T.C.
UNIVERSITY OF GAZİANTEP
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF BUSINESS ADMINISTRATION

RELATIONSHIP BETWEEN FINANCIAL RATIOS AND THE VOLATILITY OF STOCK PRICES: AN ECONOMETRIC APPLICATION ON BIST MANUFACTURING INDUSTRY INDEX

MASTER'S THESIS

METİN, YİĞİTUŞAĞI

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Supervisor: Asst. Prof. Dr. Erkan ALSU

GAZİANTEP
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T.C.
GAZİANTEP ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
İŞLETME ANA BİLİM DALI

Finansal Rasyolar ile Hisse Senetleri Fiyat Oynaklığı Arasındaki İlişki: BİST İmalat Sektörü Üzerine Ekonometrik Bir Uygulama

METİN YİĞİTUŞAĞI

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Relatıonshıp between Fınancıal Ratıos and the Volatılıty of Stock Prıces: An Econometrıc Applıcatıon on BIST Manufacturing Industry Index

METİN YİĞİTUŞAĞI

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Prof.Dr. Mustafa Paksoy
Head of Department

This is to certify that I(we) has(have) read this thesis and that in my(our) opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master's of Art/Doctor of Philosophy.

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ABSTRACT

RELATIONSHIP BETWEEN FINANCIAL RATIOS AND THE VOLATILITY OF STOCK PRICES: AN ECONOMETRIC APPLICATION ON BIST MANUFACTURING INDUSTRY INDEX

YİĞİTUŞAĞI, Metin

M. A. Thesis, Department of Business Administration

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The aim of this study is to determine the relationship between financial ratios 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, Leverage 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.

Key words: Financial ratios, Volatility, Stock price, Panel Data Analysis.

ÖZET

FİNANSAL RASYOLAR İLE HİSSE SENETLERİ FİYAT OYNAKLIĞI ARASINDAKİ İLİŞKİ: BİST İMALAT SEKTÖRÜ ÜZERİNE EKONOMETRİK BİR UYGULAMA

YİĞİTUŞAĞI, Metin

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Bu tezin amacı, panel veri tekniği gibi bir ekonometrik analiz kullanarak finansal rasyolar ile 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, kaldıraç oranı, 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 taşıyor.

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

CONTENTS

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SECTION ONE
INTRODUCTION

1.1. INTRODUCTION

In this study, we try to demonstrate the relationship between financial ratios 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, we will examine the factors of volatility 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 are mentioned and then the findings obtained from the analyses are evaluated and recommended to investigate the performance of firms.

SECTION TWO
LITERATURE REVIEW

2.1. LITERATURE REVIEW

Throughout the history of stock exchange, firstly investors and then brokers, dealers, traders and 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 under two titles.

2.1.1. National Studies

In the literature, many studies estimating stock returns by financial ratios have been conducted. Here are some of the studies done with stock returns such as return on assets, return on equity, earnings per share, price/earnings ratio, interest, tax and amortization profit, market value/book value, net profit margin as accounting basis performance criteria.

Demir and others (1997) didn't find a meaningful relationship between shareholder turnover and Price/Earnings based on the period between 1992-1994 the years.

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.

Canbaş, Düzakın and Kılıç (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.

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.

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.

Muradoglu and Sivaprasad (2008) studied 2,673 companies listed in the London Stock Exchange from 1965 to 2004. An empirical test on leverage and stock returns revealed that there is positive relationship between leverage and stock returns which is unique to utilities, a risk class that is highly regulated and has high concentration of leverage ratio.

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.

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.

Bayrakdaroglu (2012) analyzes 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) analyze 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.

Demir and Güvercin (2015) examine the role of earnings disclosures on company value, taking into account earnings stability and certain other firm-specific information. Earnings announcements affect company value. Especially, under the announcement of positive earnings, the value of the company has increased and the value of the company has decreased under the negative earnings surprise.

Cengiz and Püskül (2015) 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.

Aktas and Unal (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.

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.

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.

Ozen 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.

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.

2.1.2. International Studies

The importance of volatility is generally in the section of financial economic. Therefore, analysts, such as Gregoriou, (2009) 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.

Share prices aren't real values. They do not follow coincidental steps and they are not simply and uniquely connected to fundamentals that is, financial ratios. They are very complex and they have incomplete information, so investors create various expectations of future performance. Therefore, at any moment, they evaluate stock prices differently because stock exchanges aren't as informationally efficient as we can suppose. At this point, it's important to find inaccurate price contributing to volatility when volatility blows up (Schwartz, 13).

In their study, 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.

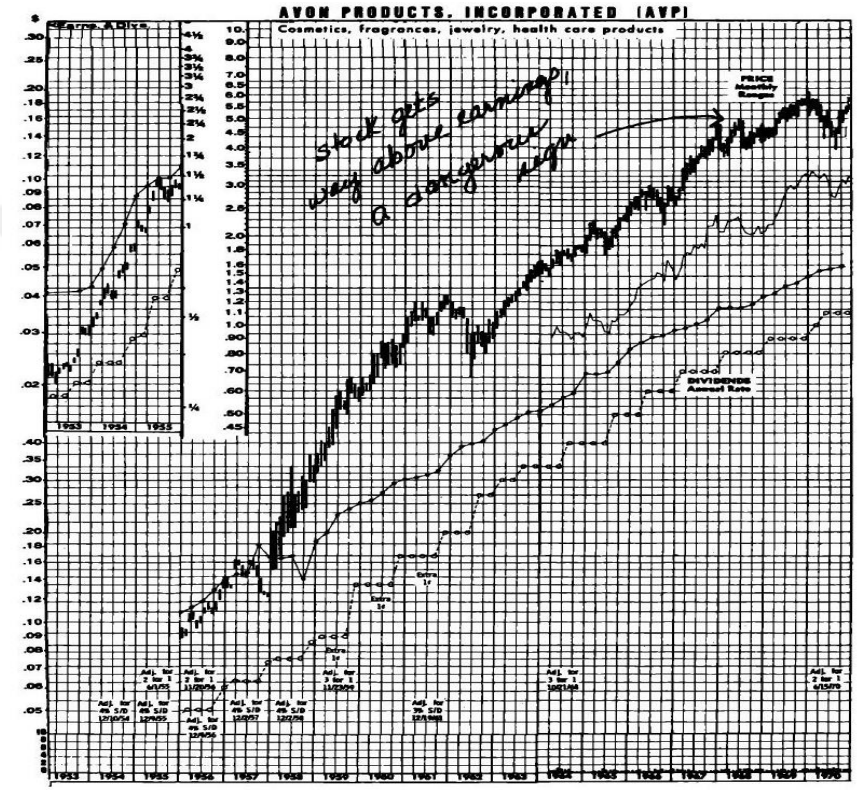
In the realm of the valuation of stock prices, in his book, Madden (1999) claims that lots of managements believe that the stock prices are driven by EPS that is, earnings per share and this assumption has been confirmed by the observations of the volatility of stock prices just after announcements of quarterly EPS either positive or negative, but he shows that a firm's CFROI is far superior to a firm‘s EPS in explaining changes in stock prices. In fact, he claims that financial ratios strongly affect changes in stock prices.

Robert J. 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.

In their book, Lynch and Rothchild (1989) ask what makes a company valuable and why it will be more valuable tomorrow than today and then answers it earnings and assets especially earnings that is, financial ratios.

Table 2.1. Price and P/E ratio



ply, the multiple. This ratio is a numerical shorthand for the relationship between the stock price and the earnings of the company. The p/e ratio for each stock is listed in the daily stock tables of most major newspapers, as shown here.

In his paper, Clifford tries to answer two basic questions of the volatility of stock prices. The first one is what can be said about the reasons of the volatility changes and the second one is why it must care how volatile share prices are. He states that there is a relation between macroeconomic variables and the volatility of stock markets based on the statistical analysis performed by Schwartz. According to Schwartz's analysis, financial leverage affects stock market volatility. He also finds another relation between trading activity and share volatility (Clifford, 954).

There are not enough studies in the international literature and our national literature that examine the effects of earnings disclosures on company value. In the international literature, one of them is that Ball and Brown (1968) studied the effect of the difference between the expected profit and the expected profit at the time of earnings disclosures on the price of stocks. They conclude that good news namely positive earnings increase the market price of company stocks, but bad news (negative earnings) reduce the price of company stocks.

Basu (1977) examines 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.

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.

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

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.

Dann and Mikkelson, Eckbo, Mikkelson and Partch (1999) found that debt announcements showed statistically meaningless negative price reaction to the debt announcement.

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.

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.

In their book, Fontanills and Gentile (2003) claim that in general volatility stems from the arrival of new information about companies. When investors have fresh and the most actual news including company earnings, fundamentals, interest

rates, and growth rates about the country economy, they try to use these news and information to make buying and selling decisions immediately. So from this collective behaviour, the potential for aggressive buying and selling which creates a high volatility occurs. For example, when investors receive unexpected news or breaking news, they feel re-evaluate their expectations about share prices, which may bring about an aggressive buying and selling. In this case, such emotions as the panic in 2001 Turkey's crisis begin making those decisions, and then volatility is able to run up. The most common cause for volatility is over earnings. A company will sometimes declare the earnings which are less than investors expect. As it comes as a big surprise, the stock price often decreases because of the report. From the other perspective, a company declares that earnings will be better than investors expect, in this time, the stock price will sharply increase because of this positive surprise. In short, earnings are a major vigour of volatility.

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.

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.

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.

Some researchers such as Gregoriou, (2009) categorize the financial markets into informed and uninformed segments. Uniformed investors react to the changes in prices as if they have new information, so they will move prices and increase price volatility, but informed investors make their trades on fair values based on fundamentals.

Suleman et al. (2011) studied 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 and others (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.

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.

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.

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.

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.

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.

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.

2.2. FINANCIAL RATIOS

Financial ratios are the most common and powerful tools to analyse a company's financial situation, which helps investors, creditors and managers of the company to see how well a firm is performing and improving. Ratios are a bit complex to understand, but simple to compute. The features of ratios let us make a comparison between companies in terms of sectors, big and small to state either their powerful sides or weak sides. The financial Ratio Analysis has been developed over many years and it has become a tool of evaluation (Arkan, 2016:13-26). Finally, financial ratios allow us to both make comparison with companies and identify their strengths and weaknesses. They are generally classified into seven main categories: liquidity, solvency, efficiency, profitability, market prospect, investment leverage, and coverage (www.myaccountingcourse.com). In this study, the subcategories of these main categories such as Price/Earning, Assets Growth, Stock Turnover Ratio, Leverage Ratio etc. will be used as follows.

2.2.1 Price / Earnings Ratio (P/E)

Certain ratios are used to compare companies in terms of financial performance and to accelerate the investment decision process. Price/Earnings is also

one of the methods used to compare companies' performances. Price/Earnings is calculated by dividing the current stock price of the company by the profit per share. Earnings per share are calculated by dividing the company's period profit (after deducting dividend distributions) by the number of shares. If the P/ E ratio is high, the price of the stock will be high if it is high, and if it is low, the share price can be interpreted as cheap. In fact, in summary, the P/E rate is based on the idea that a company must be proportionate to its share price, which is traded on the market.

Another point of view is that the current profit of companies with a high price-earnings ratio is underestimated by investors and the expectation that these companies will make high profits in the future and investors want to pay more for this company's shares. At this point, the most important thing that investors should pay attention here is to determine whether the company has been manipulated. In other words, analysing a firm's stock value based on earnings and assets is not different from analysing a pharmacy, laundry or store that we want to buy. We can understand the importance of earnings on any chart with the earnings indicator which runs alongside the stock price. In charts in general, Lynch and Rothchild (1989) point out that two lines involving earnings and stock prices will move together in tandem or if not, the stock price will catch earnings line sooner or later.

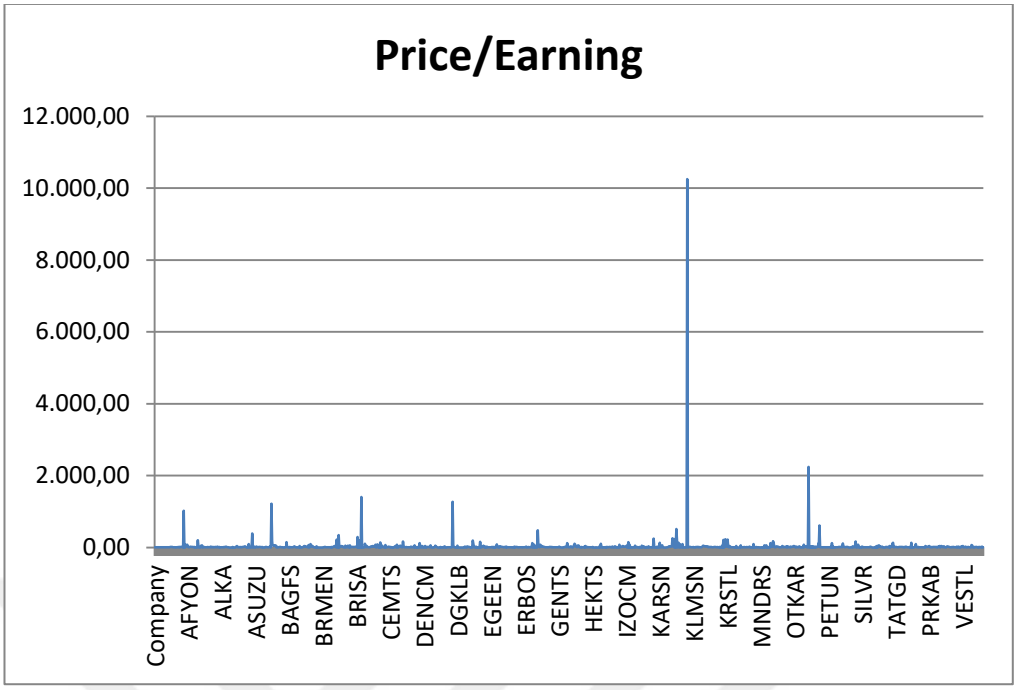
The price earnings ratio formula is calculated by dividing the market value price per share by the earnings per share as in the following formula:

Price Earnings Ratio = Market Value Price per Share / Earnings per Share

A firm that has a lower P/E ratio may show weak current and future performances, but in this case, we must also pay attention to its sector avearage. This may cause a poor investment, but a higher P/E may cause a strong investment (www.myaccountingcourse.com).

