Stock Market Returns before and after Brokerage Firms' Fiscal Year-End: The case of Tehran Stock Exchange

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Abstract

Market efficiency paradigm and time patterns concerned, as "calendar anomalies" is a contradictory issue for researches. TSE's market participants have a negative understanding of the 6th and 12th month of the fiscal year and this issue is rooted in the obliged credit settlement of the brokerage industry at the year-end. The purpose of this study is to investigate the TSE's total return before and after brokerage firms' year-end. Using GARCH-PQ, and data of market index in periods between 1390 and 1396, we concluded that periods of1st to 22nd of 6th and 12th months,and 22nd to the end of 6th and 12th months, have respectivelynegative and positive effectson TSE's stock index.

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Introduction

After 1930 and the development of efficient market hypothesis, lots of researches have confirmed the random behavior of the stock prices and showed that stock prices would not follow a defined trend which resulted in Random Walk theory (Siddiqui and Narula, 2013). In the late 1970s, the EMH reached received the highest approval. In that time, the rational expectation concept resulted in wide developments in economic theories, because the new viewpoint revealed that stock prices follow fair value measurements and intrinsic values of shares, and the only way to gain higher returns was to buy higher risk stocks. (Zagham Abbas, 2017). After accepting EMH in capital markets for 2 decades, and strengthening of market efficiency and random walk and inability in predicting future prices, a new phenomenon emerged. Rationalists eventually found out about weaknesses of the old paradigm and it was an ignition, which ended in behavioral finance (Badri and Sadeghi, 2003).

The cause of this paradigm shift was rooted in financial and calendar irregularities explored in the 80s. The financial irregularities revealed the diversion of capital market from rational rules contracting with EMH. One of these researches, Banz (1981) revealed that the size of companies influence stock prices and small sized companies have greater returns. Jim (1983) and Ringanum (1983) also showed that most of the abnormal returns happen in the first 2 weeks of January and the January effect revealed. In the 1980s, researchers studied these effects in different countries.

There were many studies in TSE regarding calendar irregularities, which revealed days of the week effect (badris and Sadeghi, 1384) and studied the effect of months like Ramadhan and Muharram (moineldin and azimi, 1391). In past few years and after escalation of credit trading and accordingly credit settlement which happens at fiscal year-ends of brokerage firms (end of 6^{th} and 12^{th} months), the empirical evidence shows that around the 22^{nd} day of these months, the behavior of market participants indicates some differences and

without any positive evidence, there is a negative view of the market return in these days, because of the persistent intention of participants to sell their holdings in these days. The subject neglected in past researches in this regard, is the relation between stock market returns and brokerage firms fiscal year-end. So the purpose of this research is to study the period between the 1st to 22nd day of 6th and 12th month on TSE's market return.

1.Literaturereview

According to previous researches in the field of irregularities in capital markets, these irregularities are divided to two sections of calendar and non-calendar ones.

1.1.Non-calendarirregularities

These irregularities are the ones that contradict EMH, but time is not the contradictory factor, which are as follow:

1.1.1.Indexeffect

Index effect reveals that the stock price of some companies start to increase after listing in some indices. Hwan (2003) was the first one that revealed the increasing effect of stocks which are listed in S&P 500 index and creates abnormal returns.

1.1.2.TheIPOEffect

The researches performed in this regard in most exchanges accordingly revealed that the stock prices of companies, which are floated thorough IPO increase and provides abnormal returns (Hawn, 2003). Zariffard and Mehrjo(2002) studied the newly listed companies in TSE and concluded that the short-term return of these companies exceeded the market return.

1.1.3.TheStockSplitEffect

Desai and Jain (1997) and Chemmanur and Huang (2014) showed evidence that stock split increases the price of related stocks before and after the announcement, which contradicts financial theories.

