İSTANBUL BİLGİ UNIVERSITY
INSTITUTE OF GRADUATE PROGRAMS
INTERNATIONAL FINANCE MASTER'S DEGREE PROGRAM

EXISTENCE OF THE CALENDAR EFFECT OR AN ILLUSION: INVESTIGATION DAYS – OF – THE – WEEK ANOMALY in ISTANBUL STOCK EXCHANGE

İHSAN CEM KARADEMİR
117664006

SUPERVISOR
Assist. Prof. BARIŞ SOYBİLGEN

İSTANBUL
2019

EXISTENCE OF THE CALENDAR EFFECT OR AN ILLUSION: INVESTIGATION DAYS - OF - THE - WEEK ANOMALY in ISTANBUL STOCK EXCHANGE

BORSA İSTANBUL'DA HAFTANIN GÜNLERİ ANOMALİSİNİN İNCELENMESİ

İHSAN CEM KARADEMİR

117664006

Tez Danışmanı : Dr. Öğr. Üyesi BARIŞ SOYBİLGEN (İmza) .....

İstanbul Bilgi ..... Üniversitesi

Jüri Üyeleri Prof. Dr. Cenktan Özyıldırım (İmza) .....

İstanbul Bilgi ..... Üniversitesi

Juri Üyesi: Dr. Öğr. Üyesi Dinçer Dedeoğlu (İmza) .....

Bahçeşehir ..... Üniversitesi

Tezin Onaylandığı Tarih : 11/06/2019

Toplam Sayfa Sayısı: 54

Anahtar Kelimeler (Türkçe)

1) Piyasa Anomalileri
2) Günlerin Anomalisi
3) Hafta sonu Etkisi
4) GARCH
5) Hisse senetleri piyasaları

Anahtar Kelimeler (İngilizce)

1) Market Anomalies
2) Week - day anomaly
3) Weekend Effect
4) GARCH
5) Stock markets

ACKNOWLEDGEMENT

I would like to thank my supervisor Barış SOYBİLGEN for his support since beginning of my work. Last but not least, I would dedicate this study to my family for the inspiration, encouragement and love.

TABLE OF CONTENTS

ABBREVIATIONS

BIST	: Borsa Istanbul
BIST30	: Borsa Istanbul 30 Index
BIST100	: Borsa Istanbul 100 Index
EMH	: Efficient Market Hypothesis
P/E Ratio	: Price to Earnings Ratio
IPO	: Initial Public Offering
CBRT:	: Central Bank of the Republic of Turkey
FED	: Federal Reserve
ECB	: European Central Bank
OLS	: Ordinary Least Squared
GARCH	:The generalized autoregressive conditional heteroskedasticity
EGARCH	:The exponential generalized autoregressive conditional heteroskedasticity

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

In this study, "days of the week anomaly", which is one of the most popular working areas of behavioral finance, was investigated on the Istanbul Stock Exchange covering the period of 2007 – 2018. The anomaly, which it was also conducted for global stock markets in the past, it has been investigated whether trading days contradict the "Efficient Market Hypothesis" assumptions and have statistically significant and different returns. By using the daily return data of BIST30 and BIST100 indexes, days of the week anomaly was observed periodically with Ordinary Least Squared Regression, GARCH (1,1) and EGARCH (1,1) methods. The decline in the investment maturity of the market participants and the irrational short – term investment strategies after the crisis are the most important factors in the existence of market anomalies. In the Borsa Istanbul indexes, it was observed that Fridays had the negative return in a statistical way between 2007 – 2010.

Keywords: Market anomalies, days – of – the week anomaly, weekend effect, GARCH, stock markets.

ÖZET

Bu çalışmada, davranışsal finansın en popüler çalışma alanlarından birisi olan piyasa anomalilerinden "Haftanın Günleri" anomalisi, Borsa İstanbul'da 2007 – 2018 dönemi için incelenmiştir. Geçmişte global hisse senedi piyasaları için de yapılmış olan bu çalışmada, işlem günlerinin "Etkin Piyasa Hipotezi" varsayımlarıyla çelişerek istatistiksel açıdan anlamlı ve farklı getirilere sahip olup olmadığı araştırılmıştır. BIST30 ve BIST100 endekslerinin günlük getiri verileri kullanılarak OLS, GARCH (1,1) ve EGARCH (1,1) metodları ile önceki çalışmalarda sıklıkla karşılaşılan hafta sonu riskinin dönemsel olarak gözlemlendiği sonucuna varılmıştır. 2007 yılında patlak veren ve ilerleyen yıllarda da finansal piyasalarda etkisini gösteren Mortgage krizi sonrası piyasa katılımcılarının yatırım vadesinde görülen düşüş ve irrasyonel kısa vadeli yatırım stratejileri, piyasa anomalilerinin ortaya çıkmasındaki önemli etkenlerdendir. Borsa İstanbul endekslerinde, 2007 – 2010 dönemleri arasında Cuma günlerinin istatistiki açıdan anlamlı ve negatif getiriye sahip olduğu gözlemlenmiştir.

Anahtar Kelimeler: Piyasa Anomalileri, Haftanın Günleri Anomalisi, Hafta Sonu Etkisi, GARCH, Hisse Senetleri Piyasaları

INTRODUCTION

One of the milestones of modern financial theory, the efficient market hypothesis was published by Malkiel & Fama (1970). The Efficient Market Hypothesis or EMH claims that, stock prices reflect all information and to obtain excess return which means better than the market return is impossible. In other words, market participants can't produce trading strategies for alfa generation. Neither technical nor fundamental analysis can get the excess return. According to the Efficient Market Hypothesis, stock markets are "efficient" and stock prices always reflect their fair value. Because of this, purchasing underperformed stocks and selling outperformed stocks doesn't produce the alfa return. Furthermore, stock selection and market timing methods can't beat the market because of the random – walk price movements.

The Efficient Market Hypothesis claims that, stock market fluctuations are random walk which means the past price actions or data of stock markets cannot be used to predict the future movements. EMH also has certain assumptions based on investor behaviors and market mechanics (Fama, 1976). Although believers of the Efficient Market Hypothesis support these assumptions, information asymmetry and investor rationality have been a matter of debate since the first publication of the hypothesis. It is considered that; excess return can be obtained with using stock selection and market timing which are important methods of active portfolio management. After examining assumptions of the Efficient Market Hypothesis and market forms, market anomalies will be analyzed in four categories.

- A new and important information are accessible free and costless by all participations,
- The market has a great number of rational investors who try to predict the future market value of an asset in the base of the risk – reward, to compete with each other to profit maximization,
- Investors are homogenous about the expectations of risk and return,
- Prices are reflected the balance of capital markets with all information.

Under these conditions, the market efficiency is divided into three subtitles which are weak form, semi – weak form & strong form. These market forms play an important role for generating trading strategies by market participants in the modern finance literature.

1.1. WEAK FORM MARKET EFFICIENCY

Weak form market efficiency claims that, financial ratios, past price actions, fundamental analysis and technical indicators don't influence the stock price. All current information is reflected to the stock price. There is no price pattern or trend in the stock market movements. Because of this, technical analysis doesn't produce trading strategies to predict the future prices. It is difficult to outperform the market in the short term.

Weak form efficiency also known as the "Random Walk Theory" means that past information and events have no relationship with current price actions. Active portfolio management methods don't work to produce excess return especially in the short run. Due to the stock markets are consolidated at fair value, random picking and a portfolio have the similar returns in the long run.

1.2. SEMI – WEAK FORM MARKET EFFICIENCY

The belief of this theory is that the past information is used to calculate stock prices and current stock prices react rapidly to all new public information. Neither fundamental nor technical analysis can be used to acquire excess return. In this form, there is information asymmetry among market participants. Company decisions that may affect the value of its share are not learned by all investors at the same time. Some investors who have non – public information about financial statements, dividend distribution, mergers & acquisitions, new projects, capital increase, division of shares etc. can outperform the market in the short run. It is possible to achieve excess return with using this method. This phenomenon is called as "insider trading" activity in the financial literature.

Semi – weak form market efficiency claims that, all information is reflected in the stock value except for the information that is not publicly disclosed. It is impossible to obtain extra return with active management in the short term.

1.3. STRONG FORM MARKET EFFICIENCY

Strong form market efficiency states that, all public and private information are used to calculate stock prices. Supporters of strong form efficiency believe that even insider information cannot provide excess return to investors. Besides, it is not possible to outperform the market in the short term.

Micro and macroeconomics events that may affect the value of the share are accounted in the stock price. Being the strongest version among the market form, as in others, claims that the excess return cannot be achieved by using fundamental and technical analysis in this form. Since the expectations are priced by the market participants, excess return can't be obtained with using non-public information. In other words, it is not possible to beat the market with insider trading activity (Fama, 1970).

In this form, unlike the semi – weak form, to define publicly available and non – public information is not easy. Investors who have the insider information are generally the dominant shareholders and executives of the listed companies. The weak and semi – weak market form can be tested with the help of specific tests, whereas strong form cannot be determined with these tests. In stock markets, market participants can earn more return than the expected with using insider trading activity. This situation contradicts to the logic of the strong form. Because of this reason, stock markets don't have strong form efficiency.

Although Fama's Efficient Market Hypothesis was accepted by many in the investment management industry, its applicability in real life was a matter of debate. Kahneman and Tversky (1979) examined the importance of human psychology while making investment

decisions for financial markets. They claim that, market participants take their investment decisions under some biases.

One of the most popular bias, as known "Loss Aversion Bias" states that investors have different attitude in the profit and loss positions. Kahneman D. and Knetsch J. and Thaler R. (1991) say that investors generally exhibit risk – averse attitude while in a profitable position, on the other hand, they want to take more risk to make their position profitable.

Non – linear investment strategies, irrational risk & return ratio expectations conflict with the market efficiency. This situation has led to abnormal price movements, which are called "market anomalies" in capital markets. Since there are unusual price patterns due to irrational investment decisions, market anomalies reject the Efficient Market Hypothesis. In other words, it is possible to outperform the market with using specific methods. After that, financial crises and market anomalies are the most important research fields of behavioral finance.

1.4. MARKET ANOMALIES

As shown in the study of Latif and Madiha and Arshad and Shanza and Fatima and Mariam and Farooq and Samia (2011), market anomalies can be divided into four parts which are calendar, technical, fundamental and other anomalies.

1.4.1. Calendar Anomalies

1.4.1.1 January Effect

After tax-loss harvesting and repurchases, investors have the common desire to put their cash bonuses to the capital markets. This situation is similar for asset management companies. Fund managers should adjust weights of their funds for the new inflows. Furthermore, there is the belief that January is the most suitable month to invest among the market participants.

