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HİSSE SENEDİ VOLATİLİTESİ VE FİNANSAL PERFORMANS ARASINDAKİ İLİŞKİ: BIST İMALAT SEKTÖRÜ ÜZERİNE EKONOMETRİK BİR UYGULAMA

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RELATIONSHIP BETWEEN FINANCIAL PERFORMANCE AND THE VOLATILITY OF STOCK PRICES: AN ECONOMETRIC APPLICATION ON BIST MANUFACTURING INDUSTRY INDEX[1]

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Öz

Bu çalışmanın amacı, panel veri ekonometrik analiz metodu kullanılarak finansal performans ve hisse senetleri fiyat oynaklığı arasındaki ilişkiyi belirlemektir. Bu çalışma Türkiye'de Borsa İstanbul'da imalat sanayii sektöründeki 123 şirketin 2007-2017 arasındaki yıllık bilanço verilerini içermektedir. Modelde kullanılan serilere durağan olup olmadıklarını belirlemek için birim kök testleri uygulanmıştır. Daha sonra korelasyon matris analizi, klasik, sabit ve tesadüfi etkiler regresyon modelleri elde edilmiştir. Bu çalışmadaki bağımlı değişken, hisse fiyat oynaklığı ve bağımsız değişkenler ise Cari Oran, Alacak Devir Hızı, Firma Değeri, Firma Değeri/Defter Değeri. Aktif Karlılık, Stok Devir Hızı, aktif Büyüme oranı ve Aktif Devir Hızı gibi finansal rasyolardır. Bu çalışmaya dayalı olarak, finansal oranların hisse senetleri fiyat oynaklığı üzerindeki etkilerinin farklı anlam düzeylerinde değiştiği tespit edilmiştir. Bu sonuçlar Borsa Istanbul'daki yatırımcılar için önemli işaretler taşımaktadır.

Anahtar kelimeler: *Finansal rasyolar, Oynaklık, Hisse Senedi Fiyatı, Panel Veri Analizi.*

Jel Kod: *G20, G20,C58*

Abstract

The aim of this study is to determine the relationship between financial performance and the volatility of stock prices by using an econometric analysis such as panel data techniques. The study covers the balance data of the period from 2007 to 2017 for the 123 companies from manufacturing industry in Borsa Istanbul in Turkey. The series to be used in the model were applied "unit root tests" and examined whether they are stationary or not. Correlation matrix analysis, the classical, fixed effect and random effect regression models were obtained. The dependent variable used in the study is the Volatility of the Stock Price and independent variables are financial ratios such as Current Ratio, Receivables Turnover Ratio, Company value, Company value/Book value, Return on Assets, Stock Turnover Ratio, Assets Turnover Ratio and Assets Growth. Based on the study, it was determined that the effects of financial ratios on the volatility of stock prices vary in different significance levels. The results carry important implications for the investors in Borsa Istanbul.

Keywords: *Financial ratios, Volatility, Stock price, Panel Data Analysis.*

Jel Codes: *G20, G20,C58*

[1] This study is derived from the thesis named "Relationshıp between financial ratios and the volatility of stock prices: an econometric application on Bist Manufacturing Industry Index" .

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1. INTRODUCTION

In this study, we try to demonstrate the relationship between financial performance and volatility and then whether financial ratios affect volatilities as a cause. At this point, there's an essential question about why we consider volatilities in stock markets. Tesfatsion (2004) suggests that the financial performance measures of firms is able to be used to guess stock prices.

The volatility in financial markets plays an crucial role in investment decisions for investors. Unexpected events constantly affect the volatility of the stock price. In this case, investors cannot predict future stock prices. So, no investor now has the opportunity to get profits. For this reason, investors who are interested in the stock market focus on stock market volatility. In other words, investors try to see and predict the change over time in stock price by analyzing the financial ratios playing an important role in the stability of stock prices in long-term period.

In some recent studies, there is an acceptance about a connection between macroeconomic state and financial markets, especially, in developing markets. For example, Kashyap (2016) states that the general macroeconomic indicators affect the changes in stock prices. The macroeconomic variables are surely important for the investors to understand the movements of financial markets as external indicators, but financial ratios, as internal variables, are more important than them because when it's spoken of market volatility, it means stock prices being effective on market volatility.

There are two reasons why the changes in stock prices started to have a high importance in recent years. The first one is that the volatility may affect the psychological situations of investors in financial and derivatives markets, which makes them panic. The second one is that it causes highly big financial crises, such as in Turkey on 21 February 2001. Therefore, all macroeconomic indicators began to be distorted in parallel with financial ratios.

With the deepening of financial markets, globalization and the increase of international capital movements, the effect of financial ratios variables affecting the volatility of stock prices has begun to gain importance. Price volatility in financial markets, and especially in stock markets, is an important factor in investment decisions. For this reason, investors who are interested in the stock market place have emphasis on stock market volatility to guess stock prices in the future. In other words, investors try to see and predict the change over time in stock price volatility because the volatility of stock price is related to risk.

Some studies demonstrate that the market volatility is not stable over time in capitalist economies. For instance, Köse (2003) states that the fragility, instability and turmoil of the financial sector and the financial movements of the real sector of the securities market are valid for all markets in the world. According to the rate of change in earnings in the financial markets in Turkey and the analysis of results of studies that violently play any of these macros cannot be explained by economic or financial factors An explanation for changes in stock prices is concerned with general macroeconomic uncertainty. This uncertainty may be clarified with the help of financial ratios by using econometric analyses. For example, in New York Stock exchange (NYSE) during the Great Depression, stock prices have a high volatility, as in 2001 in Borsa Istanbul (BIST). Therefore, it is very essential to estimate these volatile times because these are presumable and constant changes in the levels of volatility. Today, we are still getting and estimating the factors that naturally affect the stock returns and many methods that take into account different views (basic analysis, technical analysis, financial asset pricing model etc.) are used to guess volatilities over time (Kalaycı and Karatas, 2005). That's why, some studies offer to use some efficient ways together, such as financial ratios and technical analyses such as MACD, SO and RSI, and interest rates.

