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THE IMPACT OF CALENDAR ANOMALIES ON STOCK RETURN AND VOLATILITY: EVIDENCE FROM TURKISH STOCK MARKET

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Abstract

There has been a rise in recent studies on behavioral finance. According to Fama (1970) all information is priced, so it cannot be said about the undervalued stock. However, behavioral finance asserts that there are many anomalies in the market. The effects of days of the week, January effect and religious days on the returns and volatility of the stock markets were examined in the literature. In the case of Turkey, aforementioned anomalies are tested using returns and volatility of BIST100 and KAT30 indices. As a result, days of the week, January effect and Ramadan effect have no any effect on returns and volatility of both conventional and unconventional stock indices. The result has strengthened the assumption that Turkish market is more efficient in this sense and in line with Fama's EMH. It has been observed that timing does not have a significant effect on the strategies of Turkish investor.

Keywords: *Behavioral Finance, EMH, Ramadan Efect, Anomalies*

JEL Codes*: C32, C58, D53, G4*

TAKVİM ANOMALİLERİNİN HİSSE GETİRİLERİ VE VARYANSI ÜZERİNDEKİ ETKİSİ: TÜRKİYE HİSSE SENEDİ PİYASASI ÜZERİNDE BİR ÇALIŞMA

Özet

Son dönemde davranışsal finansa yönelik çalışmalarda bir artış gözlenmektedir. Fama'nın (1970) EMH'ne göre tüm bilgi, hisse değerlemelerinde fiyatlandığı için ucuz hisse senedinin varlığından söz edilemez. Davranışsal finans piyasada bir çok anomali bulunduğunu iddia etmektedir. Literatürde haftanın günleri, Ocak ayı etkisi ve dini günlerin hisse senedi piyasalarının getirileri ve oynaklığı üzerinde etkilerinin olabileceğine yönelik çalışmalar yer almaktadır. Türkiye örneğinde BIST100 ve İslami Endeks göstergesi olan KAT30 getirileri ve oynaklığı üzerine söz konusu anomaliler test edilmiştir. Haftanın günleri, Ocak ayı ve Ramazan ayının hem geleneksel hem de İslami hisse senedi endeksinin getirileri ve oynaklığı üzerinde herhangi bir etkisi bulunmadığı sonucuna ulaşılmıştır. Söz konusu sonuç Türk piyasasının bu anlamda daha verimli bir market olduğu ve Fama'nın EMH'ne göre hareket ettiği varsayımını güçlendirmiştir. Zamanlamanın Türk yatırımcının stratejilerinde kayda değer bir etkiye sahip olmadığı gözlenmiştir.

Anahtar Kelimeler: *Davranışsal Finans, EMH, Ramazan Etkisi, Anomaliler*

JEL Sınıflandırması*: C32, C58, D53, G4*

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INTRODUCTION

Stock market is a platform where buyers and sellers reach out to maximize their utility. In order to properly transact, they meanly follow the prices of securities. However, the prices depend on many economic and political fundamentals; hence, many theories have been developed by economics to examine the behavior of stock prices. Efficient Market Hypothesis (EMH) is of important theory in this field.

With respect to Efficient Market Hypothesis (EMH), Fama (1970) identified that capital assets entirely reflect all the information; thus, investors are not able to be successful in make abnormal profit. That is, the historical data is not used to the future price because the market is efficient. Furthermore, a great amount of studies has been conducted to investigate the effectualness of Efficient Market Hypothesis and many results oppose the degree of market efficiency. According to them, market anomalies exist so an investor make abnormal profits by using the past price behavior.

The persisting conflict on the level of market efficient has been very attracting research topics and many researchers emphasized that inefficient markets exist and generate stock anomalies, such as day-of-the-week effect, January effect, pre-holiday effect and other anomalies. All of them are named as calendar anomalies. With respect to these anomalies, the fluctuations of stock prices are associated with calendar and the validity of calendar effect appears. As a result, according to Kohers and Kohli (1991) investors beat markets and make abnormal profits through historical data chart. Kelly (1930) asserts that the day-of-the-week effect underline that the stock returns are relatively high on Friday but abnormally low on Monday. However, the January effect is first detected by Keim (1983) and he claimed that returns is higher on January compared to other months because investors tend to decrease their tax amount at the end of the year. Dumiriu, Stefanescu, and Nistor (2011) said that the pre-holiday effect describes that investors experience the higher average return pre-holiday

According to Weber (1930) in addition to above mentioned anomalies, religious faith plays a vital role in investor' decision making. Behavioral finance supports this view and psychological factors including religious belief cause another anomaly. Various calendars are associated with religion and the sacred days and events can shape all market and investors' mood. Lakonishok and Smidth (1988), Husain (1998), Frieder and Subrahmanyam (2004) investigated the influence of religious events on the stock markets

According to the Arslan, Iltas, and Kayhan (2017) the determinants of PE ratio of the Turkish Stock Market are dividend yield, leverage, working capital, earning volatility, size, profitability, investment and sales growth. When looking at the size and sign effect of these variables, we can see that the results are compatible with the expectation which may sign that Turkish Stock Market seems to be efficiently priced.