According to the study of Gultekin and Gultekin (1983), excess return and increasing volatility in January affect small cap companies more than other months because of the lack of liquidity. January has the highest return on US stock exchanges compared to other months by Watchel (1942). Rozeff and Kinney (1976) claims that January
returns are higher than the other months in a statistical way between 1904 – 1974 in New York Stock Exchange.

1.4.1.2 Weekend Effect

The weekend or Monday effect is a phenomenon in capital markets which the stock returns are quite lower than foregoing Friday. The effect is generally seen in the stock markets. Due to the market participants' irrational trading strategies, daily returns are statistically different from each other. Investors who do not want to take the weekend risk, tend to reduce their positions on Fridays. The underlying cause of the anomaly is the effect of the bad news after markets are closed. Because of this, there is the selling pressure on Fridays in the stock markets. In addition, Monday is the most difficult day to understand the market momentum and tendencies of market participants especially day-traders and hedge fund managers who are taking large amounts of speculative positions for intraday-trading. markets especially for Starks (1986) states that there is the negative return on Fridays in Dow Jones Industrial Average Index.

1.4.1.3 Turn of the Month Effect

During the last few days and the first week of each month, stock markets represent an upward trend. Pension funds and other retirement funds should allocate their stock weights monthly because of the new investors who want to put their money to the stock markets by using these funds. Turn of the month effect was found in fourteen countries by Agrawal and Tandon (1994).

1.4.1.4 Turn of the Year Effect

During the last week and the first two weeks of each year, there is the uptrend for the stock prices and volume. The effect was found in the both futures and cash markets by Szakmary and Kiefer (2004). This anomaly is also known as "Santa Claus Rally". Market professionals especially retail investors tend to be more bullish end of the year. It has some similarities with January Effect.

1.4.2 Fundamental Anomalies

1.4.2.1. Low Price to Earnings (P/E) Anomaly

The anomaly states that, stocks with low P/E ratio are undervalued by the investors than stocks with high P/E ratio. A bad series of earnings, changing in the dividend policies in a negative way, lower profitable numbers with respect to the consensus expectations are some of the most prominent factors make market participants become pessimistic for low P/E ratio stocks. The stocks are better risk – adjusted gain than others in a long run. The anomaly was found in Russel Index companies by Basu (1977).

1.4.2.2. Low Price to Book Anomaly

According to this anomaly, stocks with low price to book ratio have more return than stocks with high price to book ratio. Price to Book Ratio is one of the most important ratios in the fundamental analysis. Fama' research (1991) demonstrates that there is the low price to book anomaly for listed companies in the S&P 500 index between 1942 – 1981. Furthermore, Gerald Jensen and Robert Johnson (1997) found that the evidence of this anomaly exists in the American stock market indexes and Federal Reserve's monetary policies play an important role of this pricing.

On the other hand, Zaremba (2016) argues that, expensive stocks significantly outperformed the cheap stocks on the Polish Stock market between 2000 – 2014. There is no low price to book anomaly for this stock market.

1.4.2.3. Value Anomaly

Misleading earnings & financial statements of public companies affects this anomaly. Market participants generally believe that the growth companies provide more gain than the value companies in the stock markets. Additionally, fund managers prefer growth stocks because of the higher possibility of excess return in the short run. Graham and Dodd (1934) claims that investing on value companies outperforms the market. In addition, Zhang (2005) also says that value investing is more profitable than the growth investing in the long run.

1.4.2.4. Neglected Firm Effect

Neglected firm or small – company effect states that, neglected companies will outperform the market in the long term. Due to the inadequate liquidity & lack of analyst reports and recommendations, these companies are not attractable to investors. Neglected firm effect was examined by Bondt and Thaler (1985).

1.4.2.5. Reversals

The good performing stocks in one period tend to reverse afterwards. In another saying, yesterday's best performers become tomorrow's underperformers (Sharma, 2014). It is quite possible that the over-priced stocks become underperformed the market conversely and the under-priced stocks become outperformed the market.

1.4.3. Technical Anomalies

1.4.3.1. Moving Averages Effect

This trading phenomenon of technical analysis is that signals with respect to short period and long period averages. When the short period moving average raises over the long period moving average, this indicator produces "buy" signal. In contrast, when the long period moving average falls below the short period moving average, the indicator gives "sell" signal.
The indicator is frequently used by market participants for generating trading strategies. Moving averages effect was investigated by Brock and Lakonishok (1992).

1.4.3.2. Momentum Effect

Momentum trading is one of the most – used strategy by especially intraday-traders. The strategy based on buying past winners and selling past losers to obtain the excess return. This indicator was analyzed by Hons and Tonks (2011). Their research shows that, return of the winner stocks portfolio is greater than return of the loser stocks portfolio to 1996 from 1977 in the US stock market.

1.4.4. Other Anomalies

1.4.4.1. Index Effect

When a stock is announced to enter into a stock market index, it is probable that the stock price increases. ETF's (Exchange Traded Fund) should adjust the weight of their index tracking portfolios for the new stock. In this process, the stock generally outperforms the market.

On the other hand, if an announcement is made to remove a stock from the market index, the stock becomes underperformed the market. Kappou (2007) examines the index effect for the listed companies in the S&P 500 index.

1.4.4.2. Initial Public Offering Effect

Studies states that, IPO's outperform the market in the short run, on the contrary they underperform in the long run. Investors show great interest in public offerings. Because of that, these stocks can beat the market in the short term. Knopf and Teall (1999) analyzed the IPO effect and investor reactions to these companies on their initial trading days.

The most prominent reasons of market anomalies are tax – loss avoiding, insider trading activity and window dressing. These investment strategies lead the unusual price movements in the capital markets.

Market participants want to close their positions to ensure tax advantage in certain periods. This situation often creates the selling pressure on stock prices. January and Turn of the Year market anomalies can be explained with the strategy.

Dominant shareholders, financial analyst, hedge fund managers and executives of listed companies have access to private and non – public information. It is possible to achieve excess return with using this method as known "insider trading activity".

Mutual funds must share their fund performance and portfolio structure with their investors in every quarter. To prevent withdrawals from the funds, portfolio managers might raise the weights of in – the – money positions. On the other hand, they also reduce the weights of out – of – the money positions. This strategy is also known as "window dressing". Although it is beneficial to hide the poor performance of the fund in the short term, the fund will probably be adversely affected by the strategy in the long term.

In a nutshell, although the Efficient Market Hypothesis claims that it is impossible to obtain excess return, existence of market anomalies contradict with the market efficiency. Market participants can benefit from unusual price movements or patterns to provide extra returns. With using specific fundamental, technical & calendar methods, they can beat the market in the short term. In some cases, although an anomaly is known by investors, the stock market might give more profitable opportunities. The anomaly can continue in the market until it becomes attractive to them.

The days of the week anomaly is known as "weekend effect" and one of the best examples in order to observe irrational trading strategies of market participants.
Increasing volatility in asset prices and uncertainties in the global conjuncture after the 2007 Mortgage Subprime Crisis were the key drivers for shortening the investment maturities of market participants.

The leverage advantage of intra – day trading and inadequate momentum in the stock markets, increased the investors' interest to the short-term trading strategies. As the investment maturity shortens, the reaction to the stock markets increases in the short – term. Because of these reasons, popularity of calendar anomalies has increased for the last two decades. Crisis eras, insufficient market sentiment on asset prices & macro events that effect global conjuncture in an especially negative way trigger the irrational behaviors of the market participants. Calendar anomalies take an important role to analyze the market momentum and noise in the short term for retail traders and fund managers.

Market participants don't want to take the weekend risk because of the bad news flow when the stock markets are closed. Then, they generally tend to reduce their positions on Fridays. On the other hand, they tend to take positions with the more optimistic approaches on the first trading day of the week.

In order to investigate the presence of this effect in Istanbul Stock Exchange, days of the week anomaly will be viewed in this study. The effect will be investigated by using daily returns of the BIST30 and BIST100 which are the two most important stock market indexes from 2007 to 2018.

Days of the week anomaly will be investigated covering the period of 2007 – 2018 for the BIST30 and BIST100 indexes with using OLS Regression, GARCH (1,1) and EGARCH (1,1) methods. In this period, the Mortgage Subprime Crisis, which was considered as one of the biggest financial crises of all times, erupted. During this period, there was a strong selling pressure in the financial markets. The deterioration of the global financial system affected in a negative way for financials of listed companies. Due to difficulties of accessing finance, productivity and trade volumes of companies declined in this period. Decrease in the profitability of listed companies and deterioration in their asset quality damaged stock market indexes. After the crisis, large amount of funds was released from stock markets. Lehman Brothers, one of the world's largest investment bank, announced bankruptcy in this term. The high rate of derivatives transactions in the balance sheets of investment banks revealed the "moral hazard" problem in the financial intermediaries. After that, Merrill Lynch declared its bankruptcy due to CDOs (Collateralized Debt Obligations) became worthless. The bank was bought by Bank of America (BOFA) with the support of the Federal Reserve. The bank continued investment banking services with the name of BOFA Merrill Lynch. During the crisis period, Federal Reserve (FED) and European Central Bank (ECB), the two most important central banks in the world, have lowered their interest rates rapidly in order to stabilize the financial system. In other words, they provided relatively cheap funds to financial intermediaries to heal their wounds.

Although recovery process in financial markets has been observed with the increase in access to cheap funds, the deterioration signals in global conjuncture that cause shrinkage in the global trade volume pose additional risks in the pricing of financial assets.

Turkey has been affected by the crisis at the end of 2008. Due to the impairment of companies' cash flow structure, they have not been able to collect their receivables. Although the need of working capital increased, it could not be easily funded by financial intermediaries. From 2009 to 2010, the growth momentum has been lost because of the diminishing aggregation demand.

The production inputs of Turkish industry companies are predominantly in dollar terms. In addition, the European countries have the most important market for generating export revenues. Increase in raw materials costs due to problems in the American economy has negatively affected the profitability of companies. Inadequate domestic demand and dramatic decline in export revenues have led to increase in unemployment rate. In this process, profit margins of companies contracted due to these events.

After the crisis, Turkish banks have reached to the cheap funds of the FED and ECB. Since Central Bank of the Republic of Turkey (CBRT) has implemented contractionary monetary policies, it was convenient to give dollar and euro loans for Turkish banks. In 2012, credit rating agencies upgraded Turkey's credit rating to investment grade. Following this decision, there was an intense demand to Turkish assets, especially bonds and stocks, by foreign investors. A financial instrument that pension funds want to invest should be at an investment level. Thanks to the new credit rating, the private sector had reached cheaper funds.

The calm before the storm has ended with the uncertainties on global conjuncture. Policies that could negatively affect global trade volume and growth momentum began to be discussed. As a result of the referendum held in the second half of 2016, Britain decided to leave the European Union. This decision made the investors think that Euro – zone began to lose its old charm. In other words, custom tariffs and tax advantages did not benefit as much as before. One of the most important reason behind the Brexit was the crisis in Greece and its damage to the European economy.

