

THE STUDY OF RELATIONSHIP BETWEEN STOCK RETURNS IN COMPANIES WITH HIGH-TRADE VOLUME AND COMPANIES WITH LOW-TRADE VOLUME IN THE TEHRAN STOCK EXCHANGE

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Abstract: *The purpose of this study was to investigate whether the efficiency of firms with high trade volume and low trade volume are interrelated with each other and whether the efficiency of firms with low trade volume is affected by the efficiency of firms with high trade volume or vice versa. The research findings show that there is a significant relationship in both large and small companies between stock returns in companies with high trade volume and low trade volume companies. The results suggest that in both large and small companies the returns of firms with high trade volume can be used to predict returns in companies with low trade volume.*

Keywords: *day value of shares, stock returns, trade volume*

INTRODUCTION

There are two important proverbs in the Wall Street stock market: a. trade volume will create price changes, b. trade volume in Bullish Market is relatively heavy and in Bearish Market is relatively light. Studies in this area could examine these two proverbs well. Many empirical studies confirm the relationship between trade volume and absolute value of price change (first proverb) and positive relationship between trade volume and price change (second proverb).

From the viewpoint of Karpoff (1987) there are at least four reasons for the importance of the relationship between trade volume and stock price: a. in financial market models are considered that forecast the relationship between stock price

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and trade volume due to the data entry rate into the market, how to disseminate information, the size of the market and the conditions specified in short-term transactions. Therefore, the clarification of the relationship between trade volume and stock returns by different tests clarifies views about the financial markets and diagnosis (differentiation) of different hypotheses about market structure, b. knowledge of the relationship between trade volume and stock prices in event-oriented studies which use a combination of data about the trade volume and stock prices for their interpretation is important. Simultaneous determination of the price volatility and the amount of transactions will increase the diagnostic power of these tests. In other tests the price changes are affected by how to evaluate the new news by market, but changes in the trade volume refer to the agreement intensity or disagreement of exchangers about the quality of the new information. In any case, preparing a test and the validity of its results depends on the common distribution of price volatility and trade volume, c. the relationship between trade volume and stock price play an important role in discussions about the empirical distribution of speculative prices. When sample is taken in a specified period and at specified intervals such as the daily, the rate of return compared to the normal distribution has more stretched distribution. This may be due to the hypothesis of return rate distribution with infinite variances and also because the prepared statistics is obtained from different distributions with different variances (Mixture of Distribution Hypothesis (MDH)), d. the quality of the relationship between trade volume and the prices change has important consequences for futures markets' studies. The changes in price affect the trade volume of futures contracts and indeed, involve the theory that whether speculation acts as a price stabilizing factor or disturbs the future price stability. Goods' delivery time in the future contracts will affect the trade volume and through this change, prices will likely change. Generally, conducted studies in this area in terms of content can be classified into four categories:

The first group: studies that have examined the relationship between trade volumes and price change.

The second group: studies that have examined the experimental relationship between trade volume and absolute value of price change.

The third group: studies that have investigated the causal relationship between trade volumes and stock returns.

The fourth group: studies that have evaluated the conditional volatility of returns (Najarzadeh and Zivdar, 2006).

Because very little researches have been documented about the relationship between the efficiency of firms with high trade volume and low trade volumes companies, this study investigates the relationship between the efficiency of firms with high trade volume and low trade volumes in the Tehran Stock Exchange. In

other words, it is considered that whether the efficiency of firms with high trade volume and low trade volumes are interrelated and also whether efficiency of firms with low trade volume is influenced by the efficiency of firms with high trade volumes or vice versa.

BACKGROUND OF STUDY

Considering the relationship between trade volumes and stock return is one of the issues that have been interested by financial and economic researchers. Most studies in the stock market concentrate on stock price and its behavior over time. However, because of some unpleasant and random characteristics of stock price such as being variable, most studies instead of stock price focus on stock returns. According to the existing information in company, stock return reflects investors' expectations of future performance of the company. The new information will change the expectations of investors and actually is the main reason of stock price volatility (Izadinia *et al.*, 2012).

The findings of the study of Habib (2011) entitled "trade volume and returns in emerging stock markets" an empirical study in the Egyptian market shows that firstly, trade volume plays a small role in forecasting the future stock return and secondly, there is a bilateral relationship between trade volumes and return, in other words, changes in the volatility of returns changes the trade volumes, and vice versa. In a research entitled the dynamic relationship between price and trading volume with evidence from Indian stock market which is conducted by Kumar *et al.* (2009) it was concluded that there is an asymmetric positive relationship between trade volumes and price changes. It also became clear that there is a mutual relation between the trade volume and return.