Financial ratios are treated as sources of information used by investors and the effect of these on the firm's share price volatility is examined if there is a meaningful impact. At this point, if there is a meaningful impact, financial ratios affect company value. Sarıkamış (2009) points out that this information will provide a significant benefit to make investment decisions in stock markets and also with the help of this information, the real savings owners earn, speculators lose. Of course, this situation contributes to the rapid growth of national economy.

The analysis of hypotheses in this study might be tested for different companies in different sectors because the companies and sectors in stock markets may be different from others in their structures. For example, banks are most likely affected by the movements of interest rates, but oil firms are mostly affected by global oil prices. Therefore, the factors of volatility will be examined based on the companies from manufacturing industry in Borsa Istanbul rather than the whole stock market.

From the perspective of this study, the high stock price volatility indicates that the price of the stock may rise high. Investors investing in a stock with a high volatility will be able to gain considerable profits from price increases or face significant losses in price declines. So they will want to know the factors that cause price volatility and take into account many parameters.

In order to both consider many parameters and measure the strength of these relationships, the correlation matrix analysis, unit root tests and then model estimates will be obtained by considering the pooled model, fixed and random effects regression models in panel data technique, and the validity of the predictions will be determined by testing with F test, Breush Pagan test and Hausman test. The data will be analyzed using Eviews package program and Stata program with the volatility of stock prices, as a dependent variable, and the financial ratios as independent variables, calculated for a year between 2007 and 2017 and the datasets obtained from Finnet 2000 plus and Mynet finance historical data.

Finally, in the study, national and international literature are examined, the data set and method used in the model are mentioned and then the findings obtained from the analyses are evaluated and some suggestions are given to investigate the performance of firms.

2. LITERATURE REVIEW

Throughout the history of stock exchange, firstly investors and then brokers, dealers, traders academicians tried to understand why volatility as a phenomenon as well as a concept maintains in the centre of modern financial markets and academic researchs. In this section, we will give literature review.

Basu examines (1977). The impact of price/earnings ratio (P/E) on stock prices in New York Stock Exchange traded on the 1400 industrial companies' analysis between 1956: 09-1971: 08 in his work. Basu's work on P/E ratio to stock prices, the results of P/E had to be reflected quickly in terms of the effective market hypothesis but it is the result that was not reflected.

Shiller (1989) points out the importance of both changes in economic fundamentals and changes in opinion or psychology in the volatility of stock prices. Efficient markets theory says that prices in speculative markets are caused by fundamentals; however, even other theories suggest psychological factors affect changes in stock prices. It may be true in short-term, but in long-terms financial ratios affect the volatility more than opinion or psychology.

Dwyer and Hafer (1990) try to know what determines stock prices, that is, volatility. Thus, they test a particular model of financial ratios. They find out that changes in stock prices are not generally

related with financial ratios, but with changes in long term interest rates. They suggest that the volatility of stock prices has been produced by various factors.

Damien (1997) the economic added value is determined that there is a very high correlation between the financial ratio and the stock price.

Mramor and Mramor-Kosta (1997) studied the operating companies in Slovenia and they found non-linear relationships between stock returns and accounting-based performance measures.

Hull (1999) examined whether the average leverage ratio of the industry was affected by changes in stock price in terms of levels of borrowing. He found that the industry average was regarded as the optimal borrowing rate by the market, and significant earnings differences arise in connection with optimal capital structure.

Mramor and Pahor (2000) studied the operating companies in the United States and Japan. They identified non-linear relationship between financial rates and stock prices.

Muradoglu and Whittington (2001) study the power of debt ratios in predicting company performance and stock returns in the long run. They find out that companies with moderately low debt ratios get abnormal returns of up to 20% in three years.

Lewellen (2002) has developed a new test on the ability of financial ratios to predict stock returns. In the study, data were used from 1946 to 2000. He found out that Profit Share predicted market return, the Market Value / Book Value and the Price / Earnings Rate could predict the return in the shorter term.

Canbaş et al. (2002) found the significant financial ratios used in the estimation of stock returns of 173 industrial company operations traded in the BIST during 1993-1997 period, as price / earnings ratio, market value / book value ratio and liquidity, profitability and capital structure ratios. In addition, the ratios that provide useful information for the investor in the study were liquidity, financial structure and profitability ratios.

Omran and Ragab (2004) investigate whether there's a relationship between financial ratios and changes in stock prices for the operating companies in Egypt. They found a non-linear relationship between them.

Kalev and others (2004) examined the effect of firm-level announcements on the volatility of stock returns in their studies. By using GARCH model, they found a positive and statistically significant relationship between incoming news and volatility.

Şamiloğlu (2005) studied 58 companies in the leather and food sector traded on BIST based on earnings per share, cash current earnings per share and book value per share for the period 1999-2002 by using multiple regression models. He observed that there was a significant relationship between P/E, BV and share prices, but he observed that there was no meaningful relationship between currents, operating profits, annual growth and stock prices.

Yılgör (2005) investigates the impact of the changes in the financial ratios of the companies on the stock price and how these changes are perceived by the investors. As a result of the review, she finds out that the announcement of the increase in the level of debts was perceived by investors as information affecting the future of the business in certain periods. However, this information has been considered as a factor to decrease the real value of stocks in some periods and to increase the real value of stocks in some periods.

Kothari and Warner (2006) investigated the reaction of the stock market to total earnings announcement in their work. By using correlation analysis, they found that there's a negative relationship between positive earnings announcement and stock returns, while waiting for total returns to respond positively to earnings announcements.

Horasan (2009) examined the impacts of price / earnings ratio on the share returns based on the companies in BIST for 6 years period and found that the impact of P/E ratio on stock prices is significant, but there is a correlation in the opposite direction.

Gregoriou (2009) says that the importance of volatility is generally in the section of financial economic. Therefore, analysts often argue that there is a link between speculation and volatility. Investment managers closely follow volatility trends as changes in prices might have a major effect on their investment and risk management decisions. So, volatility has to reflect fundamental indicators, information and market expectations.

Büyükşalvarcı (2011) studies the effects of financial rates on stock prices during the crisis periods. For this purpose, he uses the manufacturing industry companies traded on BIST. Financial ratios differ for periods. In addition, financial ratios in 2008 economic crisis period explain the change in stocks more strongly than the 2001 economic crisis period.