Furthermore, the aggravation of the Italian banking crisis prevented European Central Bank from implementing monetary policies effectively. By the end of 2016, Donald Trump won the American election and became the president. He started to trade wars by adding extra custom duty for many products from China to America. There was the risk – off pricing in the capital markets due to the increasing macro data flow and global risks especially after the third quarter of 2018. Market participants preferred defensive investment products. In this process, emerging markets' assets have taken the biggest damage.

In 2018, Turkish Lira depreciated approximately 35 % against reserve currencies. The deterioration in fiscal discipline, the sharp rise in interest rates, private sector debt and political issues are the main risks for Turkish assets. In this period, when the volatility in the stock markets reached to record levels, BIST100 index lost 21 % on annual basis. Financial distress, fragile local currency, downward revisions on sales revenues and poor expectations in profitability figures for the listed companies are some of the reasons for institutional investors.

This period of increasing uncertainties in global conjuncture and the volatility in the stock markets between 2007 and 2018 was decided to examine with the expectation of irrational trading strategies in market participants. After this part, literature research about the days of the week anomaly will be included.

LITERATURE RESEARCH

Days of the week anomaly, one of the most popular calendar anomalies, was examined in stock market indexes. Sias and Starks (1995) found that Monday has the lower return than the other trading days in a statistical way. According to the research, institutional market professionals play an important role in this abnormal price movement. Brooks and Gita (2001) analyzed the calendar anomaly on Southeast Asian stock markets which are South Korea, Malaysia, Thailand, Taiwan and the Philippines. The significant seasonal price actions were detected in the three of these five stock markets. Rogalski (1994) states that the weekend effect creates a negative return on Mondays because of the news flow on non-trading days. Furthermore, Lakonishok and Maberly (1990) found that there is a relative change in the number of selling executions of individual investors on Mondays.

French and Roll (1986) claims that due to trading activities of the informed traders, there is the excess return on some trading days of the week in stock markets. In addition to this, Foster and Viswanathan (1990) says that the intraday volatility and average true range in the stock prices are the highest on Mondays because of the insider trading activities. Liu (2010) investigated the week – day effect on the Australian stock market. Monday is the highest return than the other days because of the weekend effect. On the other hand, according to the research of Xiao (2016) there was no evidence of the days of the week anomaly in Russell 3000 index. Moreover, calendar anomalies were examined for the currencies. Osarumwense (2016) claims that, there is an anomaly in the Nigerian currency market against the US Dollars between 2009 – 2015.

Calendar anomalies was also examined for Turkish stock and currency markets. Aydogan (1994) studied days of the week anomaly for Istanbul Stock Exchange to 2007 from 1997. The study states that, Friday is the higher return than the other days at 5% significance level. On the other hand, Wednesday has the lowest return in a statistical way. Additionally, Tuesday had the lowest return sub-periodically in this research.

Balaban (1994) searched days of the week effect with using Istanbul Securities Exchange Composite Index between 1988 and 1994. Atan and Özdemir (2009) found that Istanbul Stock Exchange Index moves in the weak form with using fifteen minutes data. Furthermore, Atakan (2008) viewed calendar anomalies which are calendar and days of the week anomalies in Istanbul Stock Exchange 100 Index from 1987 to 2008 with using ARCH – GARCH models. In this research, there is no evidence in the stock market for January effect. Besides, Friday has the highest return in a statistical way with respect to mean returns of the weekdays. Akbalık and Özkan (2016) worked on the companies of BIST30 Index. According to the research, BIMAS and TCELL stocks had the higher Friday return and EKGYO had the higher Monday return. Özarı and Turan (2016) studied calendar anomalies for BIST30 & BIST100 indexes and USDTRY currency to 2015 from 2005. In this period, days of the week effect was seen in stock market indexes. As in previous studies, Friday and Monday returns have excess return than expected in a statistical way. But there is no evidence of days of the week anomaly in USDTRY. Dastan and Aksoy (2011) claims that short selling is one of the most important factors to existence of days of the week effect. Speculative market participants, generally traders & hedge fund managers close their position on Fridays and open them with the beginning of the new week. Because of this trading strategy, week -day effect was seen in the Turkish stock market.

Karcıoğlu and Özer (2017) investigated calendar effect on the sectors of the BIST companies. There was the calendar effect to get the excess return between 2002 and 2016 in this research. Berument and Kıymaz (2001) investigated calendar anomalies during the period of 1973 and 1997 for the S&P 500 stock market index.

It is stated in the research that; Friday has the highest return in this period. In addition, Wednesday has the lowest return in a statistical way. Besides, Berument and Coskun (2007) worked on the relation between foreign exchange market volatility and days of the week anomaly. According to this research, Thursday has the higher return which is the Turkish Lira depreciates against the US Dollars and Monday has the lower return compared to Wednesdays.

When the studies about the calendar anomalies on especially stock markets demonstrates that, the weekend effect creates abnormal price movements. Market participants overreact news flow or new information when they are published on the non – trading days about listed companies. Because of this, the studies show that Mondays and Fridays have excess return compared to the other trading days. Existence of the extra return than expected rejects the
Efficient Market Hypothesis. Besides, stock markets don't move in strong form. Market participants can obtain the excess return with using different strategies. After analyzing the studies in global capital markets, days of the week anomaly will be investigated in Istanbul Stock Exchange daily returns of the main indexes which are BIST30 and BIST100 between 2007 – 2018 with using OLS Regression, GARCH (1, 1) and EGARCH (1,1) in this thesis.

After the 2007 Mortgage Subprime Crisis, a significant change was observed in trading strategies of the market participants. The increase in uncertainties, the slowdown in global economic growth and the weakening of the momentum of stock market indexes in the long – term led to a decline in the investment maturity of market participants. It will be seen whether the trading days are statistically significant for market participants in Istanbul Stock Exchange or not. As it was seen in previous studies, weekend effect and positive return on Mondays will be investigated for the BIST30 and BIST100 stock market indexes. After this part, this study will be continued with data and methodology. Graphics and statistics of the index data will be included. In addition to this, the methods to be used for modelling of the data will be explained and their formula will be included.

DATA AND METHODOLOGY

This study is performed with using the main indexes of Istanbul Stock Exchange (BIST) "BIST30 & BIST100" between 2007 – 2018. 3127 daily closing price data of the stock market indexes are taken from Bloomberg Data Terminal. The daily return data are derived from closing prices. The formula used to calculate daily return of the indexes is given below.

$$R_t = \left(\frac{P_t}{P_{t-1}} - 1\right) * 100$$

In this formula, R_t is the return at time t, where P_t is the closing price at time t, and P_{t-1} is the closing price at time t-1.

Ordinary Least Squares regression or OLS was used to observe days of the week effect on the stock market indexes. The daily return data was modelled with using dummy variables. The regression equation of the model is as follows:

$$R_t = c + \alpha_M M_t + \alpha_{Tu} Tu_t + \alpha_W W_t + \alpha_{th} Th_t + \alpha_f F_t + \varepsilon_t,\ \varepsilon_t \sim N(0, \sigma_t^2)$$

M_t, Tu_t, W_t, Th_t and F_t are the dummy variables for Monday, Tuesday, Wednesday, Thursday and Friday. Dummy variables are variables that takes values of 0 and 1 where the values point the existence and absence of the condition. For this model, when M_t (Monday) equals to 1, values of other dummy variables are 0. Daily returns on Wednesdays were removed from the model to prevent multi – collinearity.

According to the many studies likewise Starks and Smirlock (1986), French (1980); Ordinary Least Square Method (OLS) was used to investigate the days of the week anomaly in the stock markets.

On the other hand, Ordinary Least Squares regression may mislead the results. The regression results might not be reliable when the data is not normally distributed. Berument and Dogan (2012) claims that using the OLS method on the index return has two disadvantages. First of all, the existence of autocorrelation between error variables may direct the results incorrectly. The other disadvantage is the time dependency of the error variances.

The regression analysis was examined with Residuals Normality Test and White Test. Because of the auto – correlation and heteroskedasticity problems, the data was modelled with using the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and Exponential GARCH (EGARCH).

GARCH (1,1) will be used as follows:

$$R_t = c + \alpha_M M_t + \alpha_{Tu} Tu_t + \alpha_W W_t + \alpha_{th} Th_t + \alpha_f F_t + \varepsilon_t,\ \varepsilon_t \sim N(0, \sigma_t^2),$$
$$\sigma_t^2 = \gamma + \beta_1\, \varepsilon_{t-1}^2 + \beta_2 \sigma_{t-1}^2.$$

Since volatility of financial assets vary during certain periods and depend on past variance, homoscedastic approaches can't produce optimal results. ARCH specifications are widely used for modelling the volatility of asset returns. As in previous studies, it is seen that GARCH specification is the most commonly used method for modelling stock market returns.

As a robustness check, we will also use EGARCH (1,1) as follows:

$$R_t = c + \alpha_M M_t + \alpha_{Tu} Tu_t + \alpha_W W_t + \alpha_{th} Th_t + \alpha_f F_t + \varepsilon_t,\ \varepsilon_t \sim N(0, \sigma_t^2),$$
$$\log(\sigma_t^2) = \gamma + \beta_1 \left|\frac{\varepsilon_{t-1}^2}{\sigma_{t-1}^2}\right| + \beta_2 \sigma_{t-1}^2 + \beta_3 \frac{\varepsilon_{t-1}^2}{\sigma_{t-1}^2}.$$

According to Berument and Dogan (2012), Exponential GARCH has certain advantages over other ARCH specifications. First, non – negativity constraint on the model parameters is not necessary for this specification because the levels of variances are not modeled. Moreover, negative stock market shocks have affected more than positive shocks on the implied volatility due to the intraday trading leverage effect. EGARCH specification allows this asymmetry.

After explaining characteristics of the methods to be used for modelling the data, the graphics and descriptive statistics of the stock market indexes are given below.