In our scope, the Gregorian calendar is used for civil purpose and it contains many calendar anomalies (such as day-of-the-week effect, January effect etc.) but the Islamic calendar is used for religious purposes. In the literature, holy days is accepted as other calendar anomalies. Rajab, Sha'ban and Ramadan months and days such as Ashura, Eid ul-Adha and Eid ul-Fitr in Hijri calendar are sacred events and Muslims pay attention these days and months. Considering above mentioned sacred times, Ramadan and Zil-Haj are of utmost importance because two of them are mandatory for believers. In these times, people refrain from gambling, speculations, try to visit mosques frequently, pray regularly, sacrifice animals, fast and spend their assets for religious purposes. Also, peoples devote less time to other things so significant changes in daily live is experienced. All in all, events in Hijri calendar can influence all economy and so stock market.

In this study, we look forward to the effects of selected calendar anomalies on Islamic stock market as well as conventional stock market (BIST 100) in Turkey. Generally, conventional stock market and limited calendar anomalies has been studies. In this case, studies have been very limited because investors take into consideration all anomalies to make investment decisions. However, Tuna and Uysal (2015) said that some agents prefer investment instrumentals related to Shariah motives and abstain from all interest, speculation and gambling. As a results, we investigate the effects of the Ramadan effect, the January effect and the days of the week, effect on BIST 100 and Participation 30 (KTLM 30) based on Islamic rules. Therefore, it is believed that the study of this direction will make a significant contribution to the literature.

This paper consists of six different parts. After the introduction, in the second part, similar studies in the literature will be detailed. In this part, the missing area in the literature related to this subject will be underlined. Moreover, in the third part, data will be explained. Methodology used in the analysis will be detailed. After that, analysis results will be shared. Finally, in the last section, analysis results and the recommendations will be discussed.

I. LITERATURE REVIEW

Calendar anomaly is such a very popular subject that it attracted the attention of many different researchers. Because of this situation, it can be viewed that there are lots of study in which the effects of calendar anomalies on the stock markets are tried to be analyzed. Some of the studies were emphasized on this part.

The January effect (also referred as Turn of the year effect) is the most studied financial topics in the literature. This anomaly is defined by Rozeff and Kinney Jr. (1976) and they indicated that the average returns in the January is higher on contrary to other months in New York Stock Exchange. Many possible reasons are identified by researchers. According to them, investors may avoid bad stock due to tax reasons and they have tendency to sell these stock before the new year. Beginning with the January, they repurchase the stocks lead to increase trading volume and decrease interest rates which raise the stock returns. Since then, the studies of Bhardwaj and Brooks (1992), Eleswarapu and Reinganum (1993), Sewraj et.al (2010), Gultekin and Gultekin (1983) have been conducted to examine the validity of the January effect in different markets On the other hand, some studies' results oppose the January effect. For example, Raj and Kumari (2006) made a study for Indian Stock market. Their results indicated that the January effect did not exist. Al-smadi, Almsafir, and Husni (2017) and Jebran and Chen (2017) concluded the nonexistence of the January effect in their studies.

In spite of the studies above mentioned, researcher tried to investigate the other feature of the month calendar anomalies. Ariel (1987) is the first researcher who tried to examine primary part of the month effect but primary part of months was represented as first eight trading days while last half of the month should be regarded as last nine days of the month. This study emphasized that the returns in the first half are relatively higher in US Stock Market. Lakonishok and Smidth (1988), Joshi and Kc. (2005) tested half of the month effect in their studies and their results reveal that half of the month effect exist.

Besides, the days of the week is other calendar anomaly which has been attractive among researchers. According to this phenomenon, there is lower returns at the first day of week but higher returns at the last day of the week appears. In other words, the days of the week argues that stock returns are not equally distributed thus generate evidence against the EMH. Main reasons behind this anomaly are psychological biases and strategy motives. Investors generate formal strategy formulation and generally investors encounter many works and they yield their strategies on Friday. Also, many people feel pessimistic on Monday because of post- holiday and thus this behavior mood shape investment decision making. The studies of French (1980), Jaffe and Westerfield (1985), Ritter (1988), Yat, Keong, and Ling (2011), Gao and Kling (2005) have been investigated to examine the days of the week

Taking into literature consideration, calendar anomalies are based on the Gregorian calendar. But researchers found that calendar anomalies are experienced on the Islamic calendar based on lunar cycle. The Islamic calendar has many religious patterns which impact on Muslim. Ramadan is holy month and what the Muslims should done is different with respect to other months. The Muslims should fast in the whole months from dawn till sunset. In this month, works of hours reduce so economic activities shrink because the Muslims devote more time to religious affairs. Also, people increase their consumption expenditure as well as rich believers should give charity to poor people; hence, they encounter low liquidity for investment motives. The other things may impact on the financial markets is that The Muslims refrain from gambling, speculation and interest.

Because of these above-mentioned factors, many researchers have viewed the degree of Ramadan effect on the stock markets in different countries. The studies of Garkaz, Hazini, and Azimi (2014), Akrami, Garkaz, and Mehrazin (2012), Almudhaf (2012), Al-Khazali (2014), Wong et.al. (1990) Gavriilidis, Vasileios, and Tsalavoutas (2015) emphasized that the Ramadan has effect on the stock markets Different results were also emphasized over the Ramadan effect. For example, Shah, Qureshi, and Aslam (2017), Küçüksille and Özmutaf (2015), Jebran and Chen (2017) and Husain (1998) concluded that the Ramadan has not impact on the stock market returns. On the other hand, some studies found the relationship between the Ramadan and volatility. Alrashidi, Manzoor, and Beneid (2014) stated that there is low volatility in the stock market on the Ramadan. In addition to these studies, Mustafa (2011) found very controversial evidence. According to results, risks plunge on the Ramadan. Mustafa (2008) also made a study to examine the holy day effect on Pakistan Market covered the period of December 1991 to December 2010. In his study, risk analyses were conducted and their study identified that Ramadan effect is detected in all model and stock market is subject to relative high risk during the months of Ramadan.