Suleman et al. studied (2011) the effects of dividend policy on share price volatility in Pakistan. The study extracted data from Karachi Stock Exchange regarding five important sectors for the period of 2005 to 2009 and used multiple regressions model for their analysis. The study also revealed that share price volatility has significant negative relationship with growth. The study also found that share price volatility has significant positive relationship with dividend yield.

Habib et al. (2012) analyzed the relationship between dividend policy and stock price volatility. They used a horizontal section regression model to analyze the relationship between dividend yield and dividend distribution ratio and stock price. In their study, they found a positive relationship between stock price and dividend yield and a negative relationship with dividend payout ratio.

Bayrakdaroglu (2012) analyses the existence of the relationship between financial ratios and stock returns and the power of testing and explaining stock returns. He finds out that stock returns can be explained statistically by the financial ratios of shares in the related period but the power of this explanation is not very high.

Aydemir et al. (2012) tried to determine financial ratios that are effective in specifying stock prices by using the data set of 73 companies in the manufacturing sector from the year 1990 to 2009. At the end of the study, it is determined that financial ratios' effect on determining stock prices is low, however, net profit margin, return on equity and operating profit margin affects stock returns positively and statistically meaningful.

Karaca and Korkmaz (2013) analyses the factors affecting the performance of firms. The results of their study show that Dividend Payout Ratio and Earnings Per Share increase Share Closing Price, but Market Value Book Value and Market Value Increase do not affect the Share Closing Price.

Kenyoru et al. (2013) studied in Kenya to determine the impact of dividend policy on share price volatility. The study used data from the actively trading companies listed in the Nairobi Securities Exchange for a period of ten years from 1999-2008. The estimation is based on multiple regression analysis between dividend policy measures (dividend payout ratio and dividend yield) and share price volatility. The results of the study were that payout ratio is determinant for share price volatility.

Profilet and Bacon (2013) identified the impact of certain financial variables on the stock price volatility. The study used samples of 500 publicly traded firms were taken to explain the results on dividend policy and stock price volatility in the U.S. The ordinary least square multiple regression is used to find the results. The study revealed that leverage and growth both have negative relationship with stock price volatility and there is positive relationship observed between the payout ratio and the stock price volatility.

Menike and Prabath (2014) examine the factors that affect stock price. Using a single and multiple regressions model the results reveals that EPS, DPS, BVPS were positive and had a significant impact on the stock price in the CSE.

Dadrasmoghadam and Akbari (2015) examined the relationship between financial ratios and stock prices in the food groups, sugar, agricultural machinery and equipment and related services to companies listed on the Stock Exchange of Iran. They found that the significant negative relationship with stock market activity in the stock industries of agriculture.

Goncharov (2015) investigates whether the impact of fair value earnings components on stock price volatility is consistent with sophisticated analyses of financial ratios. He finds that the volatility of the stock price is higher than the volatility of fair value earnings and theoretical predictions.

Sharif et al. (2015) analyzed panel data set of 41 firms traded in Bahrain Stock Exchange during the period 2006-2010. In this study which firm size was used as a control variable, effects of entity-specific variables such as return on equity, book value per share, earnings per share, dividend per share, dividend yield, price earnings, debt to assets on market price of stocks was analyzed. Results of the study indicates that, return on equity, book value per share, dividend per share, dividend yield, price earnings ratio and firm size variables are important determinants of stock prices in Bahrain Stock Exchange.

Aktaş and Ünal (2015) studied the relationship between the financial efficiency ratios and stock prices of insurance firms, whose stocks are publicly traded in Borsa Istanbul. Taking three sets of efficiency ratios, which are namely cost, revenue and profit efficiency, as proxy, they run a regression analysis against stock prices. Their findings suggest that all of employed models confirm statistically significant relationships between the ratios and stock prices.

Güngör and Yerdelen (2015) discuss the factors that affect share prices in both micro- and macro-economic point of view using dynamic panel data analysis.In this study, quarterly balance sheets and income statements of manufacturing firms, which were publicly traded in Borsa Istanbul between 2005 and 2011. As a result of the analysis in this study, direction of the relationship between micro- and macro-economic factors, and the share price has been determined.

Kaya and Öztürk (2015) investigate relationship between accounting profit and stock prices. For this aim relationship between stock prices and accounting profits of companies operating in BIST Food, Beverage and Tobacco Sector over the period of 2000-2013 is investigated by using panel cointegration analysis and Granger causality test As a result of analysis, it was determinated cointegration between accounting profit and stock pricies and single direction causality from variables of asset profit and net profit marjin that represents accounting profits to stock price variable and bidirectional causality between operating profit variable and stock price variable.

Özen et al. (2015) show the financial ratios of the firms by using TOPSIS to calculate the relationship between stock returns and the financial performances with financial ratios. The results

find out that share prices were determined by external factors rather than internal factors in small firms.

Cengiz and Püskül (2016) revealed the relationship between profitability and stock returns by identifying that increase in profitability of equity and gross sales margin lead to increase in stock returns whereas increase in operating profit margin result in decrease in stock prices.

Sevim (2016) studied the effect of financial ratios including the sales, asset and equity profitability ratios on stock returns over 32 manufacturing entities. Finally, this study revealed that there is no statistically significant relationship between these profitability ratios and stock returns.

Bayrakdaroglu et al. (2017) aimed to show whether there is a relationship between share prices and profitability ratios which take place in financial ratios and also to analyze if profitability ratios can be directive indicator while investing in stocks with the aim of maximizing earnings. In this research, panel data regression analysis was applied between lagged stock prices of firms in BIST 100 and their profitability ratios including gross profit margin, operating profit margin, net profit margin, return on asset and return on equity. They concluded that while making investment decisions, taking net profit margin into consideration can contribute to investors' earnings.

Parlakkaya and Kahraman (2017) studied with the data set of 77 firms which place in ISE-100 index between the years 2012-2015 so as to determine the degree of explanation of stock prices with firms' accounting information. In the research, earnings per share and book value per share was taken into consideration as independent variables and share price was considered as dependent variable. At the end of the panel data regression analysis, they indicated that stock price movements are directly proportional to profitability ratios. In other words, accounting information obtained from the company's balance sheet and income statements have a role in explaining stock prices of the firm.