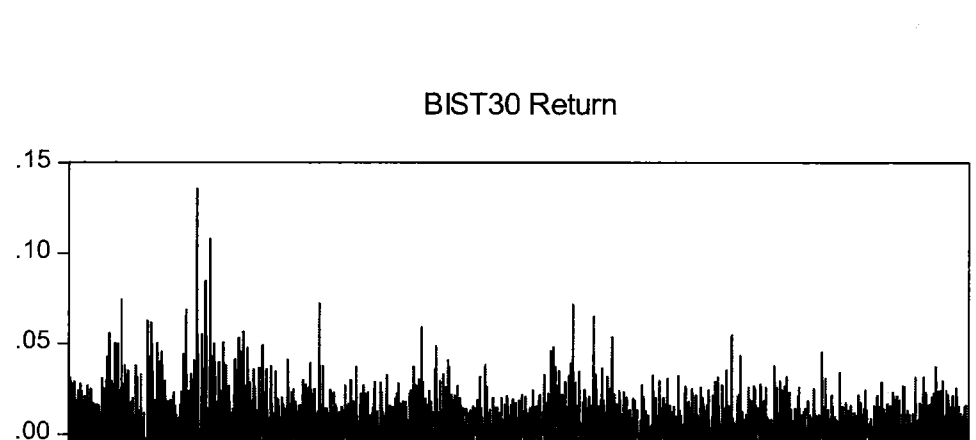

Figure 1. BIST30 Index Daily Return 2007 - 2018

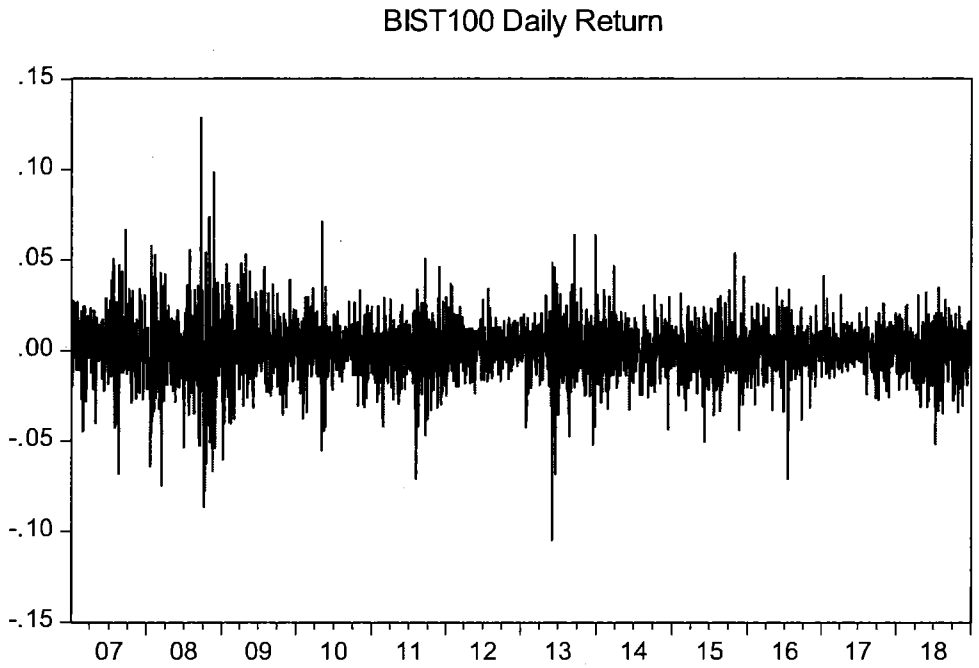

Figure 2. BIST100 Index Daily Return between 2007- 2018

In Figure 1 and Figure 2, graphics of the BIST30 and BIST100, the two of the most important stock market indexes of Istanbul Stock Exchange are given above. Periodic shocks are clearly seen in the graphics. The stock market volatility, which started to rise with the beginning of 2007, reached its peak in 2008. Graphics also shows that, there are some trading days which price changes of the indexes are more than 10 %. The psychological effects of the crisis impress investment strategies of market participants prominently. As reported in behavioral finance studies, investors overreact to the stock markets during this period.

Although volatility in the stock market indexes entered a downward trend after the crisis, price shocks are seen periodically in the graphics in the following the years. Furthermore, negative price movements are seen more frequently since 2013. External shocks and internal upheavals have put a severe dampener on the stock market indexes' performance.

Table 1. BIST30 Daily Return Descriptive Statistics

BIST30	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	0.0003	-0.0002	0.0002	0.0004	0.0004
Median	-0.0002	-0.0003	-0.0003	-0.0003	-0.0003
Maximum	0.1357	0.1352	0.1352	0.1353	0.1354
Minimum	-0.1042	-0.1037	-0.1037	-0.1037	-0.1037
Standard Deviation	0.0171	0.0171	0.0171	0.0168	0.2029
Skewness	0.0210	0.0242	0.0246	0.0252	0.0238
Kurtosis	7.1438	7.1265	7.1267	7.1259	7.1339
Jarque - Bera	2237.5460	2218.9660	2219.1760	2218.3340	2226.9520
Probability	0.0000	0.0000	0.0000	0.0000	0.0000
Observation	3127	3127	3127	3127	3127

In Table 1, descriptive statistics of the BIST30 index covering the period of 2007 and 2018 are given. According to the statistics, the highest mean value of the index is seen on Thursdays and 0.0004. On the other hand, the lowest mean value is seen on Tuesdays and -0.0002. In this period, maximum and minimum returns are 0.1357 and -0.1042 respectively. The highest volatility is seen on Fridays with respect to the other trading days.

Skewness value of the week – days are greater than 0 and skewed to the right. Kurtosis value of them are also greater than 3. BIST30 index daily returns between 2007 and 2018 have a lepto – kurtic and positively skewed curved. According to the Jarque Bera test, the null hypothesis H_0 is rejected and it means that, the data does not have the normal distribution.

In leptokurtic distributions, there are some outliers along the X axis, causing a higher kurtosis than the optimal value in the normal distribution. Kurtosis value should be large positive number in leptokurtic distributions.

Table 2. BIST100 Daily Return Descriptive Statistics

BIST100	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	-0.0002	0.0006	0.0002	-0.0001	0.0002
Median	0.0003	-0.0002	-0.0003	-0.0002	-0.0001
Maximum	0.1287	0.1285	0.1284	0.1278	0.1290
Minimum	-0.1057	-0.1052	-0.1050	-0.1047	-0.1052
Standard Deviation	0.0160	0.0168	0.0160	0.0161	0.0162
Skewness	-0.1130	-0.1074	-0.1073	-0.1065	-0.1082
Kurtosis	7.5216	7.4953	7.4957	7.4940	7.5050
Jarque - Bera	2670.4670	2639.0030	2639.4580	2637.3920	2650.4800
Probability	0.0000	0.0000	0.0000	0.0000	0.0000
Observation	3127	3127	3127	3127	3127

In Table 2, descriptive statistics of the BIST100 index covering the period of 2007 and 2018 are given. According to the statistics, the highest mean value of the index is seen on Tuesdays and 0.0006. On the other hand, the lowest mean value is seen on Mondays and -0.0002. In this period, maximum and minimum returns are 0.1290 and -0.1057 respectively. The highest volatility is seen on Tuesdays with respect to the other trading days.

Skewness value of the week – days are lower than 0 and skewed to the left. Kurtosis values are also greater than 3. BIST30 index daily returns between 2007 and 2018 have a lepto – kurtic and negatively skewed curved. According to the Jarque Bera test, the null hypothesis H_0 is rejected and it means that, the data is not normally distributed.

To prevent multi – collinearity problem, daily returns on Wednesdays of the both stock market indexes will be removed from OLS Regression and ARCH specifications. As it was seen in the previous studies, there is no statistically significant return on Wednesdays. Days of the week anomaly is primarily aimed at analyzing and interpreting the significant return differences on Fridays and Mondays.

In this study, Ordinary Least Squared Regression, GARCH and EGARCH specifications will be used. In order to ARCH specifications, residuals normality test and heteroskedasticity test will be applied for the market indexes. After the linear regression analysis, it will be checked the residuals normality test. As seen in previous studies, stock market returns generally are not normally distributed. The volatility of stock markets generally changes over – time. It means that the variance of the stock market returns is not constant. Because of this, white test will be applied to the data set. After checking heteroskedasticity of the indexes, GARCH (1,1) and EGARCH (1,1) will be used. The results of the analyzes conducted for the week – days with using OLS Regression, GARCH (1,1) and EGARCH (1,1) will be given as coefficients and p – values in parentheses.

EMPIRICAL RESULTS

Table 3. Daily returns estimation with OLS Regression between 2007 - 2018

2007 - 2018	BIST30 - OLS	BIST100 - OLS
C	0.0003 (0.6430)	0.0002 (0.6874)
Monday	0.0006 (0.5268)	0.0007 (0.4183)
Tuesday	-0.0001 (0.9911)	0.0003 (0.9677)
Thursday	0.0002 (0.9873)	0.0004 (0.9624)
Friday	-0.0001 (0.9170)	-0.0001 (0.9113)

In Table 3, days of the week anomaly was investigated from 2007 to 2018 with using OLS regression for the stock market indexes. According to the results, Monday and Thursday have the positive coefficients. In addition, Friday has the negative coefficient for the BIST30 and BIST100 indexes. However, none of these coefficients are significant. The anomaly was not found in this period for the indexes. After that, residuals normality test will be checked to robustness of regression results.

Table 4. Residuals Normality Test between 2007 - 2018

2007 - 2018	BIST30	BIST100
Mean	-0.0001	-0.0001
Median	-0.0003	-0.0001
Maximum	0.1355	0.1288
Minimum	-0.1042	-0.1057
Standard Deviation	0.0172	0.0160
Skewness	0.0207	-0.1134
Kurtosis	7.1463	7.5249
Jarque- Bera	2240.1190	2674.4290
Probability	0.0000	0.0000
Observations	3127	3127

In Table 4, residuals normality test results are given from 2007 to 2018 for the BIST30 & BIST100 indexes. Residuals' skewness values differ from 0. BIST30 residuals are skewed to the right but BIST100 residuals are skewed to the left. The kurtosis value of the two indexes are greater than 3. According to the Jarque Bera test, residuals are not normally distributed.

Table 5. White Test Results for the BIST30 & BIST100 indexes between 2007 - 2018

2007 - 2018	BIST30	BIST100
F - statistic	1.6656	0.6548
Prob. F (4,3122)	0.1551	0.5196
Obs * R - squared	6.6591	1.3120
Prob. Chi - Square (4)	0.1550	0.5189

In Table 5, white test results for the BIST30 and BIST100 stock market indexes are given between 2007 – 2018. According to the test results, probabilities are greater than 5% significance level. As seen in previous investigations, there is the heteroskedasticity problem. t – statistics in OLS Regression does not follow t – distribution. Similarly, F – statistics does not follow f – distribution and the regression results will not be consistent. Since the heteroskedasticity is involved in the study, GARCH and EGARCH specifications that allow variance and covariance to change over – time will be used to eliminate the problem.