One can see that different anomalies may emerge at the stock markets. According to the Kuzu and Torun (2017) there may be modern methods like Artificial Neural Networks measuring and forecasting stock performance. So, those anomalies may be eliminated by this new techniques.

Furthermore, the festival of Eid ul Fitar and Zil-haji are another significant holy time. The Eid ul Fitar is celebrated after the Ramadan and the daily life become as a usual. However, McGowan and Jakob made a study to investigate the validity of Eid ul Fitar in Malaysia. Results showed that the existence of Eid ul Fitar effect does not appear. Seyyed, Abraham, and Mohsen (2005) investigated the effect of Eid-ul Fitr on Saudi Arabia and Pakistan stock market. Their results posed that Eid-ul Fitr is observed in Saudi Arabia yet it was not detected in Pakistan. Zilhaji is one of the five Islamic pillars in which rich Muslims go to Mecca and performs for redemption. According to Halari, Tantisantiwong, and Power (2015) in addition to the annual pilgrimage to Mecca, the whole Muslim sacrifice animals like goats, sheep, cows and camels for Allah. As a result, these events can shape investor decision and have tendency to influence on the stock markets. With respect to pre-holiday effect, Oguzsoy and Guven (2004) tried to evaluate the effects of the feast of Ramadan and the feast of Sacrifice on BIST 100 for period between 1988 and 1999. Their study showed that seven times higher returns than the average return of other days occurs in two days before holiday.

II. DATA

We tried to understand the effects of the week days, Ramadan Month and January over BIST100 and KAT30 indices daily returns.

The companies that will enter the KAT30 index consist of shares determined as a result of the examination of the field of activity and financial ratios within the framework of shari'a rules. These criteria are formed by the common decision of the supervisors of participation banks in

Turkey. All companies that are traded on the stock exchange during the periods when the financial statements are disclosed are examined within the framework of the above-mentioned rules and the shares that are appropriate for the shari'a rules are determined. The identified shares are ranked according to the average market value of the last one year. The first 30 companies make up KAT30. As of 28.08.2017, the market value of the companies entering into the KAT30 index is 35 billion USD. The securities that make up the KAT30 index are calculated by Bizim Securities Inc. and the KAT30 index is calculated by BIST100 consists of the first 100 companies trading at Borsa istanbul according to their market value and transaction volume.

BIST100 consists of the first 100 companies trading at Borsa Istanbul according to a formula that considers the market values and transaction volumes of stocks and the calculation of the formula is done by BIST.

Daily closing data of BIST100 and KAT30 indices between 07.01.2011 and 08.08.2017 were used in the study.

III. MODEL & METHODOLOGY

III. I. Calculation of Daily Returns

When the daily return is calculated, first the logarithmic transformations of the closing data are taken. Then the logarithmic transformations are subtracted from each other.

$$RETURNBIST_t = Ln\,(BIST_t) - Ln\left(BIST_{(t-1)}\right)$$

$$RETURNKAT30_t = Ln\,(KAT30_t) - Ln\left(KAT30_{(t-1)}\right)$$

$RETURNBIST_t$ represents the continuously compounded daily return of BIST100 indice at time "t". Similarly, $RETURNKAT30_t$ represents the continuously compounded daily return of KAT30 indice at time "t".

III.II. Augmented Dickey Fuller Test (Unit Root Test)

In order to get healthy results at times series, data must not contain nonstationary trait. If the time series data is not stationary, the reliability of the results obtained can be questioned. In this sense, both the $RETURNBIST_t$ and $RETURNKAT30_t$ time series should be tested with the ADF. Generally speaking, so long as return data seems mean reverting, data is stationary.

III.III. Ordinary Least Square (OLS) Technique

In order to understand whether there exist an effect of the week days, Ramadan Month or January month over the KAT30 and BIST100 indices, we have used the OLS technique The OLS equation can be seen below;

$$RETURNBIST100_t = \sum_i \beta_i * D_{i,t} + \varepsilon_t$$

$$RETURNKAT30_t = \sum_i \beta_i * D_{i,t} + \varepsilon_t$$

While β_i 's represent the regression coefficients, $D_{i,t}$ are the dummy variables which represent the week days, Ramadan month or January month. For example if we want to understand

whether the Mondays has an effect over the returns of the BIST100 and KAT30 , we denote $D_{1,t} = 1$ if "t" is Monday and $D_{1,t} = 0$ otherwise and likewise we denote $D_{2,t} = 1$ if "t" is Tuesday and $D_{2,t} = 0$ otherwise. Similarly if we want to understand whether the Ramadan or January month has an effect over the returns of the BIST100 and KAT30, we denote $D_{1,t} = 1$ if "t" is a day within Ramadan month or January and $D_{1,t} = 0$ oherwise.