In this stage, we will give the examples and their descriptive statistics of P/E ratios of the companies in manufacturing industry in Borsa Istanbul.

Table 2.2. P/E raatio



As seen in table 2.2 and table 2.3, USAK has the lowest Price/Earning at 0. KERVT has the highest Price/Earning at 10253. The mean of the sample of the manufacturing industry in Borsa Istanbul is 28,45. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 262,79.

Table 2.3. Descriptive Statistics of P/E Ratio

Price/Earning	
Mean	24,709719
Standard Error	2,7545327
Standard Deviation	101,32038
Sample Variance	10265,82
Minimum	0
Maximum	2238,4301
Sum	33432,25
Count	1353

2.2.2. Return on Assets Ratio

An asset is a resource with economic value that a corporation owns or controls with the expectation and it will provide future benefits and profits for the company by produecing cash inflows and decreasing cash outflows . Total Assets reported on a company's balance sheet based on the concept of historical cost or book value are bought or created to increase the value of a firm or benefit the firm's

operations. So it is very important for a company to have assets growing regularly because investors will pay attention to this. Assets can be broadly categorized into short-term (or current) assets, fixed assets, financial investments and intangible assets.

The sustainable growth rate means the asset growth resulting from a continuation of capital structure for a year (Madden, 1999:169).

If a company grows to reach its target, it must be sensitive how quickly it grows (the asset growth rate) and how it grows (the mix of debt and equity financing) (Cleverley and Cleverley, 2018:261).

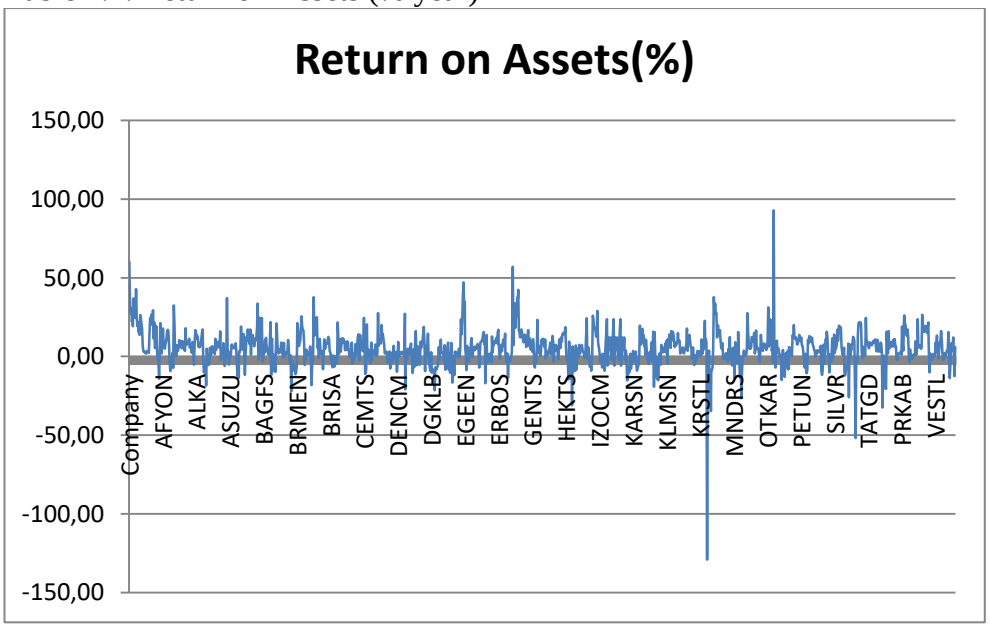
In addition, it gives an idea of how efficient management uses its assets to generate earnings. It is displayed as the percentage of return on assets calculated by dividing the annual earnings of a company by the total assets. Sometimes this is called "investment return".

ROA= net earnings /total assets

The greater the coefficient at the end of this calculation is, the more successfully the companies are in creating profits.

In this stage, we will give the examples and their descriptive statistics of ROA ratios of the companies in manufacturing industry in Borsa Istanbul.

Table 2.4. Return on Assets (% year)



As seen in table 2.4 and table 2.5, KUTPO has the lowest return on assets at -128,93. PRKME has the highest return on assets at 92,80. The mean of the sample of the manufacturing industry in Borsa Istanbul is 4,94. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 10,63.

Table 2.5. Descriptive Statistics of Return on Assets

Return on Assets	
Mean	5,18139257
Standard Error	0,29014394
Standard Deviation	10,6724075
Sample Variance	113,900282
Minimum	-128,93085
Maximum	92,7984346
Sum	7010,42415
Count	1353

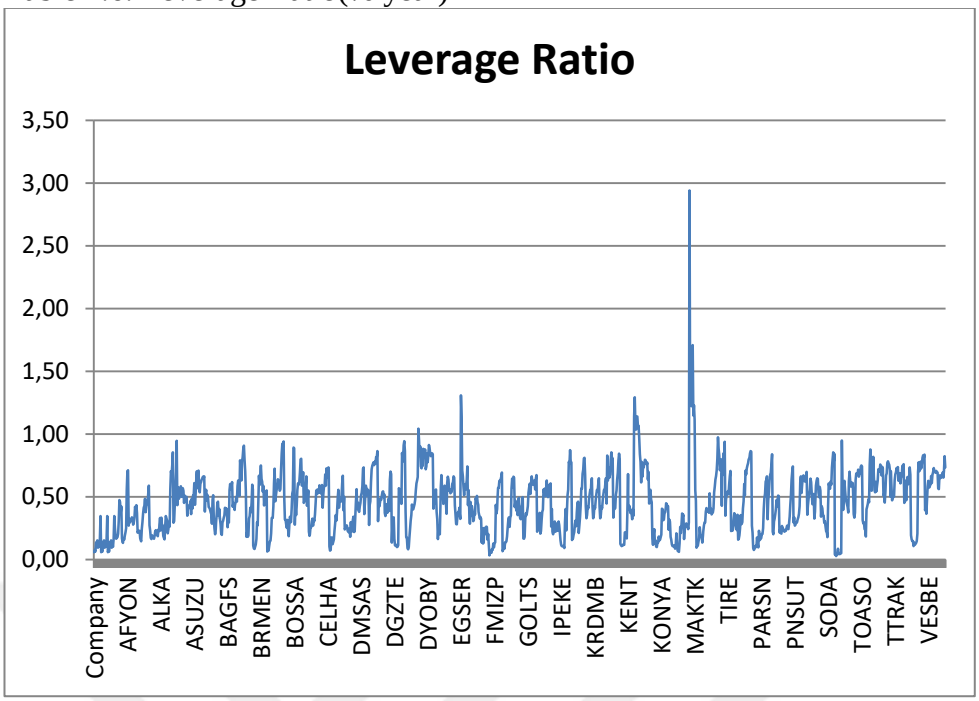
2.2.3. Leverage Ratio

Total Debts / Total Assets: This ratio, also expressed as the leverage ratio, indicates how much of the assets are covered by foreign resources. In other words, this high ratio indicates that the firm is financed in a speculative manner, that the security margin for the lenders is narrow, that the firm is under high interest burden, and therefore the firm may fall into difficulty during interest and principal repayment obligations.

It is very important that the equilibrium is very well maintained in this area. The fact that this ratio is too high means that the firm cannot meet its fixed obligations; this ratio is too low, suggesting that the company missed the opportunity to benefit from tax savings.

Lower interest rate is not the only factor causing the increases of debt level but also less documented in credit processes and appetite taking risk (Dickson and Shenkar, 2010:19).

Table 2.6. Leverage Ratio(% year)



As seen in table 2.6 and table 2.7, SNPAM has the lowest return on assets at 0,03. KUTPO has the highest return on assets at 2,94. The mean of the sample of the manufacturing industry in Borsa Istanbul is 0,43. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 0,26.

Table 2.7. Descriptive Statistics of Leverage Ratio

Leverage Ratio	
Mean	0,452334215
Standard Error	0,006652375
Standard Deviation	0,244695298
Sample Variance	0,059875789
Minimum	0,027369001
Maximum	2,939811625
Sum	612,0081933
Count	1353

2.2.4. Net Profit Growth(%)

Net profit for the period is calculated as net of all. It is a value that reflects your actions. We find a net profit margin by dividing net period profit to sales. It is a fact that allows us to reach a judgment on all of our companies' operating, investment and financing policies.

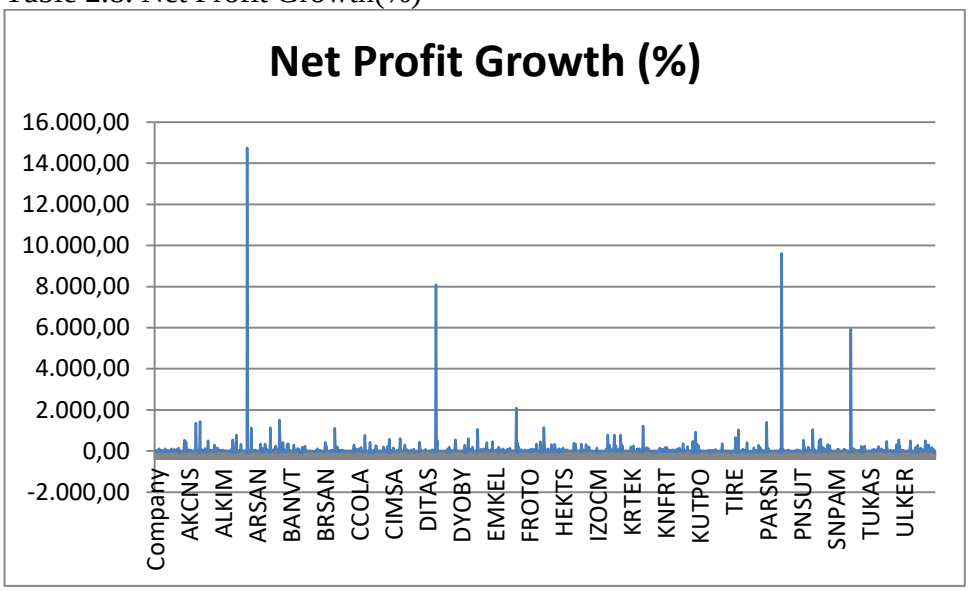
It will give significant consequences of net profit margin compared to companies in the same line of business and their past periods. By comparing it in this way, We can learn many important results and information about the development of companies. For example, if the long-term growth rate of a company's net profit is equal to the P/E rate, then the company is neither overvalued nor valuable. If the P/E ratio is greater than the long-term growth rate then the company is overvalued. If the P/E ratio is lower than the growth rate, then we may have found a company that is trading lower than its value.

Therefore, the development of profit margin has a special significance. The net profit growth rate used to measure the changes in net period profitability in periods allows us to compare the rate of increase in profitability of companies compared to other companies and also to compare with the growth rates of companies in previous periods.

Net profit margin varies from sector to sector and must be compared against competitors or sector average. Also a strong franchise, large economy of scale and price war may affect net profit margin (Ang and Chng, 2013).

What is an indicator for growth?. Revenue and net profit growth are useful measures, but work best with gross margin (BusinessNews Publishing, 2013:35).

Table 2.8. Net Profit Growth(%)



As seen in table 2.8 and table 2.9, KLMSN has the lowest net profit growth at -99,85. ASUZU has the highest return on assets at 14,74. The mean of the sample

of the manufacturing industry in Borsa Istanbul is 89,34. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 980,25.