Table 6. Daily returns estimation with GARCH (1,1) and EGARCH (1,1) between 2007 - 2018

2007 - 2018	BIST30- GARCH	BIST30- EGARCH	BIST100-GARCH	BIST100- EGARCH
C	0.0003 (0.8235)	0.0002 (0.6874)	0.0008 (0.1252)	0.0006 (0.2143)
Monday	0.0006 (0.7517)	0.0006 (0.4919)	0.0009 (0.2109)	0.0008 (0.2499)
Tuesday	-0.0001 (0.9957)	-0.0001 (0.9908)	-0.0004 (0.5603)	-0.0004 (0.6103)
Thursday	0.0001 (0.9937)	0.0001 (0.9863)	-0.0003 (0.6553)	0.0001 (0.8673)
Friday	-0.0001 (0.9615)	-0.0001 (0.9146)	-0.0003 (0.7096)	-0.0002 (0.7829)

In Table 6, days of the week anomaly was investigated with using GARCH (1,1) from 2007 to 2018 for the stock market indexes. In addition to this, EGARCH specification was used for robustness check. According to the results, Monday and Thursday have the positive coefficients in the BIST30 index.

The other trading days have the negative coefficients in this period. However, there is no statistically significant coefficient. Furthermore, Monday has the positive coefficient in the BIST100 index. The others have the negative coefficients. In parallel with the results of the BIST30 index, coefficients of the BIST100 index are not significant at any significance levels. Days – of – the – week anomaly has not been found between 2007 – 2018.

There is no evidence of days of the week anomaly covering the period of 2007 and 2018 with using GARCH (1,1) and EGARCH (1,1) specifications. As seen in previous studies, the anomaly may occur periodically. Because of this, the data set will be modelled in 4 – year subperiods which are 2007 – 2010, 2011 – 2014 & 2015 – 2018.

Table 7. Daily returns estimation with OLS Regression between 2007 - 2010

2007 - 2010	BIST30 - OLS	BIST100 - OLS
C	0.0015	0.0012
	(0.3059)	(0.3473)
Monday	-0.0008	0.0002
	(0.9677)	(0.9060)
Tuesday	-0.0016	-0.0013
	(0.4257)	(0.4869)
Thursday	-0.0006	-0.0004
	(0.7565)	(0.8328)
Friday	-0.0015	-0.0014
	(0.4584)	(0.4670)

In Table 7, days of the week anomaly was examined with using Ordinary Least Squared Regression for the BIST30 and BIST100 stock market indexes between 2007 and 2010. All week – days have the negative coefficients in the regression for the BIST30 index. BIST100 daily returns with OLS Regression show that, Monday has the positive coefficient and the other days have the negative coefficients. However, coefficients are not significant at any significance levels. There is no evidence of the anomaly with using OLS Regression in this period for the stock market indexes.

Table 8. Residuals Normality Test between 2007 - 2010

2007 - 2010	BIST30	BIST100
Mean	0.0003	0.0001
Median	-0.0006	-0.0004
Maximum	0.1357	0.1291
Minimum	-0.0942	-0.0877
Standard Deviation	0.0213	0.0197
Skewness	0.2204	0.1131
Kurtosis	6.3578	6.6476
Jarque- Bera	497.4634	579.3320
Probability	0.0000	0.0000
Observations	1041	1041

In table 8, residuals normality test results are given for the BIST30 and BIST100 indexes between 2007 – 2010. Skewness values are greater than 0. It means that, residuals of the two indexes are skewed to the right. Kurtosis values are 6.3578 and 6.6476 respectively and greater than 3. According to the Jarque – Bera test, residuals are not normally distributed.

Table 9. White Test Results for the BIST30 & BIST100 indexes between 2007 - 2010

2007 - 2010	BIST30	BIST100
F - statistic	0.6948	0.7362
Prob. F(4,1036)	0.5956	0.5673
Obs * R - squared	2.7850	2.9506
Prob. Chi - Square(4)	0.5944	0.5661

In Table 9, white test results for the BIST30 and BIST100 stock market indexes are given between 2007 – 2010. According to the results, probabilities are greater than 5% significance level. The error terms' variance of the regression analysis is not constant. Because of the heteroskedasticity problem, t – statistics in OLS Regression does not follow t – distribution. Furthermore, F – statistics does not follow F – distribution. Since the heteroskedasticity is involved in the study, GARCH and EGARCH specifications that allow variance and covariance to change over – time will be used to eliminate the problem.

Table 10. Daily returns estimation with GARCH (1,1) and EGARCH (1,1) between 2007 - 2010

2007 - 2010	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - GARCH	BIST100 - EGARCH
C	0.0033	0.0026	0.0032	0.0024
	(0.0038)	(0.0247)	(0.0019)	(0.0191)
Monday	-0.0005	0.0001	-0.0003	0.0003
	(0.7610)	(0.9509)	(0.8480)	(0.8652)
Tuesday	-0.0033	-0.0027	-0.0029	-0.0019
	(0.0610)	(0.1165)	(0.0697)	(0.2456)
Thursday	-0.0009	-0.0004	-0.0008	-0.0003
	(0.5554)	(0.7817)	(0.5867)	(0.8141)
Friday	-0.0033	-0.0029	-0.0031	-0.0029
	(0.0642)	(0.1065)	(0.0503)	(0.0773)

In Table 10, days of the week anomaly was examined with using GARCH (1,1) specification for the BIST30 and BIST100 indexes from 2007 to 2010. According to the results, Monday, Tuesday, Thursday and Friday have the negative coefficients. Tuesday is statistically significant in the BIST30 – GARCH (1,1) model. Furthermore, Friday coefficient in the BIST30 and BIST100 indexes are also significant at 10% significance level. There is the negative return on Fridays statistically for the both stock market indexes in this period.

EGARCH (1,1) method was used for a robustness check for the BIST30 and BIST100 indexes in the same period. As seen in the results of analysis with using GARCH specification, Friday coefficient is statistically significant. In this period, there is "the weekend effect" in the stock market indexes. Market participants who do not want to take the weekend risk, generally tend to reduce their positions. This trading strategy leads the abnormal price movement.

Table 11. Daily returns estimation with OLS Regression between 2011 - 2014

2011 - 2014	BIST30 - OLS	BIST100 - OLS
C	-0.0007 (0.5151)	-0.0002 (0.5702)
Monday	0.0008 (0.5806)	0.0007 (0.5852)
Tuesday	0.0021 (0.1712)	0.0018 (0.1950)
Thursday	0.0006 (0.6836)	0.0004 (0.7646)
Friday	0.0018 (0.2322)	0.0016 (0.2691)

In Table 11, days of the week anomaly was analyzed with using Ordinary Least Squared Regression for the BIST30 & BIST100 indexes from 2011 to 2014. According to the regression results, week – days have the positive coefficients. However, none of these coefficients are statistically significant.

Table 12. Residuals Normality Test between 2011 – 2014

2011 – 2014	BIST30	BIST100
Mean	-0.0001	-0.0001
Median	0.0002	0.0003
Maximum	0.0716	0.0645
Minimum	-0.1034	-0.1049
Standard Deviation	0.0160	0.0149
Skewness	-0.3765	-0.5310
Kurtosis	6.2707	7.2336
Jarque – Bera	489.5369	827.9585
Probability	0.0000	0.0000
Observations	1043	1043

In Table 12, residuals normality test results are given for the BIST30 and BIST100 indexes from 2011 to 2014. Skewness values are -0.3765 and 0.5310 respectively for the stock market indexes and lower than 0. Residuals are skewed to the left. Moreover, kurtosis values are greater than 3. According to the Jarque Bera test, residuals are not normally distributed.

Table 13. White Test Results for the BIST30 & BIST100 indexes between 2011 - 2014

2011- 2014	BIST30	BIST100
F - statistic	1:0393	1.1995
Prob. F(4,1038)	0.3857	0.3093
Obs * R - squared	4.1606	4.7991
Prob. Chi - Square(4)	0.3847	0.3085

In Table 13, white test results for the BIST30 and BIST100 stock market indexes are given between 2011 – 2014. According to the results, p – values are greater than 5 % significance level. It means that, there is the heteroskedasticity problem. Because of this, t – statistics in OLS regression does not follow t – distribution. F – statistics also doesn't follow F – distribution. Since the heteroskedasticity is involved in this study, GARCH and EGARCH specifications that allow variance and covariance to change over – time will be used to eliminate the problem.

Table 14. Daily returns estimation with GARCH (1,1) and EGARCH (1,1) between 2011 - 2014

2011 - 2014	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - GARCH	BIST100 - EGARCH
C	-0.0001	-0.0003	0.0002	-0.0002
	(0.9850)	(0.7688)	(0.8624)	(0.8198)
Monday	0.0009	0.0006	0.0008	0.0009
	(0.5107)	(0.6657)	(0.5458)	(0.4832)
Tuesday	0.0012	0.0011	0.0009	0.0010
	(0.4116)	(0.4552)	(0.4702)	(0.4516)
Thursday	0.0012	0.0008	0.0009	0.0006
	(0.3468)	(0.5415)	(0.4551)	(0.6438)
Friday	0.0017	0.0015	0.0015	0.0015
	(0.2400)	(0.2736)	(0.2348)	(0.2632)

Days of the week anomaly was investigated with using GARCH (1,1) for the BIST30 & BIST100 stock market indexes from 2011 to 2014. Coefficients of the week – days are positive. However, none of these are statistically significant. There is no evidence of the excess return in this period with using GARCH (1,1).

EGARCH (1,1) was used for a robustness check in the same period. As seen in the results of analysis with GARCH (1,1) method, all trading days have positive coefficients. None of these are statistically significant. There is no evidence of days of the week anomaly in this period with using GARCH and EGARCH specification.

Table 15. Daily returns estimation with OLS Regression between 2015 - 2018

2015 - 2018	BIST30 - OLS	BIST100 - OLS
C	0.0001 (0.8547)	0.0001 (0.9293)
Monday	0.0010 (0.4119)	0.0011 (0.3428)
Tuesday	-0.0005 (0.6845)	-0.0004 (0.7181)
Thursday	0.0005 (0.9689)	0.0001 (0.9385)
Friday	-0.0006 (0.6237)	-0.0005 (0.6779)

In Table 15, days of the week anomaly was investigated with using Ordinary Least Squared Regression for the BIST30 and BIST100 indexes covering the period of 2015 – 2018. The results show that, Monday and Thursday have positive coefficients. In addition to this, Tuesday and Friday have negative coefficients. On the other hand, none of these coefficients are statistically significant. The anomaly doesn't exist in this period with using OLS regression.

Table 16. Residuals Normality Test between 2015 – 2018

2015 - 2018	BIST30	BIST100
Mean	0.0001	0.0001
Median	-0.0004	0.0003
Maximum	0.0536	0.0527
Minimum	-0.0683	-0.0721
Standard Deviation	0.0131	0.0126
Skewness	-0.2342	-0.3555
Kurtosis	4.6171	5.0709
Jarque - Bera	123.1740	208.3489
Probability	0.0000	0.0000
Observations	1043	1043

In Table 16, residuals normality test results are given between 2015 – 2018 for the stock market indexes. The results demonstrate that, skewness values of the BIST30 and BIST100 index are -0.2342 and -0.3555 respectively and lower than 0. In other words, residuals are skewed to the left. In addition to this, kurtosis values are greater than 3. As seen in the previous analyses, residuals are not normally distributed.