III.IV. Generalized Autoregressive Conditional Heteroskedastic (GARCH) Technique

To gather the influence of holy months, weekdays and January month over the volatility of BIST100 and KAT30 returns, Generalized Auto Regressive Conditional Heteroskedastic (GARCH) technique, put forward by Bollerslev (1986) is used. The equation can be seen below;

$$RETURNBIST100_t = \sum_i \beta_i * D_{i,t} + \varepsilon_t \ (1)$$

$$RETURNKAT30_t = \sum_i \beta_i * D_{i,t} + \varepsilon_t \ (2)$$

$$h(BIST100)_t = \sum_i \beta_i * D_{i,t} + \partial * \varepsilon_{t-1}^2 + \theta * h_{t-1} \ (3)$$

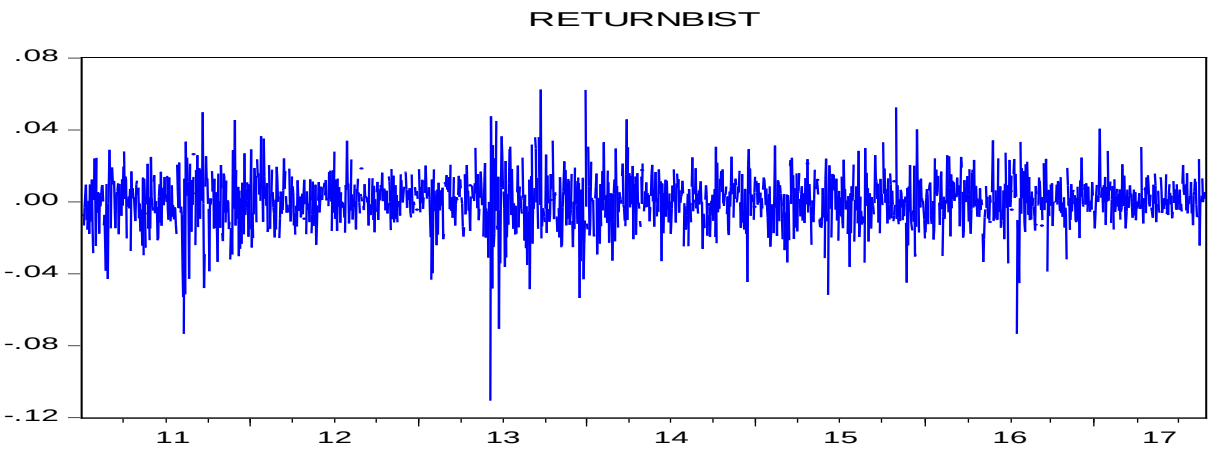
$$h(KAT30)_t = \sum_i \beta_i * D_{i,t} + \partial * \varepsilon_{t-1}^2 + \theta * h_{t-1} \ (4)$$

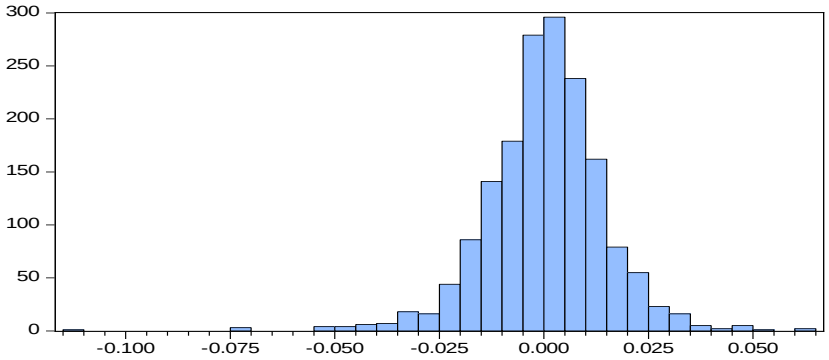
Where $h(BIST100)_t$ and $h(KAT30)_t$ denotes the conditional variance of BIST100 and KAT30 respectively. While the equations 1 and 2 represent the mean equations, equation 3 and 4 represent for the conditional variance equation. $D_{i,t}$ is a dummy variable as in the return equation in OLS technique and stands for weekdays, Ramadan Month or January month depending on the investigation about which we want to determine the effect over volatility. That is if we want to totally understand the effect of weekdays over volatility then $D_{i,t}$ is a dummy variable that stands for days or if we want to gauge the effect of Ramadan month over conditional volatility then $D_{i,t}$ is a dummy variable that is equal to 1 if "t" is a day belonging to Ramadan month and zero otherwise. β_i's corresponds to the size and direction of the effects of the weekdays, Ramadan month or January months over volatility. $\varepsilon_{t-1}^2 and\ h_{t-1}$ intend for the control the effect of ARCH and GARCH.

IV. RESULTS

IV.I. Descriptive Statistic For Data

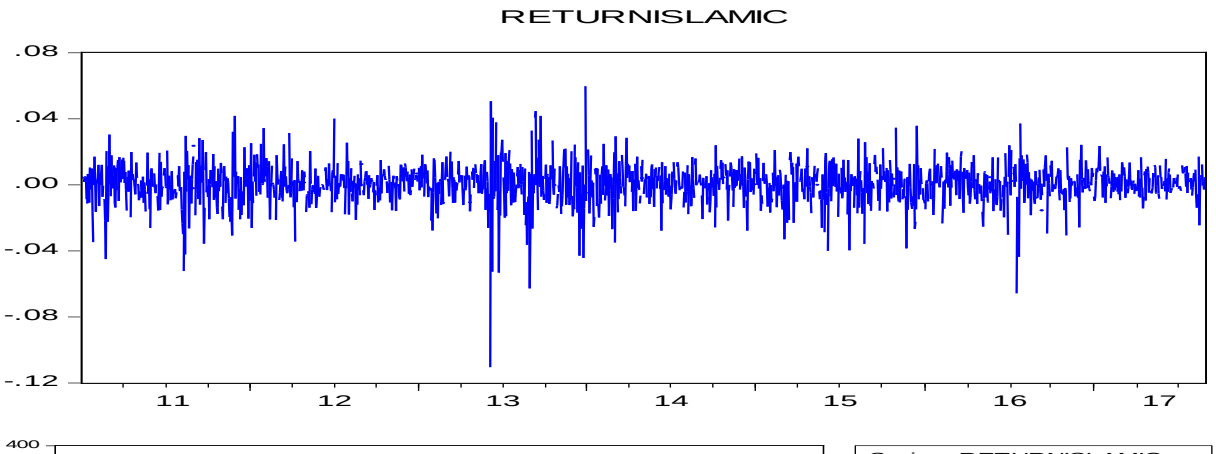
Below we summarized descriptive statistics for BIST 100 and Islamic Indice. It is understood from the graph that the returns of the BIST100 and Islamic Indice are mean reverting. This can be interpreted as stationarity of the data at first glance. Though it seems mean reverting at first glance, there exist some spikes at certain days. This may be a reason to suspect the calendar effect. While the Jarque-Bera test points out that series are not normally scattered, skewness and kurtosis indicate that 2 indices are left skewed and leptokurtictir.