Gutam (2017) shows that causal comparative research design which deals with how bank specific variables, specifically, leverage ratio, market capitalization, growth of assets, earning price ratio, dividend yield and book to market effect on stock price volatility and stock return. He found that growth of assets, book to market and earnings price ratio are the major determining variables of stock return of Nepalese commercial banks. Furthermore, growth of assets, leverage, dividend payment ratio, book to market and dividend yield are the major determining variables of share price volatility of Nepalese commercial banks.

3. MATERIALS AND METHODS

In this study, panel data analysis technique was used to investigate the impacts of financial ratios on the volatility of stock prices with the help of Stata and Eviews software. the stability of the data set covering 157 companies and 2007-2017 was examined with different panel unit root tests. Correlation analysis was calculated to show the relation between variables. In the study, the data sets including 157 companies in BIST manufacturing industry, covering the years 2007 to 2017 were used.

3.1. Panel Data Analysis

In econometric studies; Gujarati (1999) states that three types of data are used: time series data, cross-sectional data, and mixed data, which is a combination of time-series data and cross-sectional data. If the same cross-sectional unit (individual, family, or business) is being traced over time, such mixed data is called panel data.

In his book, Baltagi (1995) points out that Hsiao (2003) and Klevmarken (1989) list many of the benefits of using panel data. These include the following:

1. To control individual heterogeneity. Panel data shows that individuals, firms,

states or countries are heterogeneous.It is certain that there is a heterogeneity in these units. Panel data estimation techniques can clearly account for this heterogeneity by permitting certain cross-specific variables.

2. Panel data gives more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency.

3. Panel data creates less the problem of multicollinearity between variables.

4. Panel data can better study the dynamics of adjustment.

5. Panel data can better identify and measure effects that are simply not detectable in pure cross-section or pure time-series data.

6. Panel data models allow us to construct and test more complicated behavioral models than purely cross-section or time-series data. For example, technical efficiency is better studied and modeled with panels.

7. Micro panel data gathered on individuals, firms and households may be more accurately measured than similar variables measured at the macro level.

8. Macro panel data on the other hand have a longer time series and unlike the problem of nonstandard distributions typical of unit roots tests in time-series analysis.

Baltagi (1995) considers some limitations of panel data models in his book as follows:

1. Design and data collection problems.

2. Distortions of measurement errors.

3. Selectivity problems.

4. Short time-series dimension.

5. Cross-section dependence.

Hsiao (2003) defines three goals in panel data research. The first goal is to define inter-unit variability or the variability of each unit over time. Thus, it is possible to know both the magnitude of certain variabilities and the course of these variabilities. The second goal is to explain these variabilities in terms of some other variables. These variables may be constant over time, such as gender, or may be non-constant over time, such as mental state. The third objective is to estimate each unit in terms of the relevant variables.

The panel data can also be defined as a data set with time series of multiple units or a cross-section data with time dimension. If the panel data sets contain a time series of equal length for each section, such panel data is referred to as "balanced panel data" and "unbalanced panel data" if it contains time series at different lengths. The simple functional representation of the panel data is as follows;

$$Yit=\beta_0+ \beta_{1it}X_{1it+}.....+ \beta_{kit}X_{kit}+e_{it} \quad i=1,2,..N \;\; t=1,2,3,...T$$

Here i is the cross section and t is the time. Since Y variable has different values in each time period of each unit, it is expressed with two sub-indices as i and t.

3.1.1. Panel Unit Root

The panel data analysis created by combining the time series with the cross section also brings together time series features and time series problems. Just as it is in the time series, it should be examined whether there are the variables with unit root at the same level. The reason for this is that if the data are not stationary, the relations that are obtained are spurious estimates. Therefore, panel unit root tests are applied for this purpose.

Im, Peseran and Shin look at the average test statistic of the ADFs by calculating the ADF for each unit in the panel with the Dickey Fuller (ADF) test statistic in the panel unit root test. For panel unit root test application, N horizontal section and T time series; y_{it} first degree autoregressive process defined as follows:

$$\Delta y_{it}=a_i+\beta_i y_{it-1}+e_{it} \quad i=1,2,..N \quad t=1,2,3,...T$$

Established hypotheses:

H_0: $\beta_i=0$ $\quad i=1,2,.....N_i \quad \beta i=0 \quad i=N_1+1, N_1+2....N$

Ha: $\beta_i<0$

The acceptance of the hypothesis H_0 implies the existence of the panel unit root, and the acceptance of the alternative hypothesis Ha implies that the panel unit root is not.

3.2. Findings

In this section, the stability of the data set covering 123 companies and 2007-2017 was examined with different panel unit root tests Then model estimates were obtained by considering the pooled model, fixed and random effects regression models, and the validity of the predictions was determined by testing with F test, Breush Pagan test and Hausman test.The data were analyzed using Eviews package program and the results obtained are presented in tabular form.

Static panel model has pooled, fixed and random effects model in terms of coefficients. In the study, first the pooled model - fixed effects model is tested with the help of F test. If the probability value is greater than 0.10, the Ho hypothesis is rejected. The Ho hypothesis implies that the model is pooled. If the Ho hypothesis is rejected, it is stated that the model is consistent with the fixed effect model. In the second stage, the Pooled Model-Random Effects Model is tested with the help of the Breusch-Pagan LM test. If the probability value is greater than 0,10, the Ho hypothesis is rejected. If the Ho hypothesis is rejected, it is stated that the model is appropriate to the Random effects model. In the third stage, the Hausman test is tested to make the choice between the fixed effects model and the random effects model. In the Hausman test,

H_o hypothesis: the model is appropriate to the random effects model.

H_1 hypothesis: the model is appropriate to the fixed effects model.

If the probability value is greater than 0,10, the H0 hypothesis is rejected. In this case it is said that there are fixed effects in the data set. On the contrary, it is said that there are random effects in the data set.