Table 17. White Test Results for the BIST30 & BIST100 indexes between 2015 - 2018

2015 - 2018	BIST30	BIST100
F - statistic	3.5401	3.9307
Prob. F(4,3122)	0.5263	0.5466
Obs * R - squared	14.0405	15.5627
Prob. Chi - Square(4)	0.5158	0.5428

In Table 17, white test results for the BIST30 and BIST100 indexes are given between 2015 – 2018. The results show that, p – values are greater than 5% significance level. The error terms' variance of the regression analysis is not constant. In other words, t – statistics in OLS Regression does not follow t – distribution. Furthermore, F – statistics does not follow f – distribution. Since the heteroskedasticity is involved in the study, GARCH and EGARCH specifications that allow variance and covariance to change over – time will be used to eliminate the problem.

Table 18. Daily returns estimation with GARCH (1,1) and EGARCH (1,1) between 2015 - 2018

2015 - 2018	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - GARCH	BIST100 - EGARCH
C	0.0002	0.0001	0.0001	-0.0001
	(0.8633)	(0.9676)	(0.9342)	(0.9341)
Monday	0.0017	0.0014	0.0018	0.0014
	(0.1537)	(0.2113)	(0.1041)	(0.1862)
Tuesday	-0.0002	-0.0010	-0.0002	-0.0009
	(0.8432)	(0.4323)	(0.8633)	(0.4271)
Thursday	0.0004	0.0003	0.0005	0.0002
	(0.7404)	(0.8167)	(0.6990)	(0.8382)
Friday	-0.0005	0.0002	-0.0003	0.0001
	(0.7511)	(0.9840)	(0.7996)	(0.9024)

In Table 18, days of the week anomaly was examined with using GARCH (1,1) for the BIST30 and BIST100 indexes covering the period of 2015 – 2018. According to the results, Monday and Thursday have positive coefficients. Tuesday and Friday have negative coefficients. However, none of these coefficients are statistically significant. There is not the excess return on week – days with GARCH specification.

EGARCH (1,1) was used for a robustness check in the same period. Tuesday has negative coefficient. The other days have positive coefficients. In parallel with the results of GARCH (1,1) analysis, coefficients are not statistically significant. Days of the week anomaly doesn't exist in this period with using GARCH (1,1) and EGARCH (1,1) methods for the stock market indexes.

As a result of investigations carried out in 4-year periods, days of the week anomaly was determined in 2007 – 2010 period. Tuesday and Friday have the negative coefficients for the BIST30 and BIST100 indexes with using GARCH (1,1). They are also statistically significant. It means that, there are excess returns on Tuesdays and Fridays. These results contradict with the Efficient Market Hypothesis. The stock market indexes are not efficient in this period. Due to the weekend effect, market participants generally make selling transactions on the last trading day of the week.

Days of the week anomaly was investigated for 2011 – 2014 and 2015 – 2018 periods with using Ordinary Least Squared Regression and ARCH specifications. According to the results, days of the week coefficients are not significant. Because of this, there is no evidence of the anomaly in the periods. The anomaly will be examined for 2007 – 2008 and 2009 – 2010 periods for the BIST30 and BIST100 indexes.

Table 19. Daily returns estimation with OLS Regression between 2007 - 2008

2007 - 2008	BIST30 - OLS	BIST100 - OLS
C	-0.0009 (0.6853)	-0.0012 (0.5776)
Monday	0.0001 (0.9623)	0.0003 (0.9123)
Tuesday	0.0010 (0.7683)	0.0011 (0.7252)
Thursday	0.0003 (0.9274)	0.0007 (0.8096)
Friday	0.0018 (0.5950)	0.0016 (0.5936)

In Table 19, days of the week anomaly was examined with using Ordinary Least Squared Regression for the BIST30 and BIST100 indexes between 2007 – 2008. According to the results, week – days have positive coefficients for the two stock market indexes. However, p – values of the coefficients are not significant. There is no evidence of the anomaly in this period with OLS Regression.

Table 20. Residuals Normality Test between 2007 – 2008

2007 - 2008	BIST30	BIST100
Mean	-0.0001	0.0001
Median	-0.0008	-0.0004
Maximum	0.1349	0.1285
Minimum	-0.0919	-0.0853
Standard Deviation	0.0247	0.0227
Skewness	0.3350	0.2368
Kurtosis	5.9920	6.3479
Jarque - Bera	203.2985	247.2389
Probability	0.0000	0.0000
Observations	519	519

In Table 20, residuals normality test is given between 2007 – 2008 for the stock market indexes. Skewness values are 0.0247 and 0.227 respectively for the BIST30 and BIST100 and greater than 0. Residuals of the stock market indexes are skewed to the right. Furthermore, kurtosis values are 5.9920 and 6.3479 respectively and greater than 3. According to the Jarque – Bera normality test, residuals are not normally distributed.

Table 21. White Test Results for the BIST30 & BIST100 indexes between 2007 - 2008

2007 - 2008	BIST30	BIST100
F - statistic	0.5995	0.6180
Prob. F(4,514)	0.6631	0.6499
Obs * R - squared	2.4102	2.4841
Prob. Chi - Square(4)	0.6608	0.6475

In Table 21, white test results for the BIST30 and BIST100 stock market indexes are given between 2007 – 2008. According to the test results, probabilities are greater than 5% significance level. As seen in previous investigations, there is the heteroskedasticity problem. t – statistics in OLS Regression does not follow t – distribution. Similarly, F – statistics does not follow f – distribution and the regression results will not be consistent. Since the heteroskedasticity is involved in the study, GARCH and EGARCH specifications that allow variance and covariance to change over – time will be used to eliminate the problem.

Table 22. Daily returns estimation with GARCH (1,1) and EGARCH (1,1) between 2007 - 2008

2007 - 2008	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - GARCH	BIST100 - EGARCH
C	-0.0001 (0.9850)	-0.0003 (0.7688)	0.0002 (0.8624)	-0.0002 (0.8198)
Monday	-0.0025 (0.3744)	-0.0019 (0.4972)	-0.0024 (0.3253)	-0.0018 (0.4810)
Tuesday	-0.0035 (0.2224)	-0.0043 (0.1034)	-0.0032 (0.2151)	-0.0038 (0.1257)
Thursday	-0.0017 (0.5321)	-0.0031 (0.2177)	0.0014 (0.5647)	-0.0026 (0.2441)
Friday	0.0006 (0.9830)	-0.0007 (0.7851)	-0.0002 (0.9263)	-0.0009 (0.7053)

In Table 22, days of the week anomaly was investigated with using GARCH (1,1) for the BIST30 and BIST100 indexes between 2007 – 2008. According to the results for the BIST30 index, Friday has positive coefficient. The other week – days have negative coefficients. However, none of these coefficients are statistically significant. Additionally, Thursday has the positive coefficient for the BIST100 index. The other week – days have negative coefficients. As seen in the BIST30 index results, coefficients are not significant. The anomaly doesn't exist with GARCH (1,1) in this period.

EGARCH (1,1) was used for a robustness check in the same period. Week – days have negative coefficients for the two stock market indexes and none of these are statistically significant. Days of the week anomaly was not found in this period with using GARCH (1,1) and EGARCH (1,1).

Table 23. Daily returns estimation with OLS Regression between 2009 - 2010

2009 - 2010	BIST30 - OLS	BIST100 - OLS
C	0.0040 (0.0176)	0.0038 (0.0160)
Monday	-0.0003 (0.8895)	0.0001 (0.9611)
Tuesday	-0.0043 (0.0689)	-0.0038 (0.0894)
Thursday	-0.0016 (0.4907)	-0.0016 (0.4716)
Friday	-0.0049 (0.0392)	-0.0045 (0.0444)

In Table 23, days of the week anomaly was investigated with using Ordinary Least Squared Regression for the BIST30 and BIST100 indexes between 2009 – 2010. According to the results for the BIST30 index, week – days have negative coefficients. Monday has the positive coefficient and the other days have negative coefficients for the BIST100 index. None of these are statistically significant. The anomaly was not found in this period.

Table 24. Residuals Normality Test between 2009 – 2010

2009 - 2010	BIST30	BIST100
Mean	-0.0002	0.0001
Median	0.0008	0.0006
Maximum	0.0684	0.0675
Minimum	-0.0638	-0.0625
Standard Deviation	0.0171	0.0160
Skewness	0.0059	-0.0621
Kurtosis	4.2061	4.4659
Jarque - Bera	31.6397	47.0779
Probability	0.0000	0.0000
Observations	522	522

In Table 24, residuals normality test is given for the BIST30 and BIST100 indexes from 2009 to 2010. Skewness value is 0.0059 and skewed to the right for residuals of the BIST30 index. On the other hand, skewness value is -0.0621 and skewed to the left for residuals of the BIST100 index. Kurtosis values are 4.2061 and 4.4659 respectively. According to the Jarque Bera test, residuals of the stock market indexes are not normally distributed in this period.

Table 25. White Test Results for the BIST30 & BIST100 indexes between 2009 - 2010

2009 - 2010	BIST30	BIST100
F - statistic	1.1584	0.8842
Prob. F(4,517)	0.3283	0.4731
Obs * R - squared	4.6368	3.5468
Prob. Chi - Square(4)	0.3266	0.4708

In Table 25, white test results for the stock market indexes are given between 2009 – 2010.The results show that, probabilities are greater than 5% significance level. Because of the heteroskedasticity problem. t – statistics in OLS Regression does not follow t – distribution. Similarly, F – statistics does not follow f – distribution and the regression results will not be consistent. Since the heteroskedasticity is involved in the study, GARCH and EGARCH specifications that allow variance and covariance to change over – time will be used to eliminate the problem.

Table 26. Daily returns estimation with GARCH (1,1) and EGARCH (1,1) between 2007 - 2008

2009 - 2010	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - GARCH	BIST100 - EGARCH
C	-0.0001 (0.9850)	-0.0003 (0.7688)	0.0002 (0.8624)	-0.0002 (0.8198)
Monday	0.0006 (0.7599)	0.0006 (0.7712)	0.0010 (0.5966)	0.0008 (0.6532)
Tuesday	-0.0032 (0.1415)	-0.0027 (0.2235)	-0.0027 (0.1784)	-0.0020 (0.3133)
Thursday	-0.0005 (0.7640)	-0.0009 (0.9625)	0.0004 (0.7916)	-0.0002 (0.9069)
Friday	-0.0005 (0.0163)	-0.0049 (0.0300)	-0.0049 (0.0125)	-0.0046 (0.0248)

In Table 26, days of the week anomaly was investigated with using GARCH (1,1) for the BIST30 and BIST100 indexes covering the period of 2009 – 2010. According to the results for the BIST30 index, Monday has positive coefficient. The other week – days have negative coefficients. In addition to this, Friday daily returns are statistically significant at 5% significance level for the both stock market indexes.

