of total sales in growth rate affected stock returns in both periods positively, but insignificant in the short term. It was found that the increases in the growth rate of the total assets, on the other hand, decreased shareholder returns in the short term and increased in the long term.

On the other hand, in the analysis results of other microeconomic variables affecting the stocks, it was determined that the effect of increases in stock trading volume on stock return was positive and significant in the both short term and long term but the short term

effect was higher. It was seen that the effect of the share transaction amount on the stock return was also positive and meaningful in the both short term and long term and the short term effect was higher. It was seen that firm age affected stock returns in a short period of time, positively, significantly and at a very high level. When the firms' trading period in the stock market increased, it was seen that the stock returns decreased both in the short term and in the long run. It was understood that increases in the amount of profits per share affected short-term returns of equities positively, but they did not have a significant effect in the long term. It was found that the effect of the increase in the free float ratio of companies on the stock return was insignificant both in the short term and in the long run. The table which is seen generally in the ratio analysis shows that the effects are significant in the short term. This is also normal because investors use the data about the financial statements of companies' disclosures only to identify their short-term positions. More different micro and macro variables will be effective on long-term investor decisions.

Note

(1) In addition to that the analysis made was panel data analysis was made, Carrion-i Silvestre et al. (2009) test used here was a time series test. Since the BIST100 index was also a time series, this test had to be used. The study is the first in the literature with regards to combining panel data analysis with time series.

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