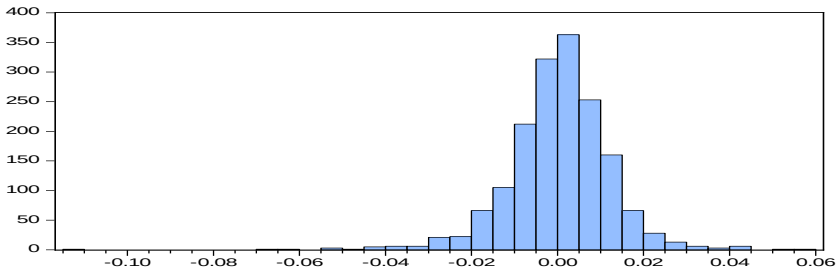




Series: RETURNBIST
Sample 1/06/2011 8/28/2017
Observations 1672

Mean	0.000277
Median	0.000718
Maximum	0.062379
Minimum	-0.110638
Std. Dev.	0.014242
Skewness	-0.604677
Kurtosis	7.377870
Jarque-Bera	1437.104
Probability	0.000000





Series: RETURNISLAMIC
Sample 1/06/2011 8/28/2017
Observations 1672

Mean	0.000397
Median	0.000915
Maximum	0.059726
Minimum	-0.110493
Std. Dev.	0.011960
Skewness	-0.835928
Kurtosis	10.18543
Jarque-Bera	3791.642
Probability	0.000000

IV.II. ADF Test

The ADF results are reported in Table 1 for both BIST100 and Islamic Indice. For all the critical test values, the ADF statistics are at the stationary level for both indices. The fact that the series are stationary for both indices will bring us to seize a long-term right relationship when we do OLS. Otherwise, the results of the spurious regression will prevent us from finding the right relationship. When looking at the mean reverting appearance graphs of both indices, we can confirm the results of ADF.

Table 1. ADF Results

Returnbist100	Test Stats	P value	Test statistics		
			1%level	5%level	10%level
Constant	-41.88462	0.0000	-3.434059	-2.863065	-2.567629
Constant &Linear Trend	-41.89655	0.0000	-3.963544	-3.412501	-3.128203

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

Islamic Index (Participation30)	Test Stats	P value	Test statistics		
			1%level	5%level	10%level
Constant	-41.57698	0.00000	-3.434059	-2.863065	-2.567629
Constant &Linear Trend	-41.57354	0.0000	-3.963544	-3.4125011	-3.128203

Sources: Scholars

IV.III. Ordinary Least Square Results of Days of Week Effect on BIST100 and Islamic Indice

The effect of days of the week on BIST100 using Eviews was examined by OLS technique in Table 2. First of all, Durbin-Watson is in acceptable field with 2.05, which means that there is no first autocorrelation in the error terms. It seems that the days of the week have not a significant influence on the BIST100 returns. Kelly (1930) said that while Mondays have negative impact on stock returns, Fridays have positive ones. We can see that such situation is not the case for the Turkish stock exchange. This derivation can be interpreted as the fact that Turkish investors do not set a strategy according to the day effect. The results also indicate that there not exist days of week anomalies on the Turkish stock returns that means in terms of calendar effect Turkish stock market is more efficient and compatible with Fama's EMH. Similar results have been achieved in Islamic indice, too.

Table 2. OLS Results of BIST100 Indice

Dependent Variable: RETURNBIST
Method: Least Squares
Date: 10/26/17 Time: 02:48
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
MONDAY	-0.007752	0.010109	-0.766911	**0.4432**
TUESDAY	-0.007571	0.010109	-0.748978	**0.4540**
WEDNESDAY	-0.008705	0.010108	-0.861115	**0.3893**
THURSDAY	-0.008614	0.010109	-0.852108	**0.3943**
FRIDAY	-0.008076	0.010108	-0.798938	**0.4244**
C	0.008413	0.010078	0.834709	**0.4040**

R-squared	0.001394	Mean dependent var	0.000277
Adjusted R-squared	-0.001603	S.D. dependent var	0.014242
S.E. of regression	0.014253	Akaike info criterion	-5.660.099
Sum squared resid	0.338450	Schwarz criterion	-5.640.643
Log likelihood	4.737.843	Hannan-Quinn criter.	-5.652.890
F-statistic	0.465015	**Durbin-Watson stat**	**2.051.295**
Prob(F-statistic)	0.802508		