EGARCH (1,1) was used for a robustness check in the same period. For the BIST30 and BIST100 stock market indexes, Monday has positive coefficient and the other days have negative coefficients. As seen in GARCH (1,1) results, there are the negative return on Fridays in a statistical way. P – values of Fridays are significant at 5% significance level. There is the evidence of the days of the week anomaly in this period with using GARCH (1,1) and EGARCH (1,1). The excess return on Fridays was observed during this period.

Turkey has started to be affected by the Mortgage Subprime Crisis in the second half of 2008. Global crisis sales were also seen in Turkish assets which are equities, Treasury bills and dollar denominated corporate bonds by especially foreign investors. Since foreign investors have a significant share in Turkish capital markets, they had a negative impact on the risk appetite of domestic market participants. With the deterioration of the long – term uptrend in the stock market, a significant decrease was observed in the investment maturities of the investors. This situation explains the extreme reactions seen in the short – term trading on the stock exchange.

In this process, the increase in global tension, and the weakening in the risk appetite also negatively affected stock investments. Market participants who do not want to take the weekend risk reduce their positions on Fridays. From 2009 to 2010, there is the negative return on Fridays because of these reasons. Days of the week anomaly was observed in the BIST30 & BIST100 stock market indexes with using GARCH (1,1) and EGARCH (1,1) in this period.

As a result of the study conducted between 2007 and 2018, the days of the week anomaly haven't been found for 12 years but the days of the week effect was observed periodically. Between 2007 – 2010, Tuesday and Friday have negative returns than expected with using GARCH (1,1) model in a statistical way for both stock market indexes. On the other hand, there is no existence of the day effect from 2011 to 2014. Although there is no existence of the calendar anomaly for BIST30 index between 2015 and 2018, but the "positive Monday return" than expected was found for BIST100 index in the same period.

Table 27. Daily returns estimation with OLS, GARCH (1,1) and EGARCH (1,1) between 2007 - 2018

2007 - 2018	BIST30 - OLS	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - OLS	BIST100 - GARCH	BIST100 - EGARCH
C	0.0003 (0.6430)	0.0003 (0.8235)	0.0002 (0.6874)	0.0002 (0.6874)	0.0008 (0.1252)	0.0006 (0.2143)
Monday	0.0006 (0.5268)	0.0006 (0.7517)	0.0006 (0.4919)	0.0007 (0.4183)	0.0009 (0.2109)	0.0008 (0.2499)
Tuesday	-0.0001 (0.9911)	-0.0001 (0.9957)	-0.0001 (0.9908)	0.0003 (0.9677)	-0.0004 (0.5603)	-0.0004 (0.6103)
Thursday	0.0002 (0.9873)	0.0001 (0.9937)	0.0001 (0.9863)	0.0004 (0.9624)	-0.0003 (0.6553)	0.0001 (0.8673)
Friday	-0.0001 (0.9170)	-0.0001 (0.9615)	-0.0001 (0.9146)	-0.0001 (0.9113)	-0.0003 (0.7096)	-0.0002 (0.7829)

Table 28. Daily returns estimation with OLS, GARCH (1,1) and EGARCH (1,1) between 2007 - 2010

2007 - 2010	BIST30 - OLS	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - OLS	BIST100 - GARCH	BIST100 - EGARCH
C	0.0015 (0.3059)	0.0033 (0.0038)	0.0026 (0.0247)	0.0012 (0.3473)	0.0032 (0.0019)	0.0024 (0.0191)
Monday	-0.0008 (0.9677)	-0.0005 (0.7610)	0.0001 (0.9509)	0.0002 (0.9060)	-0.0003 (0.8480)	0.0003 (0.8652)
Tuesday	-0.0016 (0.4257)	-0.0033 (0.0610)	-0.0027 (0.1165)	-0.0013 (0.4869)	-0.0029 (0.0697)	-0.0019 (0.2456)
Thursday	-0.0006 (0.7565)	-0.0009 (0.5554)	-0.0004 (0.7817)	-0.0004 (0.8328)	-0.0008 (0.5867)	-0.0003 (0.8141)
Friday	-0.0015 (0.4584)	-0.0033 (0.0642)	-0.0029 (0.1065)	-0.0014 (0.4670)	-0.0031 (0.0503)	-0.0029 (0.0773)

Table 29. Daily returns estimation with OLS, GARCH (1,1) and EGARCH (1,1) between 2011 - 2014

2011 - 2014	BIST30 - OLS	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - OLS	BIST100 - GARCH	BIST100 - EGARCH
C	-0.0007 (0.5151)	-0.0001 (0.9850)	-0.0003 (0.7688)	-0.0002 (0.5702)	0.0002 (0.8624)	-0.0002 (0.8198)
Monday	0.0008 (0.5806)	0.0009 (0.5107)	0.0006 (0.6657)	0.0007 (0.5852)	0.0008 (0.5458)	0.0009 (0.4832)
Tuesday	0.0021 (0.1712)	0.0012 (0.4116)	0.0011 (0.4552)	0.0018 (0.1950)	0.0009 (0.4702)	0.0010 (0.4516)
Thursday	0.0006 (0.6836)	0.0012 (0.3468)	0.0008 (0.5415)	0.0004 (0.7646)	0.0009 (0.4551)	0.0006 (0.6438)
Friday	0.0018 (0.2322)	0.0017 (0.2400)	0.0015 (0.2736)	0.0016 (0.2691)	0.0015 (0.2348)	0.0015 (0.2632)

Table 30. Daily returns estimation with OLS, GARCH (1,1) and EGARCH (1,1) between 2015 - 2018

2015 - 2018	BIST30 - OLS	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - OLS	BIST100 - GARCH	BIST100 - EGARCH
C	0.0001 (0.8547)	0.0002 (0.8633)	0.0001 (0.9676)	0.0001 (0.9293)	0.0001 (0.9342)	-0.0001 (0.9341)
Monday	0.0010 (0.4119)	0.0017 (0.1537)	0.0014 (0.2113)	0.0011 (0.3428)	0.0018 (0.1041)	0.0014 (0.1862)
Tuesday	-0.0005 (0.6845)	-0.0002 (0.8432)	-0.0010 (0.4323)	-0.0004 (0.7181)	-0.0002 (0.8633)	-0.0009 (0.4271)
Thursday	0.0005 (0.9689)	0.0004 (0.7404)	0.0003 (0.8167)	0.0001 (0.9385)	0.0005 (0.6990)	0.0002 (0.8382)
Friday	-0.0006 (0.6237)	-0.0005 (0.7511)	0.0002 (0.9840)	-0.0005 (0.6779)	-0.0003 (0.7996)	0.0001 (0.9024)

Table 31. Daily returns estimation with OLS, GARCH (1,1) and EGARCH (1,1) between 2007 - 2008

2007 - 2008	BIST30 - OLS	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - OLS	BIST100 - GARCH	BIST100 - EGARCH
C	-0.0009 (0.6853)	-0.0001 (0.9850)	-0.0003 (0.7688)	-0.0012 (0.5776)	0.0002 (0.8624)	-0.0002 (0.8198)
Monday	0.0001 (0.9623)	-0.0025 (0.3744)	-0.0019 (0.4972)	0.0003 (0.9123)	-0.0024 (0.3253)	-0.0018 (0.4810)
Tuesday	0.0010 (0.7683)	-0.0035 (0.2224)	-0.0043 (0.1034)	0.0011 (0.7252)	-0.0032 (0.2151)	-0.0038 (0.1257)
Thursday	0.0003 (0.9274)	-0.0017 (0.5321)	-0.0031 (0.2177)	0.0007 (0.8096)	0.0014 (0.5647)	-0.0026 (0.2441)
Friday	0.0018 (0.5950)	0.0006 (0.9830)	-0.0007 (0.7851)	0.0016 (0.5936)	-0.0002 (0.9263)	-0.0009 (0.7053)

Table 32. Daily returns estimation with OLS, GARCH (1,1) and EGARCH (1,1) between 2009 - 2010

2009 - 2010	BIST30 - OLS	BIST30 - GARCH	BIST30 - EGARCH	BIST100 - OLS	BIST100 - GARCH	BIST100 - EGARCH
C	0.0040 (0.0176)	-0.0001 (0.9850)	-0.0003 (0.7688)	0.0038 (0.0160)	0.0002 (0.8624)	-0.0002 (0.8198)
Monday	-0.0003 (0.8895)	0.0006 (0.7599)	0.0006 (0.7712)	0.0001 (0.9611)	0.0010 (0.5966)	0.0008 (0.6532)
Tuesday	-0.0043 (0.0689)	-0.0032 (0.1415)	-0.0027 (0.2235)	-0.0038 (0.0894)	-0.0027 (0.1784)	-0.0020 (0.3133)
Thursday	-0.0016 (0.4907)	-0.0005 (0.7640)	-0.0009 (0.9625)	-0.0016 (0.4716)	0.0004 (0.7916)	-0.0002 (0.9069)
Friday	-0.0049 (0.0392)	-0.0005 (0.0163)	-0.0049 (0.0300)	- 0.0045 (0.0444)	-0.0049 (0.0125)	-0.0046 (0.0248)

We present the summary of results in Tables 27 – 32. As a result of examination conducted with using 12-year period from 2007 to 2018 for the BIST30 and BIST100 indexes, there is no days of the week anomaly in this period with using OLS Regression, GARCH (1,1) and EGARCH (1,1) as seen in Table 27.

When the same analysis investigated for 4-year periods, there is the negative return on Fridays for the BIST30 and BIST100 indexes between 2007 and 2010 except BIST30-EGARCH as seen in Table 28. Furthermore, Tuesday has the negative return at 10% significance level for the BIST100 index for the GARCH specification but not for the EGARCH specification. From 2011 to 2014 and 2015-2018, there is no days of the week anomaly in the stock market indexes in a statistical way as shown in Table 29 and Table 30.

From 2007 to 2008, there is no days of the week anomaly in the stock markets as it is seen in Table 31. On the other hand, weekend effect that means the negative return on Fridays has been observed in the BIST30 and BIST100 indexes with using GARCH (1,1) and EGARCH (1,1) from 2009 to 2010. Friday coefficient is statistically significant at 5% significance level.

CONCLUSION

The existence of market anomalies indicates an irrational trading strategy applied by the majority of market participants. However, the assumptions of the Efficient Market Hypothesis are based on the fact that investors are rational. Therefore, market anomalies contradict with the hypothesis. They argue that, market participants often use their experiences and specific methods that are not considered rational when making investment decisions. Furthermore, stock markets are not efficient, and it is possible to obtain the excess return in the short – tern. In other words, market participants can outperform the market with using calendar, fundamental, technical & other anomalies.