1-2. Calendar Irregularities

There are many researches regarding the calendar irregularities during the past 50 years. According to EMH, the stock price in an efficient market is always changing randomly, mostly because of the reaction to random newly released information. The calendar effects happen when the time is the determining factor and is able to change the price of the stock in addition to the effect of the distributed information, and changes happen to random walk theory.

1.2.1. Days of the week effect

Days of the week effect reveals that, the stock return in some days of the week is higher than the other days. Cross (1973) studied the American companies during 1950 to 1970, and revealed that the highest and lowest returns happened on Fridays and Mondays, and inclined to this effect. Chia (2014) studied this phenomenon in Australia and Munir and Ching (2017) studied this effect in Malaysia and observed the same effect. Badri and Sadeghi (1385) studied this phenomenon in the Iranian capital market and revealed the highest and lowest return on Sundays and Wednesdays.

1.2.2. The Turn of the Month Effect

Ariel (1987) found out that stock returns during the last 4 days of each month and the 4 first days of the next month were higher relative to the other days, and Lakonishok and Smidt (1988) studied American securities market and showed that the stock return of the last trading day in each month and the next 3 trading days were higher than the other days of the month. Jafri (2011) studied the last (day) of the month effect and showed the turn of the month effect.

1.2.3. The Turn of the Year Effect

This effect is also known as the first month effect, January effect, and the last month of the year effect. Clark and Ziemba (1987) were the first ones studying this effect and showed that the market return between the last trading day of December and the first eight trading days of January was higher than the other days.

1.2.4. The Effect of Special Months

The effect of special months like Muharram and Ramadhan was studied in Islamic countries. Hussein (1988) studied the effect of Ramadhan on the Pakistan capital market and revealed that the volatility of stock prices was lower in this month, but the average stock return of this month and the other months do not have any differences. FazelSaeidet al. (2005) concluded that the stock return in Ramadhanis not different from the other months, but the vitality of the returns decreases in this month. Moineldin and Azimi (2005) concluded that there is a significant relation between Muharram and Safar months and the stock return.

2. The Research Method

This study is a descriptive and correlational based on historic data.

2.1. Research population and sampling

The study population consists of all TSE's listed companies. The Sample is the TSE's index.

2.2. Hypotheses

The end of fiscal years in brokerage firms is the end of 6^{th} and 12^{th} month, and they usually require their costumers to settle their credits then; therefore investors which use the brokerage firms credit to buy shares usually settle their debts (credits used) before the 22^{nd} of the $6^{th}$and 12^{th} months of each year, and this causes the sell-side pressure in the capital market. Therefore, it is expected that the market return to be decreased during the first 22 days of these two months and after the 22^{nd} day of them, the sell-side pressure decreases and after the beginning of the next month (the 1^{st} and 7^{th} month of each year)the credits

will be renegotiated and the market demand increases and it is expected that the market return boosts in these periods. According these discussions, the hypotheses of this study are as follow:

H1: the period of 1st until 22ndof the 6th month has a negative effect on the market return.

H2: the period of 22ndof the 6th month until the 15th of the 7thmonth has a positive effect on the market return.

H3: the period of 1stuntil22ndof the 12th month has a negative effect on the market return.

H4: the period of 22ndof the 6th month until 15th of the 1stmonth of the next year has a positive effect on the market return.

2.3. Research Variables

Return: A return is the gain or loss of a security in a particular period.

$$R_t = \frac{I_t - I_{t-1}}{I_{t-1}} \times 100 \qquad (1)$$

R_t is the market return at t, I_t index at time t, I_{t-1} index at time $t-1$

Return volatility: Volatility is a statistical measure of the dispersion of returns for a given security or market index.

$$sd = \sigma = \sqrt{\frac{\sum (R_I - \bar{R})^2}{n-1}} \qquad (2)$$

sd is the standard deviation of return, R_t return at time t , $\bar{R}$ return average, nperiods

Most researchers studied the special period's effects like one month on return using this regression model:

$$R_{it} = a_1 + a_2 D_{jan} + a_3 D_{feb} + ... + a_{12} D_{dec} + e_t \qquad (3)$$