Source: Scholars

Table 3. OLS Results of Islamic Indice

Dependent Variable: RETURNISLAMIC
Method: Least Squares
Date: 10/26/17 Time: 02:51
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
MONDAY	-0.007141	0.008481	-0.841939	**0.3999**
TUESDAY	-0.006925	0.008482	-0.816459	**0.4144**
WEDNESDAY	-0.008418	0.008481	-0.992551	**0.3211**
THURSDAY	-0.008064	0.008481	-0.950784	**0.3419**
FRIDAY	-0.006927	0.008481	-0.816767	**0.4142**
C	0.007884	0.008456	0.932326	**0.3513**

R-squared	0.003197	Mean dependent var	0.000397
Adjusted R-squared	0.000206	S.D. dependent var	0.011960
S.E. of regression	0.011958	Akaike info criterion	-6.011.168
Sum squared resid	0.238247	Schwarz criterion	-5.991.712
Log likelihood	5.031.337	Hannan-Quinn criter.	-6.003.959
F-statistic	1.068.723	**Durbin-Watson stat**	**2.036.540**
Prob(F-statistic)	0.375825		

Source: Scholars

IV.IV. GARCH Results of Days of Week Effect on BIST100 and Islamic Indice

With the ML ARCH method, the volatility impact of days of the week on the yields of BIST100 was examined. As shown in Table 3, Durbin Watson is in acceptable level with 2.04 and there is no serial autocorrelation. Results points out that as seen in return effect, the days of the week do not have any effect on the volatility of the BIST100 returns. Almost similar results have been achieved in Islamic indice.

Table 4. GARCH Results of BIST100 Indice

Dependent Variable: RETURNBIST
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 10/26/17 Time: 02:49
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments
Convergence achieved after 34 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(7) + C(8)*RESID(-1)^2 + C(9)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
MONDAY	-0.004602	0.010645	-0.432293	**0.6655**
TUESDAY	-0.005281	0.010660	-0.495453	**0.6203**
WEDNESDAY	-0.005879	0.010644	-0.552303	**0.5807**
THURSDAY	-0.005374	0.010652	-0.504520	**0.6139**
FRIDAY	-0.005205	0.010656	-0.488424	**0.6252**
C	0.006035	0.010628	0.567805	**0.5702**
	Variance Equation			
C	8.59E-06	1.89E-06	4.534.687	0.0000
RESID(-1)^2	0.079293	0.009109	8.704.454	0.0000
GARCH(-1)	0.879934	0.015792	5.572.126	0.0000

R-squared	-0.000405	Mean dependent var	0.000277
Adjusted R-squared	-0.003407	S.D. dependent var	0.014242
S.E. of regression	0.014266	Akaike info criterion	-5.752.519
Sum squared resid	0.339060	Schwarz criterion	-5.723.335
Log likelihood	4.818.106	Hannan-Quinn criter.	-5.741.706
Durbin-Watson stat	**2.048.215**		

Heteroskedasticity Test: ARCH

F-statistic	0.003040	Prob. F(1,1669)	0.9560
Obs*R-squared	0.003044	Prob. Chi-Square(1)	0.9560

Source: Scholars

Table 5. GARCH Results of Islamic Indice

Dependent Variable: RETURNISLAMIC
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 10/26/17 Time: 02:51
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments
Convergence achieved after 37 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(7) + C(8)*RESID(-1)^2 + C(9)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
MONDAY	-0.006175	0.018804	-0.328367	**0.7426**
TUESDAY	-0.006514	0.018805	-0.346411	**0.7290**
WEDNESDAY	-0.007188	0.018794	-0.382464	**0.7021**
THURSDAY	-0.006637	0.018808	-0.352884	**0.7242**
FRIDAY	-0.005879	0.018812	-0.312530	**0.7546**
C	0.007208	0.018798	0.383427	**0.7014**
	Variance Equation			
C	1.02E-05	1.94E-06	5.273.159	0.0000
RESID(-1)^2	0.131129	0.010968	1.195.587	0.0000
GARCH(-1)	0.803182	0.019489	4.121.143	0.0000

R-squared	0.001570	Mean dependent var	0.000397
Adjusted R-squared	-0.001427	S.D. dependent var	0.011960
S.E. of regression	0.011968	Akaike info criterion	-6.137.485
Sum squared resid	0.238636	Schwarz criterion	-6.108.301
Log likelihood	5.139.938	Hannan-Quinn criter.	-6.126.672
Durbin-Watson stat	**2.034.314**		

Heteroskedasticity Test: ARCH

F-statistic	0.089143	Prob. F(1,1669)	0.7653
Obs*R-squared	0.089245	Prob. Chi-Square(1)	0.7651

Source: Scholars

IV.V The Ramadan Effect

The Holy Ramadan month does not have any impact on the both the returns of conventional and Islamic indice. It does not also affect the volatility of those indices. The fact that the results obtained during the days of week impact are valid for the sacred months also strengthens the assumption that there is no calendar anomalies in determining the strategies of the Turkish investors. The studies of Küçüksille and Özmutaf (2015), Jebra and Chen (2017) and Hussein (1998) in the literature have found that the effect of Ramadan on stock returns and volatility is meaningless.