This research examines existence of one of the most popular calendar anomalies "days of the week anomaly" in Istanbul Stock Exchange indexes BIST30 and BIST100 with using Ordinary Least Squared Regression and ARCH specifications covering the period of 2007 – 2018. Market participants generally do not want to take extra positions on Fridays because of the weekend effect. The negative return on Fridays was observed in stock markets over certain periods. On the other hand, market participants start the first trading day of week with a more optimistic perspective. Because of this, there is also the positive Monday effect in stock markets over certain periods. These effects were investigated for Istanbul Stock Exchange indexes. According to the results, there is no das of the week anomaly in the BIST30 & and BIST100 indexes with using OLS Regression, GARCH (1,1) and EGARCH (1,1) between 2007 – 2018. According to the research of Xiao (2016), calendar anomalies can be observed periodically. Since the anomaly was not found in the 12-year period, the same investigation was examined for the 4-year and 2-year periods. There is the negative return on Fridays for the both stock market indexes from 2007 to 2010 at 5% significance level. In addition to this, Tuesday has also the negative return for the both stock market indexes in the same period at 10% significance level for the GARCH specification but not for the EGARCH specification. On the other hand, there is no days of the week anomaly covering the period of 2011-2014 and 2015-2018.

As a result of the analysis conducted with 2-year sub – periods, there is no days of the week anomaly between 2007-2008 period for the both stock market indexes. On the other hand, Fridays have the negative return at 5% significance level for the BIST30 and BIST100 indexes between 2009 – 2010. It is seen that, investors overreacted to the stock prices when Turkey is affected by the global crisis in this period. The depreciation of Turkish Lira, the difficulty of accessing finance and the dramatic decline in sales revenues for listed companies and the deterioration of the asset quality of banks are the major domestic risks. The increase in the volatility of asset prices after the crisis and the uncertainties in the global conjuncture have an important share in the shortening investment maturities of the market participants. This situation leads to increase short – term price shocks in the stock market.

As seen in the research of Aydogan (1994), there is the negative return on Fridays or weekend effect in the stock market indexes between 2007 – 2010. Dastan and Aksoy (2011) states that, the effect can be explained with short selling positions on Fridays. In addition, hedge fund managers and institutional traders who take speculative positions, open short positions on Fridays because of the weekend effect. Since they generally closed their positions on the first trading day of the week, other market participants think that the stock market makes a good opening.

From 2007 to 2010, crisis period and speculative trading strategies explain days of the week anomaly. According to the results, Turkish stock market doesn't move in strong from in this period. The market is not efficient and excess return can be obtained with using some specific trading strategies. In contrast to the Efficient Market Hypothesis, stock picking and market momentum will produce the excess return because of the irrational market participants.

REFERENCES

1. Agrawal A. and Tandon K. (1994). "Anomalies or illusions? Evidence from stock markets is eighteen countries", Journal of International Money and Finance, volume 13, page 83 – 106
2. Akbalık M. and Özkan N. (2016), "Haftanın Günü Etkisi: BIST 30 Endeksi Payları Üzerine Bir Araştırma", Finansal Çalışmalar ve Araştırmalar Dergisi, volume 14, page 1 – 16
3. Atakan T. (2008), "Testing the day-of-the-week effect and January effect anomalies at Istanbul Stock Exchange with ARCH – GARCH models", Istanbul University Journal of the School of Business Administration", volume 37, no. 2, page 98 – 110
4. Atan S. and Özdemir Z. (2009). "Hisse Senedi Piyasasında Zayıf Formda Etkinlik: IMKB Üzerine Ampirik Bir Çalışma", volume 2, page 33 – 48
5. Aydogan, K. (1994). "Hisse Senedi Fiyatlamasında Aykırılıklar, İşletme ve Finans Dergisi", page 83-89.
6. Balaban E. (1995). "Days the Week Effect: New Evidence from an Emerging Stock Market", Applied Economics Letters, Issue 2, page 139-143.
7. Basu S. (1977). "Investment Performance of Common Stocks in Relation to Their Price – Earnings Ratios: A Test of the Efficient Market Hypothesis", The Journal of Finance, volume 32, no. 3, page 663 – 682
8. Berument H. and Coskun N. (2007). "Day of the week effect on foreign exchange market volatility: Evidence from Turkey", Research in International Business and Finance, volume 21, issue 1, page 87 – 97
9. Berument H. and Dogan N. (2012). "Stock market return and volatility: day-of-the-week effect", Journal of Economics and Finance, volume 36, page 282 – 302

10. Berument H. and Kıymaz H. (2001). "The day of the week effect on stock market volatility", Journal of Economics and Finance, volume 25, issue 2, page 181 – 193
11. Berument H. and Kıymaz H. (2003). "The day of the week effect on stock market volatility and volume: International Evidence", Review of Financial Economics, volume 12, issue 4, page 363 – 380
12. Bondt D. and Thaler R. (1985). "Does the stock market overreact?", The Journal of Finance, volume 40, no. 3, page 793 – 805.
13. Brock W. and Lakonishok J (1992). "Simple Technical Trading Rules and the Stochastic Properties of Stock Return", The Journal of Finance, volume 47,
14. Brooks C. and Gita P. (2001). "Seasonality in Southeast Asian stock markets: some new evidence on day-of-the-week effects", Applied Economic Letters, Volume 8, Issue 3, page 155 - 158
15. Dastan I. and Aksoy M. (2011). "Short Selling and the Day of the Week Effect for Istanbul Stock Exchange", International Research Journal of Finance and Economics, volume 70, page 205 – 216
16. Fama E. (1976). "Efficient Capital Markets: Reply", The Journal of Finance, volume 31, issue 1, page 143 - 45
17. Fama E. (1991). "Efficient Capital Markets", The Journal of Finance, volume 46, no. 5, page 1575 – 1617
18. Foster. F and S. Viswanathan (1990). "A Theory of Interday Variations in Volume, Variance and Trading Cost in Securities Markets", Review of Financial Studies, Volume 3, page 593-624.
19. French K. (1980). "Stock returns and the weekend effect", The Journal of Financial Economics, volume 8, page 55 – 69
20. French, K and R. Roll (1986). "Stock Returns Variances: The Arrival of New Information and Reaction of Traders", Journal of Financial Economics, Volume 17, page 5-26.

21. Graham D. (1962). "Security Analysis: Principles and Techniques", New York: McGraw – Hill
22. Gultekin M. and Gultekin N. (1983). "Stock Market Seasonality: International Evidence," Journal of Financial Economics, volume 12, page 469 – 481
23. Jensen G. and Johnson R. (1997). "New Evidence on Size and Price to Book Effects in Stock Returns", Financial Analyst Journal, volume 53, no. 6, page 34 – 42
24. Kahneman D. and Knetsch J. & Thaler R. (1991). "Anomalies: The Endowment Effect, Loss Aversion and Status Que Bias", The Journal of Economic Perspectives volume 5, page 193 – 206
25. Kahneman D. and Tversky A. (1979). "Prospect Theory: An Analysis of Decision under Risk", Econometrica, volume 47, no. 2, page 263 – 291
26. Kappou K. and Brooks C. & Ward C. (2007). "The S&P 500 Index Effect in Continuous Time: Evidence from Overnight, Intraday and Tick-by-Tick Stock Price Performance", ICMA Centre Discussion Papers in Finance, University of Reading
27. Karan M. and Uygur A. (2008). "Istanbul Menkul Kıymetler Borsası'nda Haftanın Günleri ve Ocak Ayı Etkilerinin Firma Büyüklüğü Açısından Değerlendirilmesi", Ankara Üniversitesi SBF Dergisi, page 103 – 115
28. Karcıoğlu R. and Özer N. (2017). "Investigation of The Months of The Year Anomalies on Return and Volatility in The Stock Market: Istanbul Stock Exchange Application", Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, volume 21, page 1571 – 1596
29. Knopf J. and Teall J. (1999). "The IPO Effect and Measurement of Risk", Journal of Finance and Strategic Decisions, volume 12, no.2
30. Lakonishok J. and E. Maberly (1990). "The Weekend Effect: Trading Patterns of Individual and Institutional Investors", Journal of Finance, March, page 231-243.

31. Latif, Madiha & Arshad, Shanza & Fatima, Mariam & Farooq, Samia. (2011). "Market Efficiency, Market Anomalies, Causes, Evidences, and Some Behavioral Aspects of Market Anomalies". Research Journal of Finance and Accounting, volume 2, no. 9/10, page 3 – 6
32. Liu B. (2010). "Day-of-the-Week Effects: Another Evidence from Top 50 Australian Stocks", European Journal of Economics, issue 4, page 79-88
33. Malkiel G. and Fama E. (1970). "Efficient capital markets: A review of theory and empirical work", The Journal of Finance, volume 25, no. 2, page 383 – 417
34. Osarumwense O. (2016). "Day-of-the-week Anomaly: An illusion or a Reality? Evidence from Naira/Dollar Exchange Rates". CBN Journal of Applied Statistics, Volume 7 No. 1
35. Özarı Ç. and Turan K. (2016), "The Day of the Week and January Effect on Futures and Option Markets: Comparative Analysis", The Journal of International Social Research, volume 9, no. 42, page 1604 – 1619
36. Rogalski R. (1984). "New Findings Regarding Day-of-the-Week Returns over Trading and Non-Trading Periods: A Note", Journal of Finance, Volume 39, Issue 5, page 1603-1614
37. Rozeff M. and Kinney W. (1976). "Capital Market Seasonality: The Case of Stock Returns", The Journal of Financial Economics, volume 3, page 379 – 402
38. Sharma, A. (2014). "Stock Market Anomalies: A Challenge to Efficient Market Hypothesis", International Journal of Trends in Finance, volume 3, page 222 – 230
39. Sias W. and Starks T. (1995). "The Day-of-the-Week Anomaly: The Role of Institutional Investors", Financial Analysts Journal, Volume 51, Issue 3.
40. Starks L. and Smirlock M. (1986). "Day of the Week and Intraday Effects in Stock Returns", Journal of Financial Economics, volume 17, page 197 – 210

41. Szakmary A. and Kiefer D. (2004). "The Disappearing January/Turn of the Year Effect: Evidence from Stock Index Futures and Cash Markets", The Journal of Futures Markets, volume 24, page 755 – 784
42. Watchel S. (1942). "Certain observations on seasonal movements in stock markets", The Journal of Business of the University of Chicago, volume 15, issue 2, page 184 – 193
43. Xiao B. (2016). "The monthly effect and the Day of the Week effect in the American Stock market", International Journal of Financial Research, volume 7, no. 2, page 11 - 17
44. Zaremba A. and Konieczka P. and Okon S. and Nowak A. (2016). "The Low-Price Anomaly
45. Zhang L. (2005). "Value Premium", The Journal of Finance, volume 60, no. 1