At the last stage, the regression model is estimated. The Volatility of Stock Prices (VSP) will be used as a dependent variable to analyze the effect of financial ratios on the Volatility of Stock Prices. Current Ratio (CR), Receivables Turnover Ratio(RTR), Company or Enterprise value(CV), Company value/Book value(CB), Stock Turnover Ratio(STR), Assets Growth Ratio(AGR), Assets Turnover Ratio(ATR) and Return on *Assets*(ROA) will be used as independent variables.

In the study, the regression model is estimated as follows.

VSPit= β0it + βit CRit + βit RTRit + βit CVit + βit CBit + βit ROAit + βit STRit+ βit AGit+ βit ATRit + εit

Table 3.1 : Descriptive Statistics of Variables

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
ID	1353	62	35.519	1	123	2	122	0	1.8
TIME	1353	2012	3.163	2007	2017	2007	2017	0	1.78
CR	1353	2.313	2.088	.1	24.98	.34	10.46	3.245	20.259
STR	1353	7.336	12.699	.01	195.81	.92	87.48	7.849	80.512
RTR	1353	6.51	7.662	.01	108.21	.97	38.88	6.596	65.37
AGR	1353	.146	.286	-.71	4.33	-.29	.96	7.011	90.876
CV	1353	19.433	2.493	0	24.33	7.94	23.52	-4.472	36.368
CVBV	1353	2.35	4.856	-60.9	78.45	-4.31	14.79	5.238	119.015
ATR	1353	.971	.477	0	3.44	.1	2.6	1.165	5.521
ROA	1353	5.181	10.672	-128.93	92.8	-20.01	35.88	-.75	26.354
VSP	1353	30.134	78.438	-83.93	805.56	-72.15	327.13	3.207	21.723

Table 3.1 shows the descriptive statistics of the variables to be used in the model. The descriptive statistics of the firms in BIST operating in the manufacturing industry in Turkey taken as a sample (123 companies) are presented above. The number of observations is 1353. Annual data between 2007 and 2017 are used. Generally speaking, the average of the volatility of the stock prices is 30,13 as a whole. The average annual rate of the current ratio of the companies in the 11-year period is 2.31. This means that there is a variable amount of assets in place to meet short term liabilities. The firms transfer average stocks 7,34 times a year. And they collect their receivables on average 6,51 times a year. the assets growth rate of the companies in the sector is about 15%. At the same time, the company value / book value ratio of firms is 2,35.

Different tests are used to test whether panel data sets have unit root. It is necessary for the series to have no unit roots in terms of realistic results of regression analyses to be obtained from the data sets to be used in the study.

The series must be stationary. The hypotheses for the unit root test are as follows.

H_0: Series has a unit root.

H_1: Series has no unit root.

When all the root tests are examined, it is understood that all variables are stationary for the level values. According to the results of Im, Pesaran and Shin Wstat and ADF-Fisher Chi-square test, there is no unit root at the level of significance of 10%, 5% and 1%. H0 hypothesis is rejected because probability value is smaller than all significance values. H1 cannot be rejected that is, they are stationary at the level of the series.

Table 3.2 : Correlation Matrix of Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ID	1.000										
(2) TIME	0.000	1.000									
(3) CR	-0.030	-0.105	1.000								
(4) STR	-0.080	0.018	0.011	1.000							
(5) RTR	0.016	-0.084	0.060	0.080	1.000						
(6) AGR	0.002	0.082	-0.066	-0.031	0.063	1.000					
(7) CV	0.025	0.146	-0.264	-0.003	-0.281	0.032	1.000				
(8) CVBV	-0.030	0.058	-0.075	-0.002	-0.035	0.005	0.137	1.000			
(9) ATR	0.126	-0.084	-0.194	0.248	0.112	0.059	0.102	0.053	1.000		
(10) ROA	-0.076	0.069	0.374	0.026	0.028	0.128	0.149	-0.034	0.147	1.000	
(11) VSP	0.034	-0.010	0.053	-0.015	0.040	0.034	0.110	0.076	0.004	0.123	1.000

In the analysis of Pearson correlation coefficients, as seen in the table 3.2, the relation between independent variables seems to be very weak because there is no bigger 0,50 correlation coefficient between variables, so we can include all of them in the model.

There are some tests that need to be done to select the regression model. These tests include the F test, Bresuch-Pagan LM test and Hausman test. First, the F test is applied to determine the appropriate model between the pooled model and the fixed effect model. The F test basic hypothesis is shown below:

H_o: Pooled model is appropriate

H_1: Fixed Effect Model is appropriate

Table 3.3: Panel Regression Model(fixed effects)

VSP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
CR	5.745	1.793	3.20	0.001	2.226	9.263	***
STR	0.050	0.386	0.13	0.896	-0.707	0.808	
RTR	1.024	0.440	2.33	0.020	0.161	1.887	**
AGR	-11.784	8.004	-1.47	0.141	-27.487	3.919	
CV	10.699	1.400	7.64	0.000	7.952	13.447	***
CVBV	2.159	0.537	4.02	0.000	1.106	3.212	***
ATR	-0.333	10.058	-0.03	0.974	-20.065	19.400	
ROA	1.630	0.289	5.64	0.000	1.063	2.198	***
C	-209.577	30.884	-6.79	0.000	-270.169	-148.985	***

Mean dependent var	30.134	SD dependent var	78.438
R-squared	0.096	Number of obs	1353.000
F-test	16.229	Prob > F	0.000
Akaike crit. (AIC)	15462.703	Bayesian crit. (BIC)	15509.593

F test that all u_i=0:
F(122, 1222) = 1.16
Prob > F = 0.1171

**** p<0.01, ** p<0.05, * p<0.1*

When Table 3.3 is examined, it is seen that the probability value of F test is greater than 0,05, (0,1171>0,01, 0,05, 0,10), that's why Ho hypothesis is not rejected at all levels of significance (1%,5%,10%). Instead of the fixed effects regression model, the pooled model seems to be appropriate.