Table 6. OLS Results of BIST100 in Terms of Ramadan Effect

Dependent Variable: RETURNBIST
Method: Least Squares
Date: 10/26/17 Time: 02:52
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
RAMADAN	0.000114	0.001234	0.092453	**0.9263**
C	0.000267	0.000365	0.733419	**0.4634**

R-squared	0.000005	Mean dependent var	0.000277
Adjusted R-squared	-0.000594	S.D. dependent var	0.014242
S.E. of regression	0.014246	Akaike info criterion	-5.663.494
Sum squared resid	0.338921	Schwarz criterion	-5.657.009
Log likelihood	4.736.681	Hannan-Quinn criter.	-5.661.091
F-statistic	0.008548	**Durbin-Watson stat**	**2.049.466**
Prob(F-statistic)	0.926349		

Source: Scholars

Table 7. GARCH Results of BIST100 Indice in Terms of Ramadan Effect

Dependent Variable: RETURNBIST
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 10/26/17 Time: 02:52
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments
Convergence achieved after 25 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
RAMADAN	0.000520	0.001295	0.401264	**0.6882**
C	0.000726	0.000324	2.238.572	**0.0252**
	Variance Equation			
C	8.68E-06	1.87E-06	4.628.013	0.0000
RESID(-1)^2	0.078645	0.008596	9.148.883	0.0000
GARCH(-1)	0.880073	0.015439	5.700.278	0.0000

R-squared	-0.001263	Mean dependent var	0.000277
Adjusted R-squared	-0.001863	S.D. dependent var	0.014242
S.E. of regression	0.014255	Akaike info criterion	-5.756.126
Sum squared resid	0.339351	Schwarz criterion	-5.739.912
Log likelihood	4.817.121	Hannan-Quinn criter.	-5.750.118
Durbin-Watson stat	**2.046.873**		

Heteroskedasticity Test: ARCH

F-statistic	0.003034	Prob. F(1,1669)	0.9561
Obs*R-squared	0.003038	Prob. Chi-Square(1)	0.9560

Source: Scholars

Table 8. OLS Results of Islamic Indice in Terms of Ramadan Effect

Dependent Variable: RETURNISLAMIC
Method: Least Squares
Date: 10/26/17 Time: 02:53
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
RAMADAN	-0.000209	0.001036	-0.201869	**0.8400**
C	0.000416	0.000306	1.357.213	**0.1749**

R-squared	0.000024	Mean dependent var	0.000397
Adjusted R-squared	-0.000574	S.D. dependent var	0.011960
S.E. of regression	0.011963	Akaike info criterion	-6.012.775
Sum squared resid	0.239006	Schwarz criterion	-6.006.290
Log likelihood	5.028.680	Hannan-Quinn criter.	-6.010.372
F-statistic	0.040751	**Durbin-Watson stat**	**2.035.087**
Prob(F-statistic)	0.840044		

Source: Scholars

Table 9. GARCH Results of Islamic Indice in Terms of Ramadan Effect

Dependent Variable: RETURNISLAMIC
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 10/26/17 Time: 02:54
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments
Convergence achieved after 19 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
RAMADAN	-0.000280	0.000982	-0.284969	**0.7757**
C	0.000763	0.000271	2.811.833	**0.0049**
	Variance Equation			
C	1.04E-05	1.91E-06	5.466.674	0.0000
RESID(-1)^2	0.130173	0.009949	1.308.444	0.0000
GARCH(-1)	0.802559	0.019356	4.146.225	0.0000

R-squared	-0.000792	Mean dependent var	0.000397
Adjusted R-squared	-0.001391	S.D. dependent var	0.011960
S.E. of regression	0.011968	Akaike info criterion	-6.139.855
Sum squared resid	0.239201	Schwarz criterion	-6.123.642
Log likelihood	5.137.919	Hannan-Quinn criter.	-6.133.848
Durbin-Watson stat	**2.033.440**		

Heteroskedasticity Test: ARCH

F-statistic	0.120537	Prob. F(1,1669)	0.7285
Obs*R-squared	0.120672	Prob. Chi-Square(1)	0.7283

Source: Scholars

IV.VI. The January Effect

In the literature, some studies have shown that January has a positive effect on stock returns. According to Keim (1983), stock yields in January months are higher than the other months of the year. In this work, the January effect for BIST100 and Islamic Indice was measured for return and volatility. It is observed that there is no such anomaly for both cases as seen in Ramadan effect. Derivations are similar to works of Raj and Kumari (2006), Al- Smadi et. al. (2017) and Jebra and Chen (2017).

Table 10. OLS Results of BIST100 in Terms of January Effect

Dependent Variable: RETURNBIST
Method: Least Squares
Date: 10/26/17 Time: 02:54
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
JANUARY	0.000410	0.001242	0.330207	**0.7413**
C	0.000242	0.000364	0.664355	**0.5066**

R-squared	0.000065	Mean dependent var	0.000277
Adjusted R-squared	-0.000533	S.D. dependent var	0.014242
S.E. of regression	0.014246	Akaike info criterion	-5.663.554
Sum squared resid	0.338901	Schwarz criterion	-5.657.069
Log likelihood	4.736.732	Hannan-Quinn criter.	-5.661.152
F-statistic	0.109036	**Durbin-Watson stat**	**2.049.809**
Prob(F-statistic)	0.741285		

Source: Scholars

Table 11. GARCH Results of BIST100 in Terms of Ramadan Effect

Dependent Variable: RETURNBIST
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 10/26/17 Time: 02:56
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments
Convergence achieved after 23 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
JANUARY	0.000592	0.001031	0.574054	**0.5659**
C	0.000732	0.000329	2.225.946	**0.0260**
	Variance Equation			
C	8.67E-06	1.87E-06	4.631.476	0.0000
RESID(-1)^2	0.078916	0.008704	9.066.791	0.0000
GARCH(-1)	0.879837	0.015494	5.678.514	0.0000