D_X is variable for special months , a_1 constant

The research is statistically tested with regression on month variables and estimating their coefficients using OLS and then significance testing of the coefficients. In this way, the self-correlation of errors andheteroscedasticof errors are limited. In order to promote the estimates, we used the lagged dependent variable amounts, which resulted in the following regression model.

$$R_{it} = a_1 + a_2 D_{jan} + a_3 D_{feb} + ... + a_{12} D_{dec} + \sum_1^p a_j R_{t-j} + e_t \qquad (4)$$

D_X is days of week variable, R_{t-j} lagged daily return dependent variable.

For solving the problem of error, we considered the error dependent of time. Engle (1981) developed a model, which provides a situation for conditional return variance to change with lagged 2nd degree values of last periods as follows:

$$h_t = V_c + \sum_j^q V_j e_{t-j}^2 \qquad (5)$$

h_t Isconditional error term variance, V_c Vconstant multiplier, V_j lagged variables of error term multiplier.

With this adjustment, the error term will consist of a conditional variance which captures the time deviations of variance and the model error term reaches a zero average and a variance changing relative to time. The resulting model will be generalized autoregressive conditional heteroskedasticity (GARCH) model as follows:

$$R_{it} = a_1 + a_2 D_{jan} + a_3 D_{feb} + ... + a_{12} D_{dec} + \sum_1^p a_j R_{t-j} + \lambda h_t + e_t \qquad (6)$$

Bollerslev (1986) suggested generalized model of $GARCH_q$ within which the conditional variance is a function of lagged values of e_t^2 and h_t^2 variables. This model is as follows:

$$h_t^2 = v_c + \sum_{j=1}^q v_{ja} e_{t-1}^2 + \sum_{i=1}^p v_{jb} h_t^2 \qquad (7)$$

This model is recognized as generalized autoregressive conditional heteroskedasticity $GARCH_{(pq)}$. In designing this model, the issue that the conditional variance would be able to change the effect of different months as a risk factor, is considered.

This study tries to investigate the effect of special days on return, using three models. The first model is as follows:

$$R_{it} = a_1 + a_2 D_{jan} + a_3 D_{feb} + ... + a_{12} D_{dec} + e_t \qquad (8)$$

The second model is designed using daily lagged return amount in the first model:

$$R_{it} = a_1 + a_2 D_{jan} + a_3 D_{feb} + ... + a_{12} D_{dec} + \sum_1^p a_j R_{t-j} + e_t \qquad (9)$$

The third model is $GARCH_{(pq)}$ which consists of the following equations:

$$R_{it} = a_1 + a_2 D_{jan} + a_3 D_{feb} + ... + a_{12} D_{dec} + \sum_1^p a_j R_{t-j} + \lambda h_t + e_t \qquad (10)$$

$$h_t^2 = v_c + \sum_{j=1}^q v_{ja} e_{t-1}^2 + \sum_{i=1}^p v_{jb} h_t^2 \qquad (11)$$

λ Multiplierwas added to the model because the conditional variance as a risk factor can affect the return. λ Isa risk measure in this model.

3.Research Findings

Descriptive statistics and hypothesis testing

In order to determine the differences of period under study, the first step is to calculate the central tendency and dispersion of the data. The risk is calculated through standard deviation parameter.

Table1 : Descriptive Analysis of data

Periods	1st to 22nd of 11th month	1st to 22nd of 12th month	22nd of 12th month to 15th of the next year's 1st month	22nd of 6th month to 15th of the 7st month
Observation's no	109	103	79	115
Mean	-0.12	-0.09	0.55	0.24
Variance	0.28	0.38	0.53	0.47
SD	0.53	0.62	0.73	0.68

Source: research data

As we expected, and according to table 1, the average return for the periodof 1st to 22nd of Esfand and Shahrivarmonths from Iranian calendar was negative and the average return after the end of the fiscal year was positive.