The Bresuch-Pagan (LM) test will be applied to the data to determine the appropriate model between the pooled model and the random effects model in this stage. The basic hypothesis is shown below:

H_0: Pooled model is appropriate

H_1: Random Effect Model is appropriate

Table 3.4: Panel Regression Model (Rassal effects)

VSP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
CR	1.909	1.209	1.58	0.114	-0.461	4.279	
STR	-0.110	0.172	-0.64	0.520	-0.447	0.226	
RTR	0.759	0.290	2.62	0.009	0.190	1.328	***
AGR	4.977	7.483	0.67	0.506	-9.689	19.643	
CV	3.868	0.957	4.04	0.000	1.992	5.744	***
CVBV	1.126	0.438	2.57	0.010	0.268	1.984	**
ATR	-3.328	4.823	-0.69	0.490	-12.780	6.125	
ROA	0.641	0.231	2.78	0.005	0.189	1.094	***
CONSTANT	-57.041	20.452	-2.79	0.005	-97.126	-16.956	***

Mean dependent var	30.134	SD dependent var	78.438
Overall r-squared	0.036	Number of obs	1353.000
Chi-square	50.221	Prob > chi2	0.000
R-squared within	0.085	R-squared between	0.000

**** p<0.01, ** p<0.05, * p<0.1*

Breusch-Pagan LM Test for Random Effects Summary

Test: Var(u) = 0

chibar2(01) = 0.00

Prob > chibar2 = 1.0000

According to the results given in table 3.4, null hypothesis is not rejected because p-value is greater than 0,05, that is to say, Pooled Model is appropriate.

If the models above are examined to decide which model is good to accept, it can be seen that the appropriate model is the pooled model and in such a case it is not necessary for panel data models to apply the Hausman test because both appropriate models are the pooled model.

The pooled model can carry auto-correlation and heteroscedacity problems. In this case, the regression estimates do not show actual values. That's why, Wooldridge test for auto-correlation in panel data and Breusch-Pagan/Cook-Weisberg test for heteroskedasticity will be applied to test auto-correlation and varying variance. The result of the Wooldridge test for auto-correlation is showed in Table 3.5.

H_0: There is no first-order autocorrelation.

H_1: There is auto correlation.

Table 3.5: Wooldridge Test Summary

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,     122) =      0.001
           Prob > F =      0.9697
```

According to the results of Wooldridge test statistic in the table above, the p-value F is bigger than 0,05, so null hypothesis is not rejected. In this case, there is no auto-correlation problem between the series for the first difference values.

Table 3.6: Heteroskedasticity Test Summary

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of VSP

         chi2(1)      =    27.60
         Prob > chi2  =   0.0000
```

As seen in table 3.6, null hypothesis is rejected and then alternative hypothesis is not rejected because prob>chi2 value is smaller than 0,05 significance level, so it can be said that in the model there is varying variance(heteroskedasticity) in other words, there's no constant variance.

The correction is carried out to eliminate the heteroskedasticity problem with the help of Robust linear regression model. The robust estimation results are shown in Table 3.7.

Table 3.7: Linear Regression Model (Robust)

Vsp	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
CR	1.535	2.048	0.75	0.453	-2.479	5.550	
STR	-0.138	0.075	-1.85	0.065	-0.285	0.008	*
RTR	0.651	0.361	1.80	0.072	-0.057	1.359	*
AGR	0.108	0.759	1.34	0.181	-0.463	0.059	
CV	2.542	0.796	3.19	0.001	0.981	4.103	***
CVBV	0.795	0.577	1.38	0.168	-0.335	1.925	
ATR	-1.989	3.435	-0.58	0.563	-8.721	4.744	
ROA	0.394	0.238	1.66	0.098	-0.072	0.859	*
CONSTANT	-0,295	0,192	-1.48	0.039	-0.681	0.954	**
Mean dependent var		30.134	SD dependent var			78.438	
Number of obs		1353.000	Chi-square			30.873	

**** p<0.01, ** p<0.05, * p<0.1*

Estimation Equation with Substituted Coefficients:

VSP= -0.295 -0.138*STR+0.651*RTR + 2.542*CV+0.394*ROA +εit

According to the results given in table 3.7 of the panel regression (Robust model), the model is significant at 1%, 5% and 10% significance levels because P-value is smaller than all the significance levels. So H_0 is rejected that is,.the financial ratios in the model jointly affect the volatility of stock prices. Also some p- values of the independent variables in the model are significant at 1%, 5%, and 10% significance levels, such as Stock Turnover Ratio (STR), Receivables Turnover Ratio (RTR), Company value (CV) and Return on Assets (ROA) because their P-values are smaller than the significance level 1%, 5%, and 10%. Thus, it can be said that these financial ratios can jointly influence the volatility of stock prices. However, the other financial ratios are not significant at all the significance levels (1%, 5%, and 10%).

On the one hand, if Stock Turnover Ratio (STR) increases by 1 unit, the volatility of the stock price will decrease by 0.13 units, or if it decreases by 1 unit, VSP will increase by 0.13 units, namely STR seems to have anegative effect on the volatility of the stock price. If (RTR) increases by 1 unit, the volatility of the stock price will increase by 0,65 units, or if it decreases by 1 unit, VSP will decrease by 0,65 units, namely RTR seems to have a positive effect on the volatility of the stock price. Also CV seems to have a positive effect on the volatility of the stock price. If company value (CV) increases by 1 unit, the volatility of the stock price will increase by 2.5 units or if CR decreases by 1 unit, VSP will decrease by 2.5 units. On the one hand, if ROA increases by 1 unit, the volatility of the stock price (VSP) will increase by 0.394 units or if ROA decreases by 1 unit, VSP will decrease by 0,.394 units.

All of the variables included in the analysis are the coefficient of multiple determinants (R^2) indicating the degree of effect is 0,0854. The R^2 value can range from 0 to 1. If R^2 is close to value 1, it is better that the change in the dependent variable is explained by the independent variable changes. The fact that R^2 is close to 0 indicates that the changes in the dependent variable are due to factors other than the changes in the independent variables. The R^2 value of the model is 0.0854. This ratio implies that independent variables can account for nearly 9% of the dependent variable (VSP).

CONCLUSION

In this study, it was tried to demonstrate the relationship between financial ratios and volatility and then whether financial ratios affect volatilities as a cause. For this reason, the stability of the data set covering 123 companies and 2007-2017 was examined with different panel unit root tests such as Im, Pesaran and Shin W-stat and ADF Fisher. Then model estimates were obtained by considering the pooled model, fixed and random effects regression models, and the validity of the predictions was determined by testing with F test and Breush Pagan test.