Table 2.9. Descriptive Statistics of Net Profit Growth

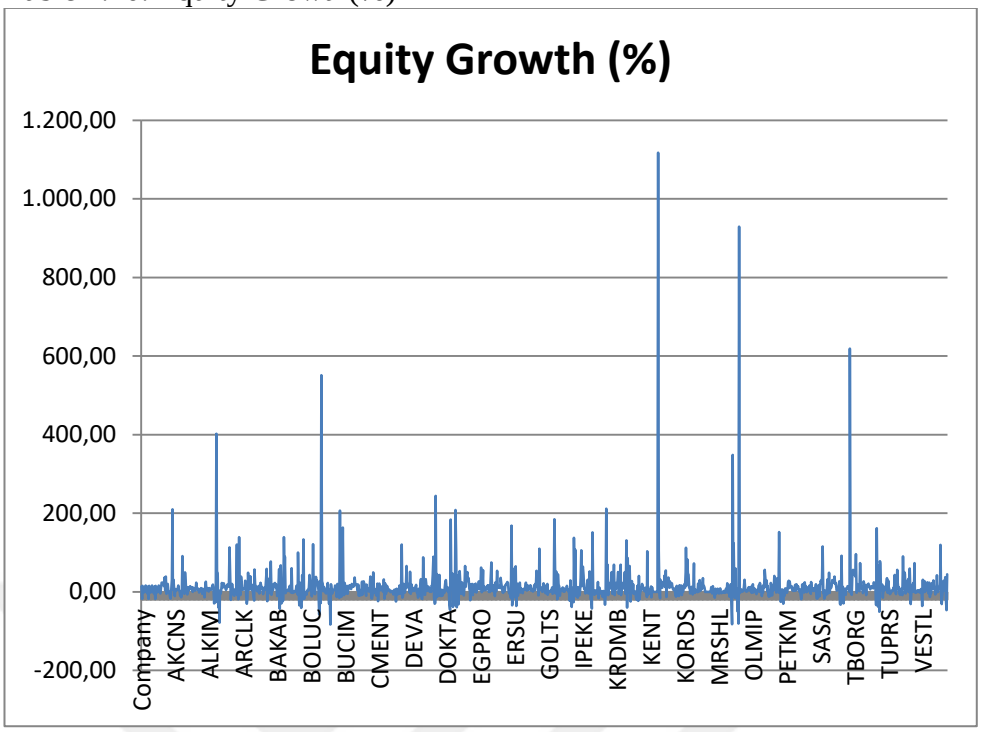
Net Profit	
Mean	407,989332
Standard Error	403,211743
Standard Deviation	14831,3974
Sample Variance	219970348
Minimum	-322,2144
Maximum	545549,844
Sum	552009,567
Count	1353

2.2.5. Equity Growth(%)

An owner of the business or the owners own documents. Assuming that the business does not receive credit and the market borrower provides it, it is the sum of equity. On the other words, the difference between the sum of assets and liabilities constitutes the entrepreneur's interest in the business (equity capital). It is registered in the equity capital liability table and the totals of the active and passive statements are equalized.

If a company has a sustainable growth in terms of long-term financial mission, it must have a healthy equity growth. A healthcare company expecting to have a low equity growth in the future can’t usually get the sufficient resources to reach its financial target. In short, a company’s equity growth rate most likely depicts its potential assets growth over the next decade (Cleverley and Cleverley, 2018:262).

Table 2.10. Equity Growth(%)



As seen in table 2.10 and table 2.11, ASUZU has the lowest equity growth at -38,08. KERVT has the highest equity growth at 1117. The mean of the sample of the manufacturing industry in Borsa Istanbul is 17,40. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 60,55.

Table 2.11. Descriptive Statistics of Equity Growth

	Equity Growth
Mean	7,85766
Standard Error	0,817438
Standard Deviation	30,06795
Sample Variance	904,0818
Minimum	-431,939
Maximum	617,7885
Sum	10631,41
Count	1353

2.2.6. Company Value /Book Value

Company Value /Book Value is another important ratio we use for company valuation and stock selection. The English abbreviation is used as EV / EBITDA. Enterprice Value / Earnings Before Interest, Tax, Depreciation, Amortization.

There is no definite level of EV / EBITDA, but it varies from 5 to 14 on average. The lower EV / EBITDA, the more favorable the company is. Of course,

when choosing a stock, we would like to take into account not only the EV / EBIT, but also the P / E ratio, MV / BV ratio, which we mentioned in our previous note. EV / EBITDA ratio gives advantages in analyzing below:

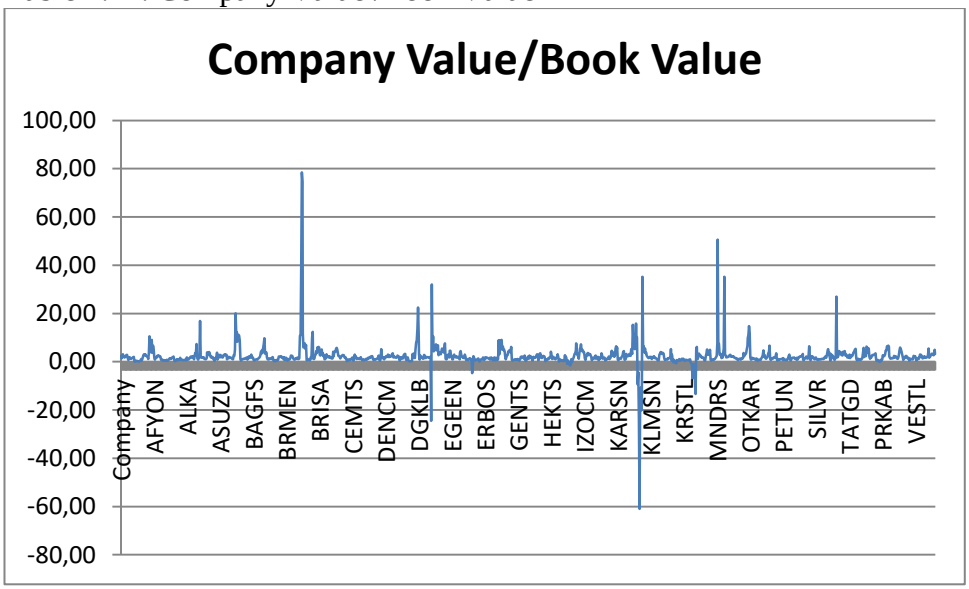
- To abolish taxation differences between countries,
- Company's capacity to generate profits in the future, (how much profit it will provide from its usual activities).
- The possibility of analyzing the operating profit by taking into account the profits provided by the company, not the temporary and profitable profits (the analysis on the operating profit may be more healthy than the analysis on the period profit because the period profit may be temporary, unusual, extraordinary or one time profit increase).

On the other hand, the EV / EBITDA ratio also has some disadvantages;

- Since there is no standard calculation, it may change according to the person.
- It is used for long term analysis, not for short term analysis (this is actually an advantage for us)
- Calculations are not appropriate for the banking sector and complex sectors.

As a result, EV / EBITDA gives us important information for a stock, which is a positive situation for our long-term investments. But we have to look at P / E, MV / BV ratios, balance sheet analysis, sector analysis, not just EV / EBITDA ratio.

Table 2.12. Company Value /Book Value



As seen in table 2.12 and table 2.13, KERVT has the lowest Company Value /Book Value at -60,90. BFREN has the highest Company Value /Book Value

at 78,45. The mean of the sample of the manufacturing industry in Borsa Istanbul is 2,06. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 4,61.

Table 2.13. Descriptive Statistics of Company Value /Book Value

Company Value /Book Value	
Mean	2,350073
Standard Error	0,132027
Standard Deviation	4,856362
Sample Variance	23,58426
Minimum	-60,9045
Maximum	78,44924
Sum	3179,649
Count	1353

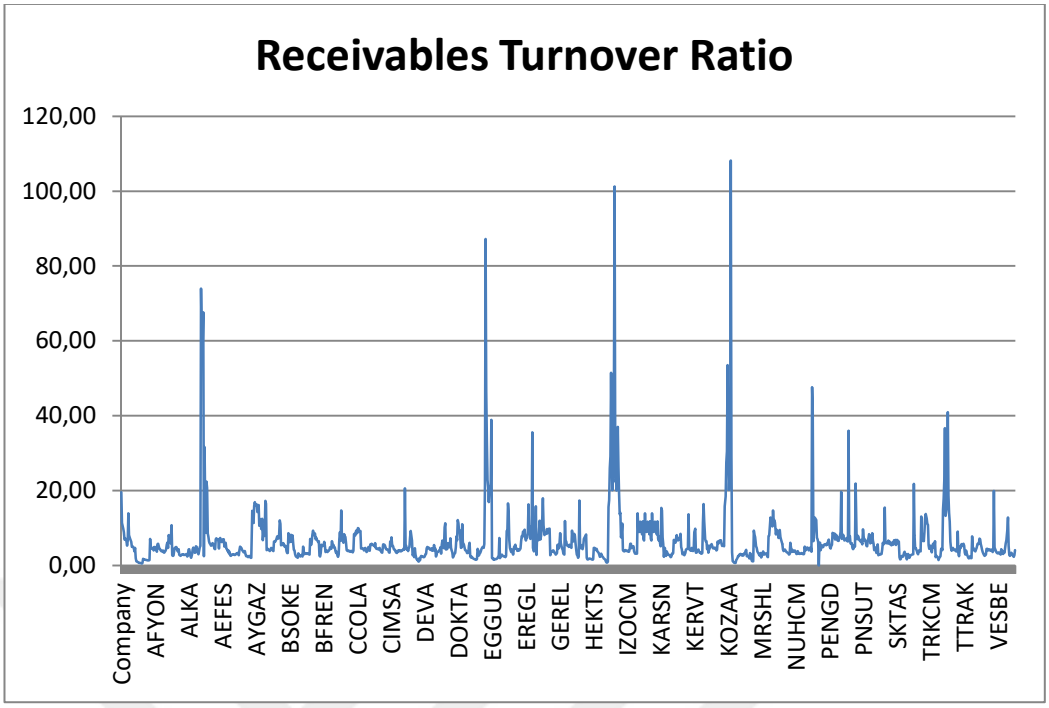
2.2.7. Receivables Turnover Ratio

This is a measure of the ability of receivables to pay. This is called the quickness of what you will get into the money. The receivables turnover rate is calculated by dividing the amount of credit sales in an accounting period by the sum of trade receivables at the end of the year.

Receivables Turnover = Sales Revenue / Avg. Accounts Receivable

It shows how many times your trade receivables turn into sales. In general, the increase and increase of the turnover rate is interpreted as a good indicator.

Table 2.14. Receivables Turnover Ratio



As seen in table 2.14 and table 2.15, FROTO has the lowest Receivables Turnover Ratio at 0,01. KOZAA has the highest Receivables Turnover Ratio at 108,21. The mean of the sample of the manufacturing industry in Borsa Istanbul is 8,50. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 52,54.

Table 2.15. Descriptive Statistics of Receivables Turnover Ratio

Receivables Turnover Ratio	
Mean	6,50980565
Standard Error	0,20830665
Standard Deviation	7,66217456
Sample Variance	58,7089189
Minimum	0,01050799
Maximum	108,211887
Sum	8807,76705
Count	1353

2.2.8. Current Ratio

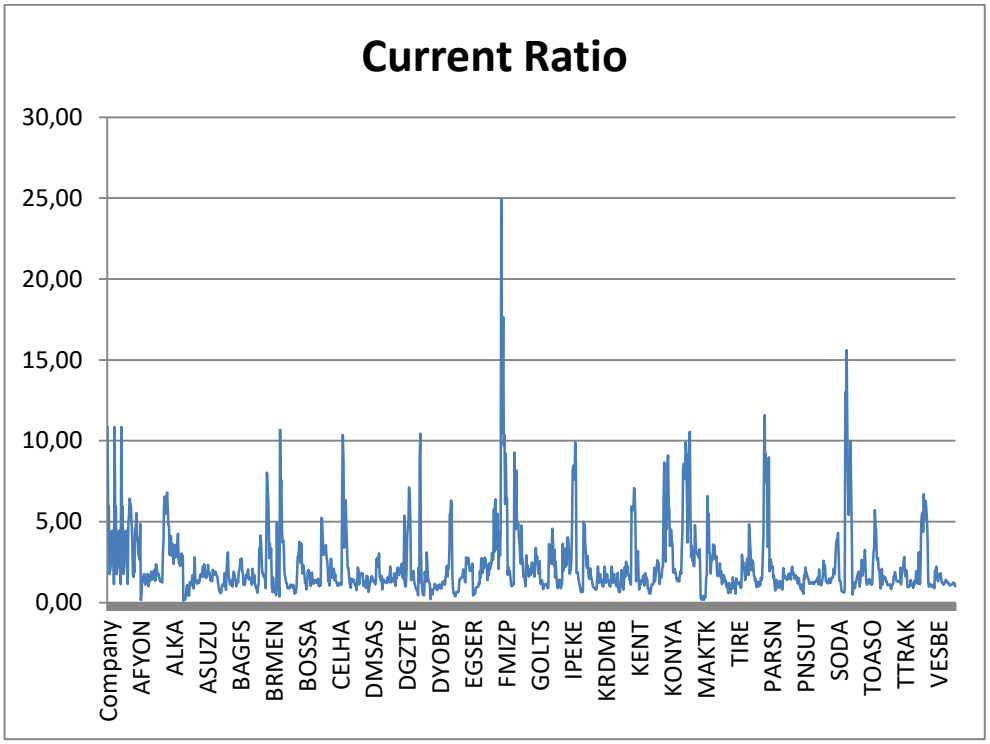
The current rate gives information about the short term debt payment power of the company. The current ratio is the most commonly used ratio among the liquidity ratios. Current assets are divided by short-term liabilities.