Mahajan and Singh (2009) have conducted a study entitled the empirical investigation of relationship between return, trade volume and dynamics of volatility in Indian stock market. Their research results show that a significant positive correlation between trade volumes and return volatility. Findings of the study of Mubarik and Javid entitled "the relationship between stock return, trading volume and volatility: an evidence from Pakistani stock market in 2009" indicate an autocorrelation in stock return, a feedback relationship between market returns and trade volumes, and the significant impact of the previous day's trade volume on the current stock return. According to the results of this research, it can be stated that the previous day' trade volume and return have explanatory power to explain the current stock of market. Medeiros and Van Doornik (2004) conducted a study entitled "The empirical relationship between stock returns, return volatility and trade volume in the Brazilian stock market and concluded that there is simultaneous and dynamics relationship between stock returns and trade volumes and also between return volatility and trade volumes. Mustafa and Nishat in a research entitled "Trading volume and serial correlation in stock returns in Pakistan

in 2003 showed that non- information trade has a significant impact on prices and stock returns mostly vary by change in expected returns.

Liorente *et al.* research findings in 2002 entitled dynamic volume-return relation in stocks show the cross-sectional variation in the relationship between trade volume and autocorrelation of return refers to the informing content of transactions by a method which is consistent with the theoretical predictions. Lee and Rui (2002) in a research named the dynamic relationship between stock returns and trading volume demonstrated that firstly, trade volume is not due to the granger's stock return and secondly, there is a positive relationship between trade volumes and return volatility.

Churdia and Swaminathan (2000) have done a study entitled "trading volume and autocorrelations in stock returns. Their findings showed a relationship between efficiency of firms with high trade volume and low trade volumes and also they stated that the efficiency of firms with less trade volume is affected by the efficiency of firms with high trade volumes.

Izadinia *et al.* (2012) in a study named "predicting the direction of stock return based on stock trade volume concluded that the stock trade volume has some predictive power of return's direction in companies with high trade volume as well as companies with zero down efficiency ratio. But for companies with low trade volume and above zero efficiency ratios, trade volume does not have the same predictive power to explain the direction of stock returns.

The findings of the study of Alverdy *et al.* (2011) entitled "investigating the simultaneous and dynamics relationship between trade volume and stock return by using vector autoregressive models" show that there is no positive and significant correlation in simultaneous relationship between trade volume and stock return. These findings reject the mixed distribution hypothesis (MDH) in the Tehran Stock Exchange. Also, investigating the dynamic correlation between two variables by using vector autoregressive models showed that trade volume is the result of granger's stock return, but return is not the reason of the granger's trade volume.

Badri and Shavakhy Zavareh (2010) conducted a study entitled "reference points, stock price and trade volumes: evidences of Tehran Stock Exchange". Their findings show that trade volume is increased by price passing from the maximum price of last year, but price passing from the minimum price of last year and the cost of purchase do not cause significant change in the trade volume. Therefore, the maximum price in the past year is the investor's reference point in the Tehran Stock Exchange.

The study results of Eslami Bidgoli *et al.* (2009) entitled "investigating the effects of the change on fluctuation limit of the shares price on market fluctuation, market

efficiency, the number of transactions, transaction size and velocity of shares in Tehran Stock Exchange" shows the change on fluctuation limit of the shares price from 2% to 3% in the Tehran Stock Exchange during the study period has not had a significant effect on market volatility and efficiency and the number of transaction; but has had a significant relationship with the size of market transactions and stock velocity in a way that the increase in fluctuation limit of the shares price increase the size of transactions or reduce the stock velocity or market liquidity. In other words, the study results showed that one percent increase in the fluctuation limit of the stock price in Tehran Stock Exchange has no significant impact on market main variables.

Najarzadeh and Zivdar (2006) done a study entitled "considering the experimental relationship between trade volume and stock return in the Tehran Stock Exchange. The study results confirmed the simultaneous relationship between trade volume and stock return and a feedback (bilateral) relationship between trade volume and stock return.

THE THEORETICAL BACKGROUND

Stock return

The daily stock return is used in the study. In this regard, the mean of daily stock return is calculated based for all companies in intended year based on the information obtained from Stock Exchange Organization and is used for analysis.

Trade volume

In this study for analysis firstly, the mean number of shares traded by each company during the intended year is calculated based on the information about the number of shares traded by each company during the in question year, and then the ratio of average number of shares traded to the total number of shares in the hands of shareholders is used as trade volumes.

Daily value of stock

In this study, to consider the effect of firm size on stock return in each year, the companies are divided into four categories (p1 to p4) based on the daily value of the stock at the end of last year. Group one (p1) represents the smallest companies and group four (p4) represents the largest company.