Table2 : estimation of mean equation

Variable	Coefficient	Sd	T value	Sig

Constant	0.04	0.021	2.3	0.021
Lagged return amount	0.33	0.28	11.98	0.000

Source: research data

In order to investigate the current return with the one-year lagged return, the mean equation was estimated as shown in table 2, and considering the significant level of less than 5 percent, it can be interpreted that the relation exists and is significant at 95% confidence interval.

One of the assumptions of regression model is the error term of conditional variance through which the unpredictable factor that can affect the return is considered fixed, but in reality, it can be a variable factor which we used ARCH model to study this effect.

According to test results, the heteroscedastic nature of variables emerged, and we solved this problem with GARCH model.

Table3 : variance model

Variable	Coefficient	Sd	Z	Sig
Constant	0.065	0.017	3.79	0.000
Error term squared	0.36	0.07	4.68	0.000
The lagged value of conditional variance	0.59	0.05	10.04	0.000

Source: research data

In order to estimate the standard deviation to study the effect of risk on return (in addition to the effect of special days), the variance model was estimated. Considering the sum of coefficients of squared error term and the lagged conditional variance is bigger than 0 and smaller than 1, and are significant, it can be interpreted that the shock (risk) effect does not last, and changes with time.

Table4 : estimation of coefficients (in percent)

Variable	Coefficient	Sd	t value	Sig
1^{st} to 22^{nd} of 6^{th} month	-0.18	0.07	-2.32	0.02
1^{st} to 22^{nd} of 12^{th} month	-0.21	0.08	-2.74	0.000
22^{nd} of 6^{th} month to 15^{th} of 7^{th} month	0.23	0.07	3.21	0.000

22nd of 12th month to 15th of next year's 1st	0.50	0.08	5.83	0.008
Risk	019	0.07	2.60	0.000

Source: research data

In table 4, we estimated the coefficients of special days and risk coefficients simultaneously. The results show that all estimate of coefficients were significant and all research hypotheses were accepted.

Hypothesis 1: the period of 1stuntil22ndof the 6th month has a negative effect on the market return.

According to the tests and considering the risk influence on return, the return per every day from 1st to 22nd of Shahrivar month was -0.18 percent. Therefore, the first hypothesis was accepted in TSE.

Hypothesis 2: the period of 22ndof the 6th month until 15th of the 7th month has a positive effect on the market return.

According to the tests and considering the risk influence on return, the return per every day from 22nd of Shahrivarto 15th of Mehrwas 0.23 percent. Therefor the second hypothesis was accepted in TSE.

Hypothesis 3: the period of 1st until22nd of the 12th month has a negative effect on the market return.

According to the tests and considering the risk influence on return, the return per every day from 1st to 22nd of Esfand was -0.21 percent. Therefore, the third hypothesis was accepted in TSE.

H4: the period of 22ndof the 6th month until the 15th of the 2ndmonth of the next year has a positive effect on the market return.

According to tests and considering the risk influence on return, the return per every day from 22nd of Esfandto 15th of Farvardin in the next year was 0.5 percent. Therefore, the fourth hypothesis was accepted in TSE.

The results are in accordance with Kim and Ringanum (1983) which suggested that there is abnormal return during the two first weeks of January.

5.Conclusion and Discussion

The study investigated the market return before and after brokerage firms' fiscal year end. The results show that the 1st to 22nd day of the final month of a

fiscal yearaffect negatively the market return, which is statistically significant. We concluded that the phenomenon happens because of the final deadline for credit settlement of investors with brokerage firms and this causes the sell-side pressure. We also concluded that the last 8 days of the fiscal year and the beginning 15 days of the first month in the next year affect positively the market return. The reasoning is twofold;the first one happens because of the shrinkage of sell side pressure and market regainingits equilibrium; and the second and seemingly more important reasoning is that in this period, the credits are renegotiated and investors are able to invest in the capital market, which strengthen the buy-side pressure.

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