Current Ratio = Total Current Assets / Total Short Term debts

In other words, the amount of debt the company has to pay within a year is less than the amount of assets that can be converted into cash in a year? In this case, debt is more than assets, so a problem occurs. Of course the company is not going to be ruined because of this problem, but most likely the need for new borrowing to solve this problem occurs. When you borrow a new debt, both the liabilities and the financing allowance of the company increase, by resulting in a net profit decrease. Everything actually depends on the financial charts, once you understand the logic, the rest is easy.

If we come to an interpretation of our current rate here, the event is a bit confused. 2 as a rate is generally regarded as a security limit for a company. If it is not lower than 1, then it must be our absolute choice. When interpreting rates, you need to evaluate them on their own. The current assets we use when calculating the current rate include the company's stocks. If the company has a high inventory turnover rate, that is, if it can shorten its inventories in a short period of time, then our current ratio does not need to be 2 but it is not a good sign to be below 1 so always accept 1 as the minimum value. In general, the increase in the rate over the years means that the company's current debt servicing power has increased.

Table 2.16. Current Ratio



As seen in table 2.16 and table 2.17, KRTEK has the lowest Current Ratio at 0,10. FMIZP has the highest Current Ratio at 24,98. The mean of the sample of the manufacturing industry in Borsa Istanbul is 2,26. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 2,44.

Table 2.17. Descriptive Statistics of Current Ratio

	Current Ratio
Mean	2,312834453
Standard Error	0,056775349
Standard Deviation	2,088376086
Sample Variance	4,361314676
Minimum	0,100656373
Maximum	24,97595532
Sum	3129,265015
Count	1353

2.2.9. Volatility of A Stock Price

Volatility is a statistical measure of the dispersion of returns for a given security or market index. Volatility can either be measured by using the standard deviation or variance between returns from that same security or market index. For example , as in Table 2.12 and Table 2.13 standard deviation was used to measure the volatility of prices.

Table 2.18. Standard deviation of price level and housing

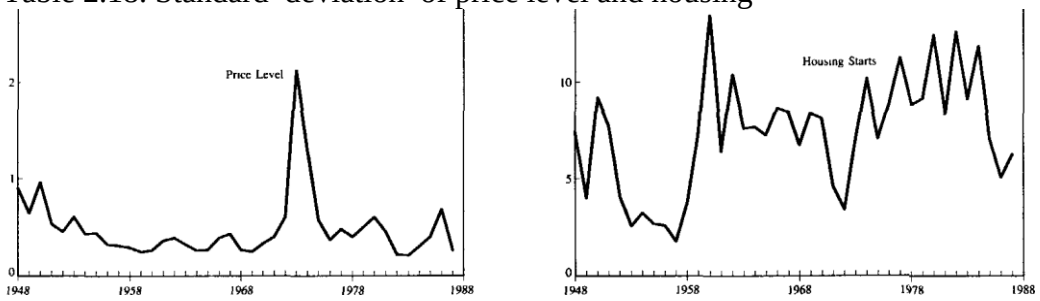
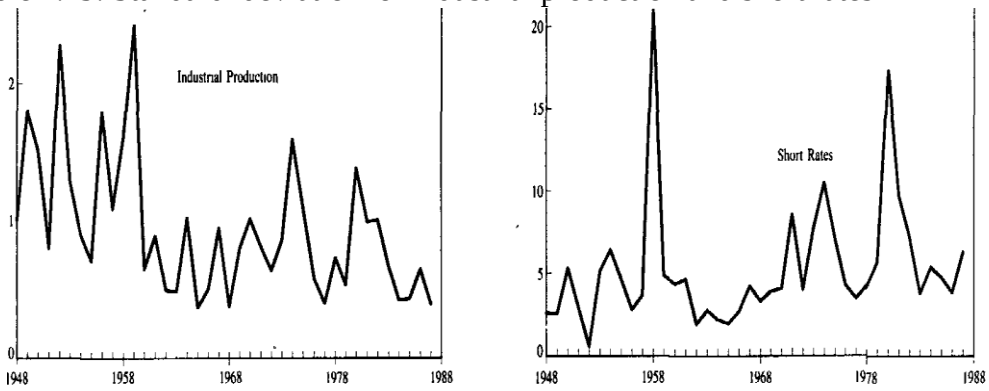


Table 2.19. Standard deviation of industrial production and short rates

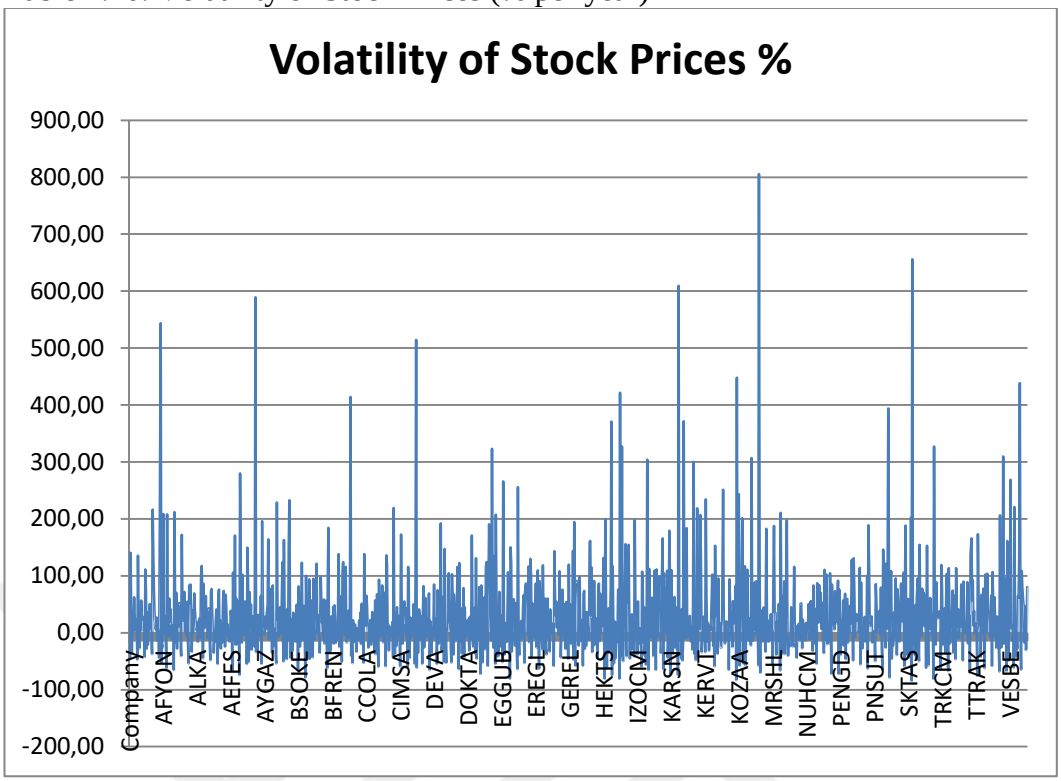


Commonly, the higher the volatility, the riskier the security. In other words, volatility refers to the amount of uncertainty or risk about the size of changes in a security's value. A higher volatility means that a security's value can potentially be spread out over a larger range of values. This means that the price of the security can change dramatically over a short time period in either direction. A lower volatility means that a security's value does not fluctuate dramatically, but changes in value at a steady pace over a period of time. There are certain underlying factors which have a strong influence on the movement of stock prices. In general stock prices will be in greater demand when investors want to get more earnings, so factors which make firms more profitable will bring about a rise in stock prices.

Volatility affecting the stock market is caused by several factors. Many studies demonstrated that domestic economic factors, such as monetary policy, fiscal policies (exchange rate, interest rate and inflation) and economic indicators (industrial production, money supply, real activity and CPI) and internal factors, such as oil prices, the world index (Khositkulporn, 2013:16).

There is a strong evidence that financial asset volatility helps predict future security market volatility; and financial leverage affects stock market volatility. Also the relation between volatility and leverage is not surprising (Clifford, 1989:954).

Table 2.20. Volatility of Stock Prices (% per year)



As seen in table 2.16 and table 2.18, SNPAM has the lowest volatility of stock prices at -83,93. MAKTK has the highest volatility of stock prices at 805,56. The mean of the sample of the manufacturing industry in Borsa Istanbul is 30,13. The standard deviation of the sample of the manufacturing industry in Borsa Istanbul is 78,44.

Table 2.21. Descriptive Statistics of the volatility of Stock Prices

Volatility of Stock Prices	
Mean	30,13442047
Standard Error	2,13245307
Standard Deviation	78,43833757
Sample Variance	6152,5728
Minimum	-83,9285714
Maximum	805,5555556
Sum	40771,87089
Count	1353

SECTION .THREE
METHODOLOGY

3.1. MATERIALS AND METHODS

In this thesis, 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.

3.1.1. 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.

3.1.1.1. Panel Unit Root and Cointegration Tests

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 cointegration between the variables with unit root and 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. Panel unit root tests and panel cointegration 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:

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

Established hypotheses:

H_0: $\beta_i=0$ i =1,2,.....N_i $\beta i=0$ 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.

The cointegration test applied to the panel data tests the absence hypothesis of H_0 thatis, no cointegration.

3.1.2. Linear Panel Data Models

Regression models created using panel data are called panel data regression models. A simple linear panel data regression model is generally expressed as:

$Yit=\beta_{1it}+ \beta_{2it}X_{2it}+.....+ \beta kitXkit+eit$ i=1,2,..N t=1,2,3,...T

In this model, Y represents the dependent variable and X explanatory variables (k-1 units) and e is the error term with zero mean and constant variance, i is the cross-section data size (i = 1, ..., N), t is the time series data size (t = 1, ..., T).

There are three methods that can be used in the estimation phase with pooled regression as the estimation method in both the time and the cross section data. These methods include; Classic Model, Fixed Effects Model and Random Effects Model.

Grene (2010) points out that the main difference between these methods is due to the fixed terms. The same constant term exists for the elements of the pooled regression in the classical model. In the fixed effect model, there is a separate fixed term for each section. But the slope coefficients are the same. In the random effects model, the differences between the units are modeled in error terms.

The classical model is a model in which both constant and slope coefficients are constant with respect to units and time. This model is as follows:

$Y_{it} = \beta_0 + \sum \beta 2it X2it$

Kaya (2009) states that parameters can be estimated by Least Squares method. Since the classical panel regression model does not incorporate the differences between the units and the changes arising from differences over time (exclusionary effects) between the units, fixed and random effect models have been developed to include the exclusionary effects into the model.

The models in which the slope coefficients do not change and the constant coefficients change only for the cross-sectional data or only for the time data or for both data are called "fixed effects model". In other words, if there is a difference between the cross-sections in the panel variables, then the regression model to be formed in this case will be a "one-sided and cross-connected fixed effect model" if there is no temporal variation, connected fixed effects model ". If the source of the fixed term is the difference between the cross-sections and the time, this time the "two-way fixed effect model" will be discussed. Because the difference between the cross-sections is more noticeable than the difference in the time of the panel data analysis, the general representation of the fixed effect model assumes that the differences between the cross-sections can be seen in differences in constant terms.

Baltagi (1995) points out that in the random effects model, the changes that occur according to units or units and time are included as a component of the model, error term. Therefore, to prevent the loss of freedom level in fixed effect models is desired. Karaca (2008) states that because it is important in the model of random effects that the units or the units and the time specific not the presence of coefficients, but the presence of the units or the units and time-specific error components. In addition, the random effects model takes into account not only the effects of differences that occur according to units and time, but also the effects outside the sample.

If the random effects model deals only with the differences between the cross-sectional units, the "One-Way Random Effects Model" is called "Two-Way Random Effects Model" if it considers the differences that occur according to both dimensions.

3.1.3. Tests for Panel Data Models

There are some tests that have been developed to decide which of the classic fixed effective and random effect models should be used. The most important of these tests are the Random Effects Test (Lagrange Multiplier Test), Likelihood Ratio (LR) Test, and Hausman Tests.

The main problem faced by researchers is fixed effects on panel data analysis model or with the random effects model? This is based on the assumption made about the possible correlation between the largely horizontal section specific error component εi and the X explanatory variables.

If there is no correlation between εi and X, then the random effects model, whereas if there is a correlation between εi and X, the fixed effect model will be appropriate. In which situations is it expected that there is a correlation between εi and X? Generally speaking, if the horizontal sections of N come from a large main body, the random effects model would be appropriate. If, on the other hand, the interest is on a particular N horizontal section, the fixed effect model will be appropriate.