Research hypotheses

According to research conducted by Churdia and Swaminathan (2000) entitled "Trading volume and autocorrelations in stock returns" the hypotheses of the study are as follows:⁷

- There is a relationship between stock return of companies with low trade volume and companies with high trade volume.
- The stock return of companies with low trade volume can be predicted by stock return of companies with high trade volume.

METHODS

The correlational descriptive method is used in the study. The study examines the linear relationship between stock return of companies with low trade volume and companies with high trade volume. The information about variables is collected from the website of the Stock Exchange from 2009 to 2013. The statistical population of the study is companies that have the following features:

- Membership in the Tehran Stock Exchange from 2009 to 2013
- Investment firms, leasing, banks and financial intermediaries are excluded from the study scope.

Given the above circumstances, 1280 observations (firm-year) are chosen as sample and the required data are extracted. To test the statistical hypothesis and data analysis, the multiple linear regression is used by ordinary least squares at reliability level of 95% in SPSS software. Kolmogorov- Smirnov test is used to test variables normality. Also, Durbin-Watson statistics is used to consider the presence of autocorrelation in the variables.

RESEARCH MODEL

The following models are used to test research hypotheses:

$$r_{A,t} = a_0 + br_{B,t-1} + u_t \quad (1)$$

$$r_{B,t} = c_0 + dr_{A,t-1} + v_t \quad (2)$$

In which $r_{A,t}$ is stock return of companies with low trade volume in year t, $r_{A,t-1}$ is stock return in companies with low trade volume in the year t-1, $r_{B,t}$ refers to stock return in companies with high trade volume in year t, and $r_{B,t-1}$ is stock return in companies with high trade volume in year t-1.

In the above models if $b = d = 0$ namely there is no relationship between the stock return in companies with low trade volume and stock return in companies with high trade volume and first hypothesis is rejected and if one of them to be opposite to zero, it means that there is a relationship between them and the first hypothesis is confirmed.

If $b = d$, also the second hypothesis is rejected which means that by using stock return of any companies the stock return of other companies cannot be

predicted. But if $b > d$, the second hypothesis is confirmed which means that by using stock return of companies with high trade volume the stock return of companies with low trade volume can be predicted and if $b < d$, the second hypothesis is rejected which means that the stock return of companies with high trade volume can be predicted by using stock return of companies with low trade volume.

In this study, at first, in each year the companies are classified into four categories (p1 to p4) based on the daily value of the stock at the end of last year. Group one (p1) represents the smallest companies and group four (p4) represents the largest companies. Then, companies included in each group are divided into four groups (p11 and p44) based on the ratio of the average number of shares traded to the total number of shares in the hands of the shareholders (trade volume). For example, the portfolio p11 represents the smallest companies with the lowest trade volume, p14 indicates the smallest companies with the highest trade volume, p41 shows the largest companies with the lowest trade volume and p44 demonstrates the largest companies with the highest trade volume.

FINDINGS

Table of descriptive statistics for the various portfolios is as follows:

Table 1
Descriptive statistics

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
lnreturn p11	62	-1.20	5.37	2.8825	1.31799
lnreturn p14	74	-2.66	6.18	3.5956	1.24848
lnreturn p21	72	-.16	4.86	2.7333	1.17241
lnreturn p24	79	-1.43	5.64	3.7898	1.37088
lnreturn p31	84	-2.04	5.37	3.0723	1.03733
lnreturn p34	74	-.29	6.26	3.9202	1.24573
lnreturn p41	87	-.89	5.03	2.8004	1.29361
lnreturn p44	75	-.56	5.62	3.6044	1.30817

Results of Kolmogorov - Smirnov test that is used to test the normality of variables indicate that the amount of sig of all variables (stock return of companies in all portfolios mentioned above) is obtained less than 5% which means that these variables are not normal, for this purpose, the natural logarithm of these variables is used. The table of results of this test is as follows:

Table 2
The result of Kolmogorov - Smirnov test

<i>Before log</i>	<i>Sig</i>	<i>After log</i>	<i>sig</i>
return p11	.002	lnreturn p11	.961
return p14	.002	lnreturn p14	.308
return p21	.008	lnreturn p21	.760
return p24	.031	lnreturn p24	.212
return p31	.000	lnreturn p31	.525
return p34	.000	lnreturn p34	.492
return p41	.013	lnreturn p41	.118
return p44	.028	lnreturn p44	.294

The results of the hypotheses testing are presented in the following tables:

Table 3
Coefficients about the group 1 of companies in terms of size (the smallest group)

	<i>Model</i>	<i>B</i>	<i>Sig.</i>	<i>R</i>	<i>Adjusted</i>	<i>Durbin-</i>
			<i>Square</i>	<i>R Square</i>	<i>R Square</i>	<i>Watson</i>
lnreturn p11	(Constant)	1.865	.004			
lnreturn p14	lnreturn p14	.260	.051	.055	.035	1.85
	Dependent Variable: lnreturn p11					
	(Constant)	3.142	.000			
	lnreturn p11					
	Dependent Variable: lnreturn p14					
	lnreturn p14	.211	.051	.055	.035	2.169