With the deepening of financial markets, the increase of globalization and international capital movements, the influence of the financial ratios variables, which affect the volatility of stock prices, has begun to gain importance. Price volatility in financial markets, especially in stock markets, is an important factor in investment decisions. For this reason, investors who are interested in the stock market are emphasizing the volatility in the stock market in order to forecast stock market prices in the future. In other words, investors are interested in seeing and forecasting the volatility in stock prices since they are concerned with volatility risk in stock prices.

As for the results, it can be concluded that some financial ratios in the model such as Stock Turnover Ratio (STR), Current Ratio (RTR), Company Value (CV) and Return on Assets (ROA) can jointly affect and explain the volatility of stock prices. In general, the increase and decrease of Company Value (CV) is interpreted as a good indicator. Namely, Company Value (CV) is sensitive to the Volatility of Stock Prices and explanatory positively. The evaluation of this ratio (ROA) stems

from the fact that it shows how much profitable companies are, so it is an important evaluation criterion. Assets Growth Ratio (AGR), which is not ratio in the model, also no affects the volatility of stock prices. On the other hand, according to the analysis results; it is understood that there is no statistically significant relationship between Current Ratio (CR), Assets Growth Ratio (AGR), Company Value/Book Value (CVBV) and Assets Turnover Ratio (ATR).

In conclusion, it can be said that there are many reasons for the changes in stock prices in collaboration with financial ratios, such as macroeconomic indicators, interest rates, the psychological situations of investors and the internal dynamics of a stock market, namely, technical analysis. Financial ratios are just one of them.

RECOMMENDATIONS

- The investors in stock markets should pay attention not only to financial ratios but also to certain underlying factors affecting the volatility of share prices when they buy and sell stocks. In addition to these, they should know and remember that the best indicator and essential backbone to long-term performance of a company's stock price is the earnings and assets making it valuable.
- In considering BIST Manufacturing Industry Index, it can be recommended that the investors may use Assets Growth Ratio to predict the volatility of stock prices (VSP) because it is the most sensitive ratio to the volatility of stock prices and explanatory in the model, but negatively.
- It can be suggested that the regulatory authorities should focus on insider trading to improve the competiveness and international efficiency in emerging markets because of unequal access to financial performance rates.
- Politics should develop policies to increase the contribution of the stock market to the development and economic growth. Realizing all variables on the volatility of stock prices is very important in terms of economic, financial and political future. Therefore, macroeconomic variables which have long-term relationships with stock prices must be meticulously monitored in terms of individual and institutional investors in stock markets.

REFERENCES

AKBARI, S. M. AND DADRASMOGHADAM, A. (2015). Relationship between Financial Ratios in the Stock Prices of Agriculture-Related Companies Accepted On the Stock Exchange for Iran. *Research Journal of Fisheries and Hydrobiology*, 10(9), May , 586-591.

AKTAS, R. AND UNAL, S. (2015). The relationship between Financial Efficiency Ratios and Stock Prices: an Empirical Investigation on Insurance Companies Listed in Borsa Istanbul. *Finansal Araştırmalar ve Çalışmalar Dergisi*, 7(12), Ocak, ss.1-16.

AYDEMIR, O. ÖGEL, S. AND DEMIRTAŞ, G. (2012). Hisse Senetleri Fiyatlarının Belirlenmesinde Finansal Oranların Rolü, Yönetim ve Ekonomi: *Celal Bayar Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 19(2):277-288.

BALTAGI, B.H.(1995). Econometric Analysis Of Panel Data, John Wiley and Sons, New York, 458p.:13

BASU, S.(1977). Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of The Efficient Market Hypothesis. *The Journal of Finance*, 32(3):663-682.

BAYRAKDAROGLU, A. (2012). An Empirical Study on Performance Criteria's Explanatory Power of Stock Returns. *The Journal of Accounting and Finance,* January, pp.139-153.

BAYRAKDAROGLU, A., MIRGEN, C., KUYU, E. (2017). Relationship between profitability ratios and stock prices: an empirical analysis on BIST-100. *PressAcademia Procedia (PAP),* V.6.,p.1-10.

BÜYÜKŞALVARCI, A. (2011). finansal analizde kullanılan oranlar ve hisse senedi getirileri arasındaki ilişki: ekonomik kriz dönemleri için imkb imalat sanayi şirketleri üzerine ampirik bir uygulama. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi,* 25(1):225-240.

CANBAŞ, S., DÜZAKIN, H. AND KILIÇ, S.B. (2002). Fundamental and Macroeconomic Information for Common Stock Valuation: TheTurkish Case. *Yapı Kredi Economic Review*, 13(1):55-64.

CENGIZ, H., & PÜSKÜL, A. Ö. (2016). Hisse Senedi Getirileri ve Karlılık Arasındaki İlişki: Borsa İstanbul Endeksinde İşlem Gören İşletmelerin Analizi. *Yalova Sosyal Bilimler Dergisi*, 7(12):295-306.

DAMIEN, PAUL (1997), Economic Value Added Model to Assess Bank Performance. University of Michigan Business School Working Paper.

DWYER, G. JR. AND HAFER, R. W. (1990). The Stock Market: Bubbles, Volatility, and Chaos. Springer Science+Business Media, New York, pp.3.

Finnet 2000 Plus. http://www.finnet2000plus.com/(23.03.2018).

GONCHAROV, I. (2015). Fair Value Accounting, Earnings Volatility, and Stock Price Volatility. Lancaster University, Management School, Lancaster, pp.29-30.

GUJARATI, D.N. (1999). Temel Ekonometri , (Çev. Ü. Şenesen, G.G.Şenesen), *İstanbul, Literatür*, 849s.

GUTAM, R. (2017). Impact of Firm Specific Variables on Stock Price Volatility and Stock Returns of Nepalese Commercial Banks. *International Journal of Research in Business Studies and Management,* 4(6):33-44.

GÜNGÖR, B., YERDELEN, K. C. (2015). Determination Of The Factors That Affect Share Prices Using Dynamic Panel Data Analysis. *The Journal of KAU IIBF,* 6(9):149-168.