Besides all these determinations, it helps to select the fixed and random effects model there is also a test. The Haussman statistic tests the correlation between horizontal individual specific effects (εi) and explanatory variables. This test has a statistical asymptotic $\chi 2$ distribution. Rejection of the null hypothesis leads to the conclusion that the fixed effects model should be accepted against the random effects model. In this context, hypotheses can be constructed as follows:

H_0:E(εi|Xit)=0There is no correlation between (εi) and the explanatory variables (X).
Ha:E(εi|Xit)≠0 There is a correlation between (εi) and the explanatory variables (X).

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,

Ho hypothesis: the model is appropriate to the random effects model.
H1 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), Leverage Ratio(LR), Receivables Turnover Ratio(RTR), Company or Enterprise value(CV), Company value/Book value(CV/BV), Stock Turnover Ratio(STR), Assets Growth Ratio(AG), 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.

$$VSP_{it} = \beta_{0it} + \beta_{it}\, CR_{it} + \beta_{it}\, LR_{it} + \beta_{it}\, RTR_{it} + \beta_{it}\, CV_{it} + \beta_{it}\, CV/BV_{it} + \beta_{it}\, ROA_{it} + \beta_{it}\, STR_{it} + \beta_{it}\, AG_{it} + \beta_{it}\, ATR_{it} + \varepsilon_{it}$$

Table 3.1. Definitions of Variables

VARIABLES	DEFINITIONS
VSP (dependent variable)	Volatility of Stock Prices per year
CR (independent variable)	Current Ratio per year
LR (independent variable)	Leverage Ratio per year
RTR (independent variable)	Receivables Turnover Ratio per year
CV (independent variable)	Company value per year
CV/BV (independent variable)	Company value/Book value per year
STR (independent variable)	Stock Turnover Ratio per year
AT (independent variable)	Assets Turnover Ratio per year
AG (independent variable)	Assets Growth per year
ROA (independent variable)	Return on Assets per year

Table 3.1 shows the variables to be used in the model.

Table 3.2. Descriptive Statistics of Variables

```
. summarize CR LR STR RTR AG CV CVBV AT ROA VSP
```

Variable	Obs	Mean	Std. Dev.	Min	Max
CR	1,353	2.312834	2.088376	.1006564	24.97596
LR	1,353	.4523342	.2446953	.027369	2.939812
STR	1,353	7.336344	12.69855	.0066032	195.8119
RTR	1,353	6.509806	7.662175	.010508	108.2119
AG	1,353	.1461743	.2860737	-.7121937	4.325829
CV	1,353	19.43245	2.492905	0	24.32536
CVBV	1,353	2.350073	4.856362	-60.90454	78.44924
AT	1,353	.9713994	.4770194	.0001701	3.437773
ROA	1,353	5.181393	10.67241	-128.9309	92.79843
VSP	1,353	30.13442	78.43834	-83.92857	805.5556

Table 3.2 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 leverage ratio is on average 45%. This shows that 45% of the assets are financed through borrowing. 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.

H0: Series has a unit root.

H1: Series has no unit root.

3.2.1. Im, Pesaran and Shin W-stat Unit Root Tests of Variables

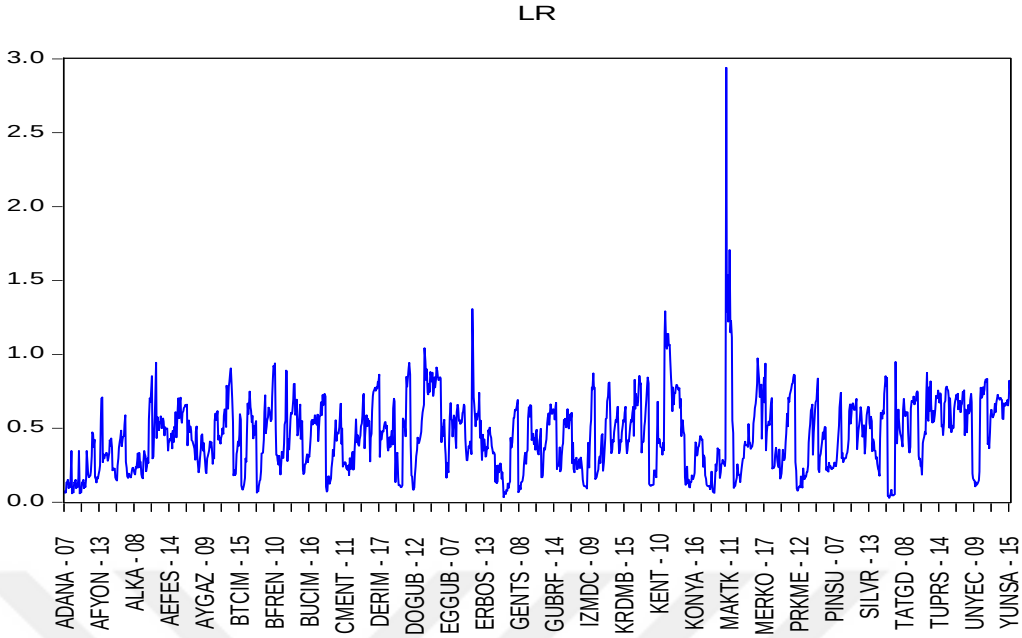
Table 3.3. Unit Root Test of LR

Null Hypothesis: Unit root (individual unit root process)
Series: LR
Date: 09/11/18 Time: 01:33
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1201
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-0.14291	0.4432

According to the panel root test results given in Table 3.3, because the probability value is greater than 0.05, we can not reject Ho and we say that the series of LR has a unit root. In such a case, we take the derivative of the series and add it to the model as follows:

Table 3.4. Graphic of LR



As seen in Table 3.4, Series LR has a trend.

Table 3.5. Unit Root Test of D(LR)

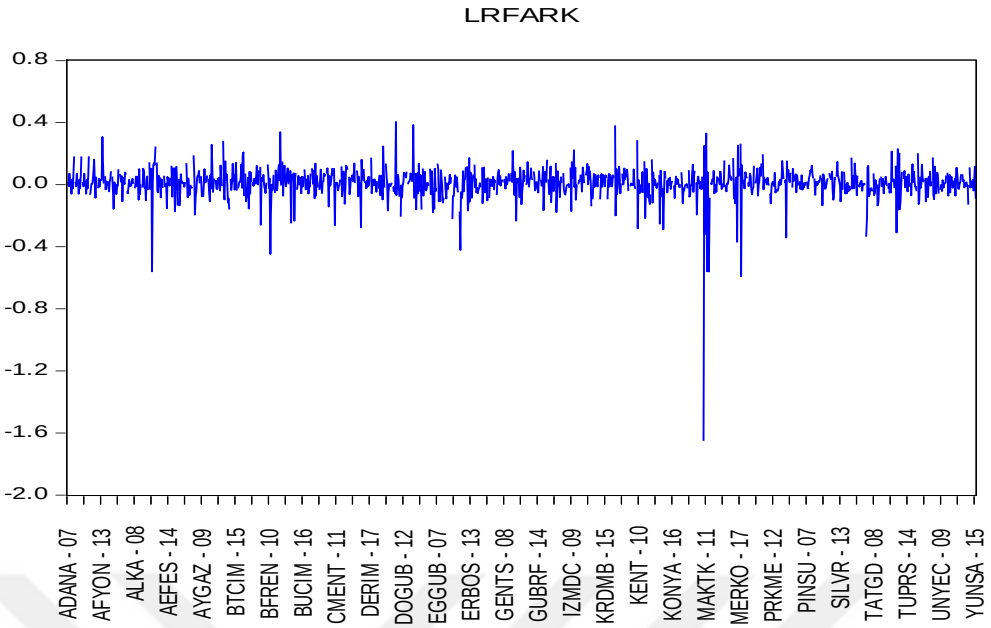
Null Hypothesis: Unit root (individual unit root process)
Series: D(LR)
Date: 09/11/18 Time: 01:38
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1068
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-21.5579	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.5, it was determined that D(LR) series is stationary for the first difference values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series

Table 3.6. Graphic of LRFARK



As seen in Table 3.6, Series LRFARK has no trend.

Table 3.7. Unit Root Test of CR

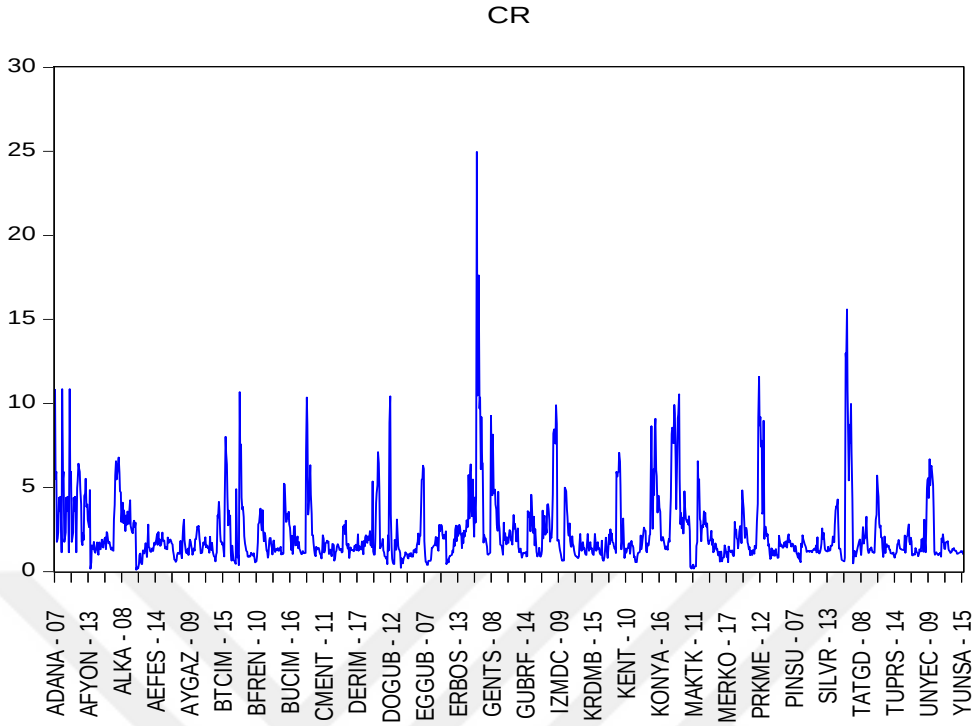
Null Hypothesis: Unit root (individual unit root process)
Series: CR
Date: 09/11/18 Time: 01:44
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1206
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-6.98836	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.7, it was determined that CR series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.8. Graphic of CR



As seen in Table 3.8, Series CR has no trend.

Table 3.9. Unit Root Test of VSP

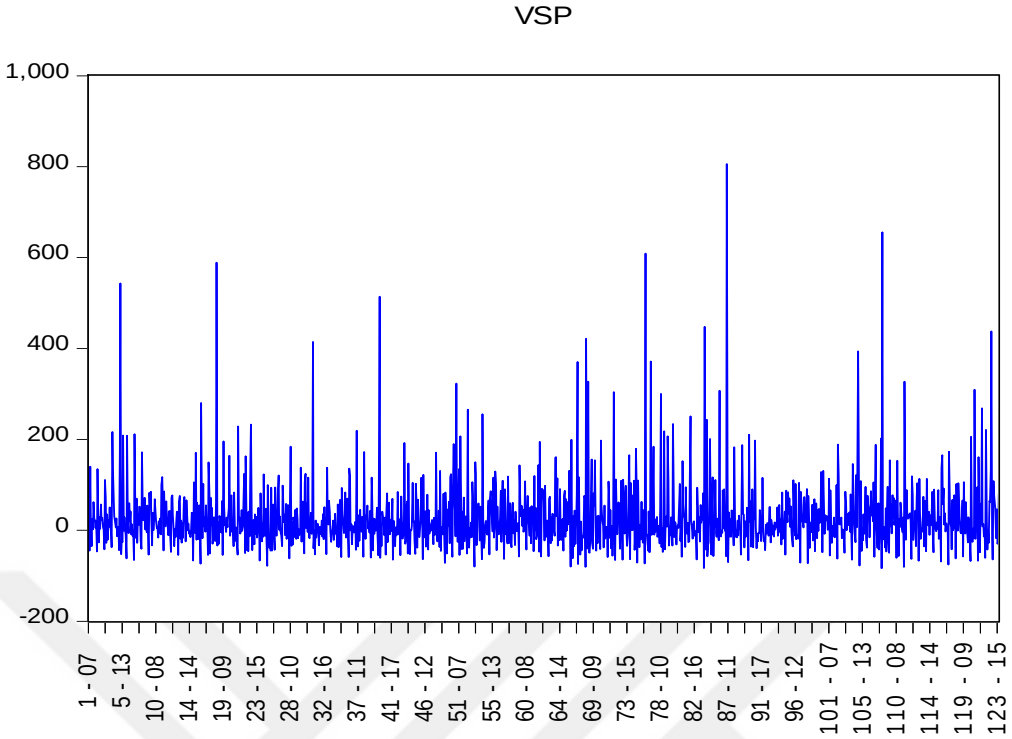
Null Hypothesis: Unit root (individual unit root process)
Series: VSP
Date: 09/11/18 Time: 01:59
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1186
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-23.1283	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.9, it was determined that VSP series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series

Table 3.10. Graphic of VSP



As seen in Table 3.10, Series VSP has no trend.