Table 4
Coefficient in companies of group 2 in terms of size

	<i>Model</i>	<i>B</i>	<i>Sig.</i>	<i>R</i>	<i>Adjusted</i>	<i>Durbin-</i>
				<i>Square</i>	<i>R Square</i>	<i>Watson</i>
lnreturn p21	(Constant)	2.720	.000			
lnreturn p24	lnreturn p24	.012	.181	.005	.000	1.93
	Dependent Variable: lnreturn p21					
	(Constant)	3.877	.000			
	lnreturn p21	.013	.181	.005	.000	2.19
	Dependent Variable: lnreturn p24					

Table 5
Coefficient in companies of group 3 in terms of size

	<i>Model</i>	<i>B</i>	<i>Sig.</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Durbin-Watson</i>
Inreturn p31	(Constant)	3.380	.000			
Inreturn p34	Inreturn p34	-.023	.153	.028	.012	2.195
	Dependent Variable:					
	Inreturn p31					
	(Constant)	4.037	.000			
	Inreturn p31	-.035	.153	.028	.012	2.193
	Dependent Variable:					
	Inreturn p34					

Table 6
Coefficient in companies of group 4 (the largest group) in terms of size

	<i>Model</i>	<i>B</i>	<i>Sig.</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Durbin-Watson</i>
Inreturn p41	(Constant)	2.818	.000			
Inreturn p44	Inreturn p44	-.057	.073	.047	.038	1.83
	Dependent Variable:					
	Inreturn p41					
	(Constant)	3.766	.000			
	Inreturn p41	-.048	.073	.047	.038	2.16
	Dependent Variable:					
	Inreturn p44					

The Table results of all groups indicate a good value (about 2) for the Durbin-Watson statistic namely, there is no autocorrelation.

Table 3 shows the statistic value of sig about the relationship between return on portfolios p11 and p14 (small companies) which is equal to 0.051 and beta coefficients which are 0.211 and 0.26 respectively. Because the coefficients are opposite to zero thus, in reliability level of 95% it can be expressed that in the portfolios of small companies, stock return of companies with the lowest trade volume has a significant relationship with stock return of companies with the highest trade volume and first hypothesis about small companies is confirmed. Regression equations for portfolios p11 and p14 are as follows:

$$\text{Ln retuen p11} = 1.865 + .26 \text{ Ln retuen p14}$$

$$\text{Ln retuen p14} = 3.142 + .211 \text{ Ln retuen p11}$$

According to the above equations it can be seen that the beta coefficient in first equation (Ln return p14 is independent variable) is greater than the second equation (Ln return p11 is independent variable) which means that the stock return of companies with low trade volume can be predicted by using stock return of companies with high trade volume and second hypothesis about small companies is confirmed.

According to Tables 4 and 5 it can be seen that the sig statistics value about the relationship between return in portfolios p21 and p24 is equal to 0.181 and in portfolios p31 and p34 is equal to 0.153 which means that at the reliability level of 95% for portfolios p21, p24, p31 and p34 (average companies in terms of size) both hypotheses are rejected.

Table 6 shows the statistics value of sig about the relationship between return in portfolios p41 and p44 (large companies) is equal to 0.073 and beta coefficients are -0.057 and -0.048 respectively. Because the coefficients are opposite to zero therefore, at the reliability level of 93% it can be expressed that in the portfolios of large companies, stock return of companies with the lowest trade volume has a significant relationship with stock return of companies with the highest trade volume and first hypothesis about large companies like small companies is confirmed. Regression equations for p41 and p44 portfolios are as follows:

$$\text{Ln return p41} = 2.818 - .057 \text{ Ln return p44}$$

$$\text{Ln return p44} = 3.766 - .048 \text{ Ln return p41}$$

According to the above equations it can be seen that the beta coefficient in first equation (Ln return p44 is independent variable) is greater than the second equation (Ln return p41 is independent variable) which means that the stock return of companies with low trade volume can be predicted by using stock return of companies with high trade volume and second hypothesis about large companies like small companies is confirmed.

CONCLUSION

The findings of the research show that in both large companies (at the reliability level of 93%) and small companies (at the reliability level of 95%) stock return of companies with high trade volume and companies with low trade volume have a significant relationship with each other. Also, results suggest that both in large companies and small companies, the stock return of companies with low trade volume can be used to predict the stock return of companies with high trade volume. The results of the study are consistent with findings of Chordia and Swaminathan (2000).

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