R-squared	-0.001207	Mean dependent var	0.000277
Adjusted R-squared	-0.001807	S.D. dependent var	0.014242
S.E. of regression	0.014255	Akaike info criterion	-5.756.136
Sum squared resid	0.339332	Schwarz criterion	-5.739.923
Log likelihood	4.817.130	Hannan-Quinn criter.	-5.750.129
Durbin-Watson stat	**2.047.306**		

Heteroskedasticity Test: ARCH

F-statistic	0.000860	Prob. F(1,1669)	0.9766
Obs*R-squared	0.000861	Prob. Chi-Square(1)	0.9766

Source: Scholars

Table 12. OLS Results of Islamic Indice in Terms of January Effect

Dependent Variable: RETURNISLAMIC
Method: Least Squares
Date: 10/26/17 Time: 02:58
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
JANUARY	0.000350	0.001043	0.335598	**0.7372**
C	0.000367	0.000306	1.199.951	**0.2303**

R-squared	0.000067	Mean dependent var	0.000397
Adjusted R-squared	-0.000531	S.D. dependent var	0.011960
S.E. of regression	0.011963	Akaike info criterion	-6.012.818
Sum squared resid	0.238995	Schwarz criterion	-6.006.333
Log likelihood	5.028.716	Hannan-Quinn criter.	-6.010.415
F-statistic	0.112626	**Durbin-Watson stat**	**2.035.421**
Prob(F-statistic)	0.737216		

Source: Scholars

Table 13. GARCH Results of Islamic Indice in Terms of Ramadan Effect

Dependent Variable: RETURNISLAMIC
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 10/26/17 Time: 02:58
Sample (adjusted): 1/07/2011 8/28/2017
Included observations: 1672 after adjustments
Convergence achieved after 22 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
JANUARY	0.000631	0.000914	0.689643	**0.4904**
C	0.000687	0.000271	2.537.236	**0.0112**
	Variance Equation			
C	1.04E-05	1.91E-06	5.462.262	0.0000
RESID(-1)^2	0.130266	0.010034	1.298.242	0.0000
GARCH(-1)	0.802593	0.019440	4.128.600	0.0000

R-squared	-0.000803	Mean dependent var	0.000397
Adjusted R-squared	-0.001402	S.D. dependent var	0.011960
S.E. of regression	0.011968	Akaike info criterion	-6.140.077
Sum squared resid	0.239203	Schwarz criterion	-6.123.864
Log likelihood	5.138.105	Hannan-Quinn criter.	-6.134.070
Durbin-Watson stat	**2.033.886**		

Heteroskedasticity Test: ARCH

F-statistic	0.103732	Prob. F(1,1669)	0.7474
Obs*R-squared	0.103850	Prob. Chi-Square(1)	0.7473

Source: Scholars

CONCLUDING REMARKS

In recent years, many academic studies have been conducted with the development of behavioral finance. Behavioral finance claims fundamentally investors' decisions are based on optimism and pessimism, instead economic and financial theories. In this sense, behavioral finance is settled as opposed to Fama's (1970) EFM. According to Fama (1970), the market is efficient and all information is priced in the assets. In this sense there is no undervalued stock in the market. However, after Keynes' " Animal Spirit " concept, behavioral finance showed a opposed stance to Fama (1970). According to Behavioral Finance, there is no information at the same capacity for all investors in the market. Although information is equally distributed to all investors, investors' information processing ability and moods are different from each other. This situation causes some anomalies to appear in the market.

Although there are many anomalies, the calendar effect is only one of them. Accordingly, certain days of the week, holidays, religious days, and some months may have a different effect on the return and volatility of the stock markets. When looking at the literature, for example, it is seen that investors are more likely to be pessimistic on Mondays due to the fact that investors are on bad mood after first day of weekend. Likewise, during the Holy Months such as Ramadan and Zilhicce, the Muslims' tendency towards religious activities and the monetary religious activities such as the sacrifice feast resulted in the fall of the returns and volatility of stock markets by the cash out of the stock market. Similarly, in January months, the US stock market is particularly upbeat. One of the factors explaining this is the fact that stocks that are loss level in December are sold due to the tax effect and are taken back in January.

In this work, we measured the impact of days of the week, January and Ramadan effect on the return and volatility of return of BIST100 and KAT30 which is an Islamic stock index. Even though the literature suggests that Monday is more likely to be a bearish closure and Friday is more likely to be a bullish closure, we have not observed any impact on stock returns and volatility of stock returns on any given day of the week. Even dough there are some studies in the literature claiming that in January, especially the US stock market has high return, there are also some studies showing there is no effect of January on stock returns. It has been observed that there is no statistically significant effect of January on both the return and the volatility of returns of both the traditional and Islamic indices in the Turkish stock market. It has been stated in the literature that there is no meaningful effect of the month of Ramadan while the results show that Zilhicce month generally decreases the return and volatility of the stock returns. This article generated that Ramadan month does not have a meaningful effect on the Turkish stock market in terms of stock return and volatility.

The fact that days of the week, Ramadan and January effect do not have a statistically significant effect on either conventional or Islamic stock market in terms of return and volatility can be interpreted as that Turkish stock market is efficient and not influenced by calendar anomalies and that it converges to Fama's hypothesis. In other words, Turkish investors do not take into account factors that are not affecting the operations of companies such as the days of the week or months, and do not develop a strategy for timing. In the future studies, the effect of Zilhicce month for the Turkish market can be investigated in order to make the work more advanced. In addition, more efficient results can be obtained by increasing the number of Islamic stocks by similar criteria. Because there are only 30 stocks in the Islamic indice.

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