Table 3.11. Unit Root Test of AG

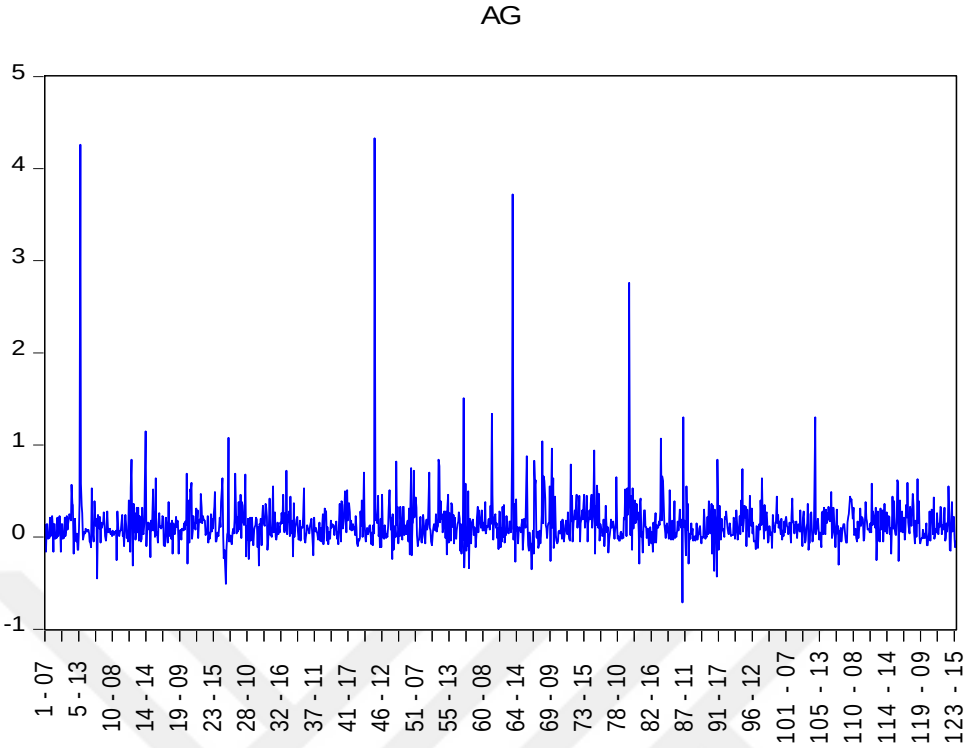
Null Hypothesis: Unit root (individual unit root process)
Series: AG
Date: 09/11/18 Time: 02:04
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1194
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-18.6335	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.11, it was determined that AG series is stationary for the level difference values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series

Table 3.12. Graphic of AG



As seen in Table 3.12, Series AG has no trend.

Table 3.13. Unit Root Test of CV

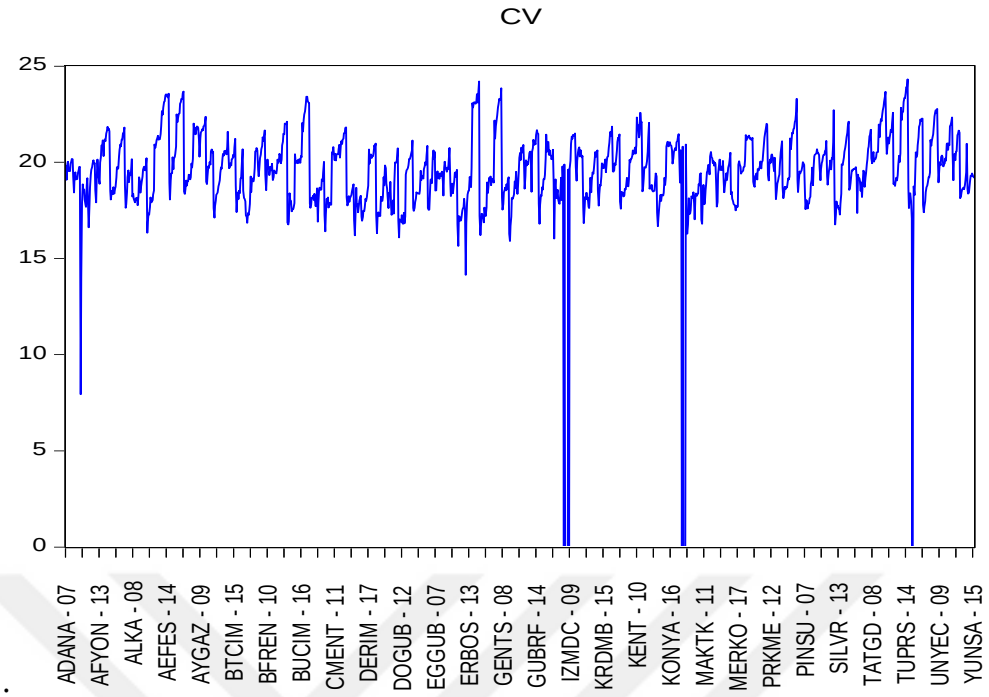
Null Hypothesis: Unit root (individual unit root process)
Series: CV
Date: 09/11/18 Time: 01:48
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1200
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-6.85252	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.13, it was determined that CV series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series

Table 3.14. Graphic of CV



.

As seen in Table 3.14, Series CV has no trend.

Table 3.15. Unit Root Test of CV/BV

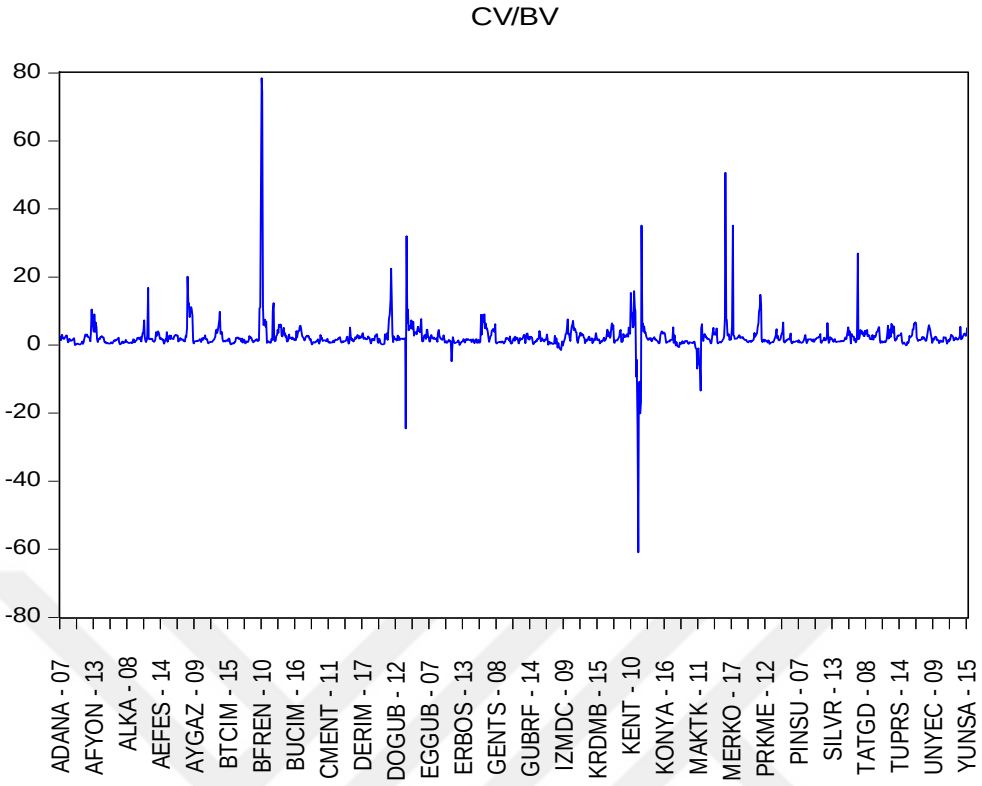
Null Hypothesis: Unit root (individual unit root process)
Series: CVBV
Date: 09/11/18 Time: 01:51
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1204
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-8.59232	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.15, it was determined that CV/BV series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.16. Graphic of CB



As seen in Table 3.16, Series CB has no trend.

Table 3.17. Unit Root Test of RTR

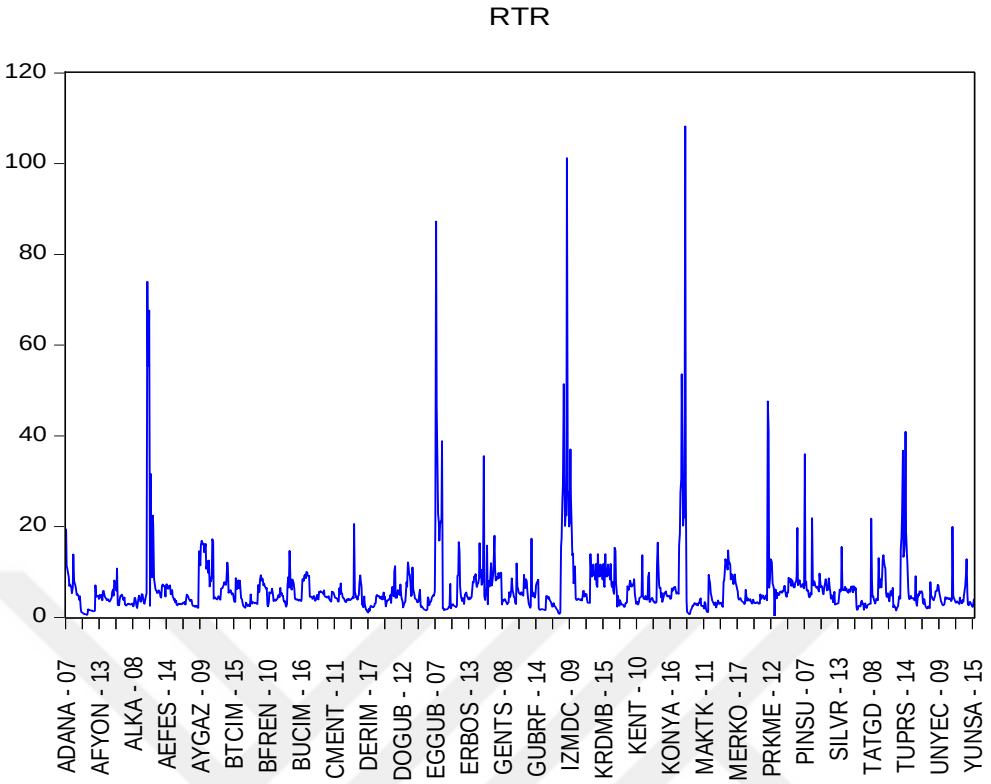
Null Hypothesis: Unit root (individual unit root process)
Series: RTR
Date: 09/11/18 Time: 01:53
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1201
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-19.8633	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.17, it was determined that RTR series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.18. Graphic of RTR



As seen in Table 3.18, Series RTR has no trend.

Table 3.19. Unit Root Test of ROA

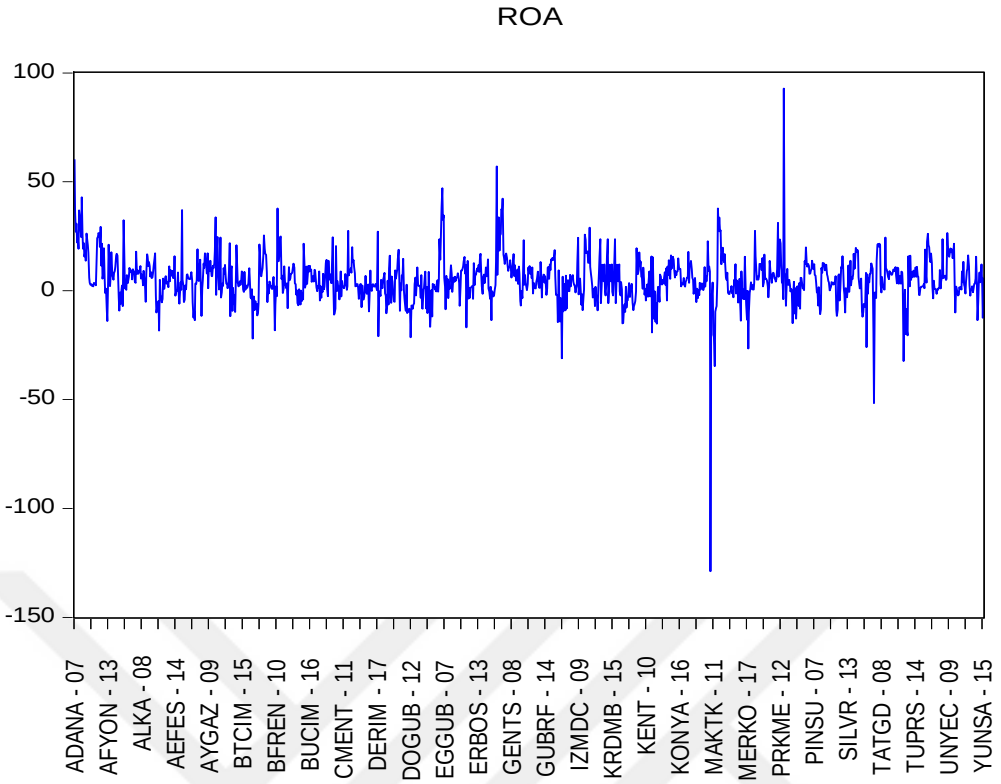
Null Hypothesis: Unit root (individual unit root process)
Series: ROA
Date: 09/11/18 Time: 01:57
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1192
Cross-sections included: 123

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-14.9193	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.19, it was determined that ROA series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.20. Graphic of ROA



As seen in Table 3.20, Series ROA has no trend.