GREGORIOU, G. (2009). Stock Market Volatility. CRC Press, New York, pp.3-4-8.

HABIB, Y., ZERNIGAH, I.K. AND MUHAMMAD A.K (2012). Dividend Policy and Share Price Volatility: Evidence from Pakistan. Global *Journal Of Management AndBusiness Research*, 12(5):78-84.

HORASAN, M. (2009). Fiyat/Kazanç Oranının Hisse Senedi Getirilerine Etkisi: MKB30 Endeksi Üzerine Bir Uygulama. Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi, 23(1):181-192.

HSIAO, C. (2003). *Analysis of Panel Data* (Cambridge University Press, Cambridge).

HULL, R.M. (1999). Leverage Ratios, Industry Norms and Stock Price Reaction: An Emperical Investigation of Stock-For-Debt Transactions. *Financial Management, Summer*, 28(2):32-45.

KALAYCI, S. AND KARATAS, A. (2005). Hisse Senedi Getirileri ve Finansal Oranlar iliskisi: MKB'de Bir Temel Analiz Arastırması. *Muhasebe ve Finansman Dergisi*, 27, ss. 146-157.

KALEV, P., S., VD. (2004). Public İnformation Arrival and Volatility of İntraday Stock Returns. *Journal of Banking and Finance*, 28:1441-1467.

KARACA, S. AND KORKMAZ, Ö. (2013). The Factors Affecting Firm Performance: The Case of Turkey. *Ege Academıc Revıew,* 13(2), April, pp.169-179.

KASHYAP, A. (2016). Financial Market Regulations and Legal Challenges in South Asia. IGI Global, Hershey PA, pp.135.

KAYA, A. AND ÖZTÜRK, M. (2015). Muhasebe Karları İle Hisse Senedi Fiyatları Arasındaki İlişki : BİST Firmaları Üzerine Bir Uygulama. *Muhasebe ve Finansman Dergisi*, 67(Temmuz), 37–54.

KENYORU, N. D., KUNDU, S. A., & KIBIWOTT, L. P. (2013). Dividend Policy and Stock Price Volatility. *Research Journal of Finance and Accounting*, 6(6):115-120.

KLEVMARKEN, N.A. (1989). Panel studies: What can we learn from them? Introduction, *European Economic Revie*, 33, 523–529.

KOTHARI, S. P, WARNER. J., B. (2006). Stock Returns, Aggregate Earnings, Surprises, and Behavioral Finance. Journal of Financial Economics, 79.

LEWELLEN, J. (2002). Predicting Returns with Financial Ratios. Social Science Research Network Working Paper Series, 4371(2).

MENIKE, M. G. P. D. AND PRABATH, U. S. (2014). The Impact of Accounting Variables on Stock Price: Evidence from the Colombo Stock Exchange, Sri Lanka. *International Journal of Business and Management*, 9(5).

MURADOGLU, G. AND WHITTINGTON, M. (2001). Predıctabılıty of uk stock returns by usıng debt ratıos. CUBS Faculty of Finance Working Papers, 5, October, pp.1-24. http://papers.ssrn.com/abstract=287653/.

MRAMOR, D. AND MARMOR-KOSTA, N. (1997). Accounting Ratios as Factors of Rate of Return on Equity. New Operational Approaches for Financial Modeling. Heidelberg: Physica-Verlag, pp. 335-348.

MRAMOR, D. PAHOR, M. (2000). Testing Nonlinear Relationships Between Excess Rate of Return on Equity and Financial Ratios. *Faculty of Economics, University of Ljubljana.*

Mynet Finans. https://finans.mynet.com/tarihselveriler/(05.04.2018).

OMRAN, M. RAGAB, A. (2004). Linear Versus Non-Linear Relationships Between Financial Ratios and Stock Returns: Empirical Evidence Form Egyptian Firms. *Review of Accounting and Finance*, 3(2):84-102.

OZEN, E., YESILDAG, E., AND SOBA, M. (2015). TOPSIS Performance Evaluation Measures and Relation Between Financial Ratios and Stock Returns. Journal of Economics Finance and Accounting, 2(4).

PARLAKKAYA, R. & KAHRAMAN, Ü. M. (2017). Muhasebe Bilgilerinin Hisse Fiyatlarını Açıklama Düzeyi Üzerine Bir Araştırma: Bist100 Uygulaması. *Selçuk Üniversitesi İktisadi ve İdari Bilimler Fakültesi Sosyal Ekonomik Araştırmalar Dergisi,* 17(33):46-58.

PROFILET AND BACON (2013). Dividend Policy and Stock Price Volatility in the U.S. Equity Capital market. *Proceedings of ASBBS*, 20(1).

SEVIM, U. (2016). İşletme Finansal Oranlarının Hisse Senedi Getirileri Üzerine Etkisi: BİST 100 İmalat İşletmeleri Örneği. *Eskişehir Osmangazi Üniversitesi İİBF Dergisi,* 11(2):221-235.

SHARIF, T., PUROHIT, H., & PILLAI, R. (2015). Analysis of Factors Affecting Share Prices: The Case of Bahrain Stock Exchange. *International Journal of Economics and Finance*, 7(3):207-216.

SHILLER, R, J. (1989). Market Volatility. The MIT Press, London, pp.5.

SULEMAN, M., ASGHAR M., ALI SHAH, S., & HAMID, K. (2011). Impact of dividend policy on stock price risk: Empirical evidence from equity market of Pakistan. *Journal of Finance*, 4(1), 45-52.

ŞAMILOĞLU, F. (2005). Hisse Getirileri ve Fiyatlarıyla, Kazanç ve Nakit Akımları Arasındaki İlişki: Deri ve Gıda Şirketlerinde Ampirik Bir İnceleme. İstanbul *Üniversitesi İşletme Fakültesi Dergisi*, 26:120-126.

TESFATSION, L. (2004), Financial Market Illustrations: Some Stock-Market Basics. Pearson Addison-Wesley.

YILGÖR, A. G. (2005). İşletmelerde borçlanma düzeyindeki değişimin hisse senedi getirileri üzerindeki etkileri. *D.E.Ü.İ.İ.B.F.Dergisi*, 20(1).15-28.