Table 3.21. Unit Root Test of AT

Null Hypothesis: Unit root (individual unit root process)
Series: AT
Date: 09/11/18 Time: 02:09
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1189
Cross-sections included: 123

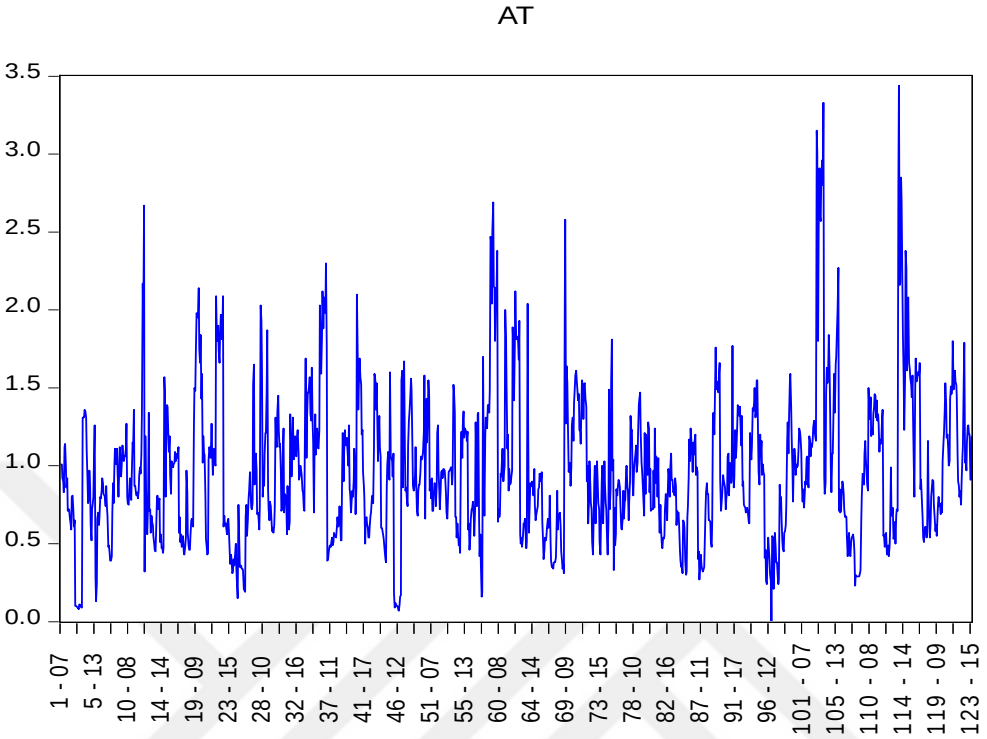
Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-7.60982	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.21, it was determined that AT series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that

there is no spurious regression problem in the model that will be formed with difference series .

Table 3.22. Graphic of AT



As seen in Table 3.22, Series AT has no trend.

Table 3.23. Unit Root Test of STR

Null Hypothesis: Unit root (individual unit root process)
Series: STR
Date: 09/11/18 Time: 02:19
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1198
Cross-sections included: 123

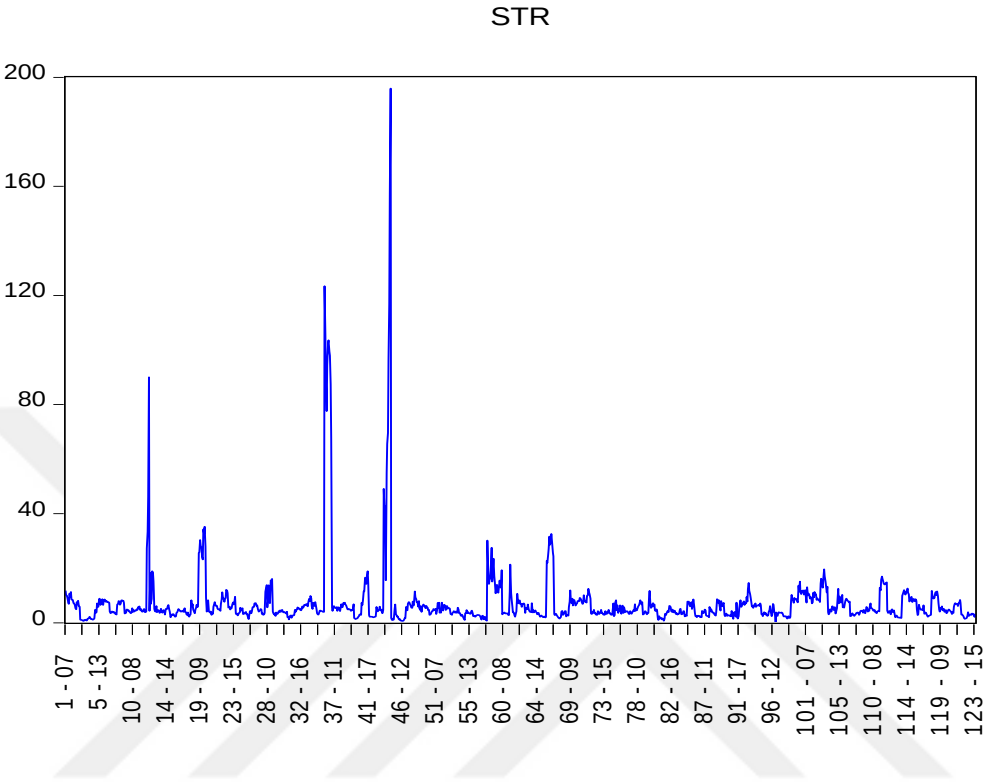
Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-8.74206	0.0000

** Probabilities are computed assuming asympotic normality

According to the panel root test results given in Table 3.21, it was determined that STR series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that

there is no spurious regression problem in the model that will be formed with difference series .

Table 3.24. Graphic of STR



As seen in Table 3.24, Series STR has no trend.

3.2.2. Fisher ADF Unit Root Tests of Variables

Table 3.25. Unit Root Test of CV

Null Hypothesis: Unit root (individual unit root process)
Series: CV
Date: 09/11/18 Time: 02:41
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1200
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	298.169	0.0128

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.25, it was determined that CV series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series.

Table 3.26. Unit Root Test of CR

Null Hypothesis: Unit root (individual unit root process)
Series: CR
Date: 09/11/18 Time: 02:48
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1206
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	427.706	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.26, it was determined that CR series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.27. Unit Root Test of AG

Null Hypothesis: Unit root (individual unit root process)
Series: AG
Date: 09/11/18 Time: 02:50
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1194
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	768.908	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.27, it was determined that AG series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series.

Table 3.28. Unit Root Test of LR

Null Hypothesis: Unit root (individual unit root process)
Series: LR
Date: 09/11/18 Time: 02:33
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1201
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	298.227	0.0127

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.28, it was determined that LR series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.29. Unit Root Test of CV/BV

Null Hypothesis: Unit root (individual unit root process)
Series: CVBV
Date: 09/11/18 Time: 02:59
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1204
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	412.088	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.29, it was determined that CV/BV series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.30. Unit Root Test of RTR

Null Hypothesis: Unit root (individual unit root process)
Series: RTR
Date: 09/11/18 Time: 02:56
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1201
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	578.665	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.30, it was determined that RTR series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series.

Table 3.31. Unit Root Test of ROA

Null Hypothesis: Unit root (individual unit root process)
Series: ROA
Date: 09/11/18 Time: 02:56
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1192
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	677.011	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.31, it was determined that ROA series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.32. Unit Root Test of AT

Null Hypothesis: Unit root (individual unit root process)
Series: AT
Date: 09/11/18 Time: 02:52
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1189
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	441.915	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.32, it was determined that AT series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

Table 3.33. Unit Root Test of STR

Null Hypothesis: Unit root (individual unit root process)
Series: STR
Date: 09/11/18 Time: 02:54
Sample: 2007 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on AIC: 0 to 1
Total number of observations: 1198
Cross-sections included: 123

Method	Statistic	Prob.**
ADF - Fisher Chi-square	483.611	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

According to the panel root test results given in Table 3.33, it was determined that STR series is stationary for level values because it has not unit root (probability value) is smaller than 0,05 significance level. It has been observed that there is no spurious regression problem in the model that will be formed with difference series .

When all the tables of root tests are examined, it is understood that all variables are stationary for the level values except for LR. In such a case, we take the derivative of the series LR and then add it to the model. 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 except LR.

In the following table, the correlation coefficients between the variables in the study are shown. If there is a bigger 0.50, we have to say that we have high correlation between the variables and we continue modeling by discarding one of these variables. If not, we include the variables in this way. If there is a correlation between the variables, the results will not reflect the reality.

Table 3.34. Correlation Matrix of Variables

```
. correlate CR LR STR RTR AG CV CVBV AT ROA
(obs=1,353)
```

	CR	LR	STR	RTR	AG	CV	CVBV	AT	ROA
CR	1.0000								
LR	-0.6254	1.0000							
STR	0.0108	-0.0436	1.0000						
RTR	0.0602	-0.0508	0.0796	1.0000					
AG	-0.0663	0.1385	-0.0306	0.0633	1.0000				
CV	-0.2637	0.1359	-0.0034	-0.2807	0.0322	1.0000			
CVBV	-0.0754	0.1338	-0.0018	-0.0354	0.0054	0.1366	1.0000		
AT	-0.1937	0.2113	0.2484	0.1123	0.0591	0.1022	0.0535	1.0000	
ROA	0.3737	-0.4972	0.0255	0.0281	0.1278	0.1490	-0.0342	0.1470	1.0000

According to table 3.34, here are some of the results of the correlation matrix of the variables in the study as follows:

- There is a weak negative relation between LR and ROA.
- There is a very weak negative relation between CV/BV and CR.
- There is a very weak positive relation between CV and ROA.
- There is a very weak negative relation between ROA and CV/BV.
- There is a very weak positive relation between RTR and ROA.
- There is a weak positive relation between CR and ROA.
- There is a very weak positive relation between LR and CV.
- There is a weak negative relation between LR and RTR.
- There is a medium negative relation between LR and CR.
- There is a very weak positive relation between LR and CV/BV.
- There is a weak negative relation between CV and RTR.
- There is a weak negative relation between CV and CR.
- There is a very weak positive relation between CV and CV/BV.
- There is a very weak positive relation between RTR and CR.
- There is a weak negative relation between RTR and CV/BV.
- There is a weak negative relation between CR and CV/BV.
- There is a very weak positive relation between STR and CR.
- There is a weak negative relation between STR and LR.
- There is a weak negative relation between STR and RTR.
- There is a very weak negative relation between STR and AG.
- There is a very weak negative relation between STR and CV.
- There is a very weak negative relation between STR and CV/BV.
- There is a very weak positive relation between STR and AT.
- There is a very weak positive relation between STR and ROA.
- There is a very weak negative relation between STR and CV/BV.
- There is a very weak negative relation between AG and CR.
- There is a very weak positive relation between AG and LR.
- There is a very weak negative relation between AG and STR.

In the analysis of Pearson correlation coefficients, 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:

Ho: Pooled model is appropriate

H1: Fixed Effect Model is appropriate

Table 3.35. Panel Regression Model(fixed effects)

```
. xtreg vsp cr str rtr ag cv cvbv at roa d_lr, fe

Fixed-effects (within) regression               Number of obs      =       1,230
Group variable: id                              Number of groups   =         123

R-sq:                                           Obs per group:
     within  = 0.1129                                         min =          10
     between = 0.0001                                         avg =        10.0
     overall = 0.0470                                         max =          10

                                                F(9,1098)          =       15.52
corr(u_i, Xb)  = -0.6334                        Prob > F           =      0.0000
```

vsp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cr	5.44379	2.022882	2.69	0.007	1.474639	9.41294
str	.0436921	.4070654	0.11	0.915	-.7550219	.8424062
rtr	1.158811	.5010805	2.31	0.021	.1756274	2.141994
ag	-12.23619	8.599436	-1.42	0.155	-29.10937	4.636999
cv	11.13138	1.48582	7.49	0.000	8.216016	14.04675
cvbv	2.229176	.5573162	4.00	0.000	1.135651	3.322701
at	-6.259624	11.321	-0.55	0.580	-28.47286	15.95362
roa	1.741548	.3481827	5.00	0.000	1.05837	2.424727
d_lr	-80.53655	24.50575	-3.29	0.001	-128.6199	-32.45315
_cons	-211.9906	32.96486	-6.43	0.000	-276.6719	-147.3094
sigma_u	34.738573					
sigma_e	77.836011					
rho	.16610228	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(122, 1098) = 1.03                     Prob > F = 0.3922
```

When Table 3.35 is examined, it is seen that the probability value of F test is greater than 0,05, (0,3922>0,05, 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 of the test is shown below:

Ho: Pooled model is appropriate

H1: Random Effect Model is appropriate

Table 3.36. Panel Regression Model(Random effects)

```
. xtreg vsp cr str rtr ag cv cvbv at roa d_lr, re

Random-effects GLS regression                   Number of obs     =       1,230
Group variable: id                              Number of groups  =         123

R-sq:                                           Obs per group:
     within  = 0.0850                                         min =          10
     between = 0.0182                                         avg =        10.0
     overall = 0.0620                                         max =          10

                                                Wald chi2(9)      =       80.61
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =      0.0000
```

vsp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
cr	1.754699	1.301148	1.35	0.177	-.7955045	4.304902
str	-.0882488	.1807054	-0.49	0.625	-.4424249	.2659273
rtr	.8254482	.3172695	2.60	0.009	.2036114	1.447285
ag	6.92503	7.867514	0.88	0.379	-8.495014	22.34507
cv	4.04583	.993202	4.07	0.000	2.09919	5.99247
cvbv	1.25426	.4503024	2.79	0.005	.3716832	2.136836
at	-2.463106	5.162156	-0.48	0.633	-12.58075	7.654533
roa	.6679661	.2636575	2.53	0.011	.1512069	1.184725
d_lr	-122.7524	22.60786	-5.43	0.000	-167.063	-78.44179
_cons	-60.97467	21.30159	-2.86	0.004	-102.725	-19.22433
sigma_u	0					
sigma_e	77.836011					
rho	0	(fraction of variance due to u_i)				

Table 3.37. Breusch-Pagan LM Test for Random Effects Summary

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        vsp[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                         |       Var      sd = sqrt(Var)
                 --------+------------------------------
                     vsp |    6432.292        80.20157
                       e |    6058.445        77.83601
                       u |          0               0

        Test:   Var(u) = 0
                                 chibar2(01) =      0.00
                              Prob > chibar2 =    1.0000
```

According to the results given in table 3.37, null hypothesis is not rejected because p-value is greater than 0,05, that is to say, Pooled Model is appropriate

After estimating the three models above, we shall have to decide which model is good to accept.

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.

Table 3.38. Linear Regression Model (Pooled)

```
. reg vsp cr str rtr ag cv cvbv at roa d_lr
```

Source	SS	df	MS		
Model	489985.823	9	54442.8692	Number of obs	= 1230
Residual	7415301.59	1220	6078.11606	F(9, 1220)	= 8.96
				Prob > F	= 0.0000
Total	7905287.42	1229	6432.29245	R-squared	= 0.0620
				Adj R-squared	= 0.0551
				Root MSE	= 77.962

vsp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cr	1.754699	1.301148	1.35	0.178	-.798037	4.307434
str	-.0882488	.1807054	-0.49	0.625	-.4427766	.2662791
rtr	.8254482	.3172695	2.60	0.009	.2029939	1.447902
ag	6.92503	7.867514	0.88	0.379	-8.510327	22.36039
cv	4.04583	.993202	4.07	0.000	2.097257	5.994403
cvbv	1.25426	.4503024	2.79	0.005	.3708067	2.137713
at	-2.463106	5.162156	-0.48	0.633	-12.59079	7.664581
roa	.6679661	.2636575	2.53	0.011	.1506937	1.185238
d_lr	-122.7524	22.60786	-5.43	0.000	-167.107	-78.39779
_cons	-60.97467	21.30159	-2.86	0.004	-102.7665	-19.18287

The pooled model in table 3.38 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 3.39.

H0: There is no first-order autocorrelation.

H1: There is auto correlation.

Table 3.39. Wooldridge Test Summary

```
. xtserial vsp cr str rtr ag cv cvbv at roa d_lr, output

Linear regression                               Number of obs =    1107
                                                F(  9,   122) =    7.27
                                                Prob > F      =  0.0000
                                                R-squared     =  0.1503
                                                Root MSE      =  112.68

                                   (Std. Err. adjusted for 123 clusters in id)
------------------------------------------------------------------------------
             |               Robust
       D.vsp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          cr |
         D1. |    1.694714   5.412256     0.31   0.755    -9.019388    12.40882
             |
         str |
         D1. |    1.391063   .8286424     1.68   0.096    -.2493175    3.031443
             |
         rtr |
         D1. |    1.059745   .6517623     1.63   0.107    -.2304834    2.349974
             |
          ag |
         D1. |   -29.55015   21.02006    -1.41   0.162    -71.16146    12.06117
             |
          cv |
         D1. |    16.25571   3.575618     4.55   0.000     9.177416      23.334
             |
        cvbv |
         D1. |    3.976017   1.847655     2.15   0.033     .3184001    7.633634
             |
          at |
         D1. |   -64.62294   18.81182    -3.44   0.001    -101.8628   -27.38306
             |
         roa |
         D1. |    3.211728   .8019604     4.00   0.000     1.624167    4.799289
             |
        d_lr |
         D1. |   -27.08721   108.4851    -0.25   0.803    -241.8444    187.6699
------------------------------------------------------------------------------

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,     122) =     15.234
           Prob > F =      0.0002
```

According to the results of Wooldridge test statistic in the table above, the p-value F is very smaller than 0,05, so null hypothesis is rejected. In this case, H1 is not rejected namely, there is auto-correlation problem between the series for the first difference values.

Table 3.40. Heteroskedasticity Test Summary

```
. estat hettest

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

         chi2(1)       =     56.73
         Prob > chi2   =    0.0000
```

As seen in table 3.40, null hypothesis is rejected and then alternatives hypothesis is not rejected because prob>chi2 value is smaller than 0,05 significance level, so we can say 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 autocorrelation and heteroskedasticity problem. The robust estimation results are shown in Table 3.41.

Table 3.41. Linear Regression Model (Robust)

```
. reg vsp cr str rtr ag cv cvbv at roa d_lr, robust

Linear regression                               Number of obs =    1230
                                                F(  9,  1220) =    6.26
                                                Prob > F      =  0.0000
                                                R-squared     =  0.0620
                                                Root MSE      =  77.962
```

vsp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
cr	1.754699	2.555849	0.69	0.493	-3.259649	6.769046
str	-.0882488	.1214747	-0.73	0.468	-.3265711	.1500736
rtr	.8254482	.3847198	2.15	0.032	.0706624	1.580234
ag	6.92503	10.17455	0.68	0.496	-13.03652	26.88658
cv	4.04583	1.06422	3.80	0.000	1.957926	6.133734
cvbv	1.25426	.6777841	1.85	0.064	-.0754919	2.584011
at	-2.463106	4.811879	-0.51	0.609	-11.90358	6.977369
roa	.6679661	.2920536	2.29	0.022	.0949832	1.240949
d_lr	-122.7524	49.36855	-2.49	0.013	-219.6091	-25.8957
_cons	-60.97467	25.81648	-2.36	0.018	-111.6243	-10.32504

H_0: Financial ratios don't affect the volatility of stock prices

H_1: Financial ratios affect the volatility of stock prices

Estimation Equation with Substituted Coefficients:

VSP=-60.97467+0.8254482*RTR+4.04583*CV+0.6679661*ROA
+1.25426*CV/BV-122.7524*D(LR)+ εit

According to the results given in table 3.40 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 H0 is rejected that is,.the financial ratios in themodel 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 RTR, CV, CV/BV, LR and 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 (RTR) increases by 1 unit, the volatility of the stock price will increase by 0,83 units, or if it decreases by 1 unit, VSP will decrease by 0,83 units, namely Receivables Turnover Ratio seems to have a positive effect on the volatility of the stock price. If (CV/BV) increases by 1 unit, the volatility of the stock price will increase by 1,25 units, or if it decreases by 1 unit, VSP will decrease by 1,25 units, namely Company Value /Book Value seems to have a positive effect on the volatility of the stock price. Also Company Value 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 4,05 units or if CV decreases by 1 unit, VSP will decrease by 4,05 units. Likewise, if Return on Assets (ROA) increases by 1 unit, the volatility of the stock price (VSP) will increase by 0,67 units or if ROA decreases by 1 unit, VSP will decrease by 0,67 units.

On the other hand, if Leverage Ratio (LR) increases by 1 unit, the volatility of the stock price will decrease by 122,75 units, or if it decreases by 1 unit, VSP will increase by 122,75 units, namely Leverage Ratio seems to have a negative effect on the volatility of the stock price.

All of the variables included in the analysis are the coefficient of multiple determinants (R2) indicating the degree of effect is 0,06. The R2 value can range from 0 to 1. If R2 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 R2 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 R2 value of the model is 0.06. This ratio implies that independent variables can account for nearly 6% of the dependent variable (VSP).

SECTION FOUR
CONCLUSION

4.1. CONCLUSION

In this study, we 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.The data were analyzed using Eviews package program and Stata program and then the results obtained are presented in tabular form.

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, we can conclude that some financial ratios in the model such as Receivables Turnover Ratio (RTR), Company Value (CV) Leverage Ratio (LR), Company Value/Book Value (CV/BV) and Return on Assets (ROA) can jointly affect and weakly explain the volatility of stock prices. In general, the increase and increase of the Receivables Turnover Ratio (RTR) is interpreted as a good indicator. On the one hand, Cmpany Value is more sensitive to the Volatility of Stock Prices and explanatory than the others positively. The evaluation of this ratio

(CV) stems from the fact that among the biggest causes of preference is the elimination of the differences arising from the taxation policies among the countries, making them an international evaluation criterion. It is also used as one of the best indicators in measuring the future cash potential of the company, so it can be said that the companies in the manufacturing industry in BIST strongly have a future cash potential. Company Value /Book Value (CV/BV) also affects the volatility of stock prices as the second high rate, so it is very important for a company to have assets growing regularly because investors will pay attention to this because if a company grows to reach its target, it must be sensitive how quickly it grows (the asset growth rate) and how it grows (the mix of debt and equity financing) (Cleverley and Cleverley, 2018:261). Leverage Ratio negatively affects the volatility of stock prices. If the firm is under high interest burden, it may fall into difficulty during interest and principal repayment obligations. Therefore, it is very important that the equilibrium is very well maintained in this area.

On the other hand, according to the analysis results; it is understood that there is no statistically significant relationship between Current Ratio, Stock Turnover Ratio, Assets Turnover Ratio, and Assets Growth Ratio, and the Volatility of Stock Prices. As a result, it is understood that there is no relation between these rates and the volatility of stock prices.

In conclusion, we can say 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.

4.2. 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, we recommend the investors to use Company Value (CV) ratio, Company Value/Book Value (CV/BV) to predict the volatility of stock prices (VSP) because it is more

sensitive to the volatility of stock prices and explanatory than the others positively, but Leverage Ratio (LR) is very sensitive negatively.

- We recommend 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.
- Goncharov (2015) says that If financial rates are to be used in the study, the yearly data should be used instead of quarterly or monthly data. With the help of the yearly data, financial rates errors are very much minimized in annual financial statements errors.
- 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 are long-term relationships with stock prices, must be meticulously monitored in terms of individual and institutional investors in stock markets.

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ÖZGEÇMİŞ

Metin Yiğituşağı 1968 yılında Gaziantep'de doğdu. Anadolu Üniversitesi Açıköğretim Fakültesi İktisat Bölümü'nden 1997 ve Gaziantep Üniversitesi Fen Edebiyat Fakültesi Batı Dilleri ve Edebiyatları İngiliz Dili ve Edebiyatı Bölümü'nden 2015 yılında mezun oldu. Ayrıca yüksek lisans derecesini 2018 yılında "Finansal Rasyolar ile Hisse Senetleri Fiyat Oynaklığı Arasındaki İlişki" üzerine master tezi ile Gaziantep Üniversitesi Sosyal Bilimler Enstitüsü, İşletme Ana Bilim Dalı'ndan aldı. Metin Yiğituşağı İngilizce, Fransızca, Almanca ve Arapça bilmektedir. 2016 yılından beri Gaziantep M. Nurettin Horoz Lojistik Mesleki ve Teknik Anadolu Lisesi'nde ingilizce öğretmeni olarak çalışmaktadır.

VITAE

Metin Yiğituşağı was born in Gaziantep in 1968. He graduated from the Department of economics, Faculty of Economics at Anadolu University in 1997 and the Department of English Language and Literature, Faculty of Arts and Sciences at Gaziantep University in 2015. He also graduated from the Department of Business Administration at Gaziantep University Social Sciences Institute with his Master's Thesis on "Relationship Between Financial Ratios and the Volatility of Stock Prices" in 2018. He knows English, French, German, and Arabic. He has been working as an English teacher since 2016 at Gaziantep M. Nurettin Horoz Logistics Professional and Techniques Anatolian High School.

ANNEXES

ANNEX 1

A.1. Symbols and Abbreviations

et al.	And others
MACD	Moving Average Converge and divergence
RSI	Relative Strenght Index
SO	Stochastic Oscillator