EMPIRICAL ANALYSIS OF THE IMPACT OF VOLUME ON STOCK PRICE

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Abstract

Volume is an important factor affecting the stock price is an important basis for stock technical analysis, the relationship between them is one of the hot topics in financial research.In order to test the interactive relationship between the volume and the stock price, the paper uses the monthly data of Shanghai Composite Index, Shenzhen Composite Index and ChiNext Index from January 2013 to April 2017 to conduct empirical analysis to explore the different levels of capital Market, the interaction between volume and stock prices.We use the ADF to test the stability of the time series of each indicator. We also use Granger causality test to test the correlation between stock price and volume.The results show that the volume and stock price movements are consistent.But in different levels of the capital market, the interaction between the volume and the stock price is different:he interaction between the trading volume and the stock price in the SSE Index market is better than the trading volume and the stock price in the Shenzhen Stock Exchange. The interactive relationship between the trading volume and the stock price in the GEM market is the highest among the three markets Poor.And the major impact of the volume is the opening and closing prices of the stock price, allowing investors to better predict the trading period.

Key words: *Stock price,Stock turnover,ADF test,Granger causality test,A linear regression model.*

1. FOREWORD

Research background and significance

Research Background

China's stock market emerged in Shanghai from the late 19th century to the early 20th century and gradually spread to other big cities with economically developed coastal areas. At that time, with the invasion of foreign capital and the development of China's commodity economy, the stock market developed rapidly Scene.However, during the 50 years from the 1930s to the 1980s, due to the impact of the war and the implementation of China's planned economy, the development of China's stock market was hampered and even disappeared at one time.After the 1980s, thanks to the development of the real estate industry and the reform and opening up, China's economy recovered and more and more capital inflows to the Chinese stock market brought the Chinese stock market a new chapter.

Significance

With the reform and opening up, China opened its door to the eyes of the people with the rapid development of the economy and the rapid increase of people's income.Because securities have a high rate of return, and more and more people are more willing to invest in stocks than to put money into banks for interest, so that the stock market is growing rapidly and more and more people join the stock market.People who scrambled stocks know that the stock price and the stock volume are the two most important indexes for the first choice of investing in stocks. In China, there is a saying circulating in the stock market: "Everything can be deceptive, and only the volume can not be deceived of".How to profit in the stock market?The way to make

a profit is for investors to make sales and purchase spreads by buying and selling stocks. Therefore, investors are most concerned about the stock price, and most of the change in stock prices lies in how investors view the future development of the stock.If the vast majority of investors think that the future price of the stock will rise, people will go crazy to invest in the stock, the stock volume will increase at this time, the stock price will rise as well;If investors believe that the future price of the stock will fall, people will sell the stock to withdraw funds, the volume of the stock is bound to shrink, the share price will drop.

Therefore, the size of the stock volume not only reflects investors' expectations of the future development of the stock, but also reflects the degree of attraction of the stock to the market. By combining the stock volume with the stock price, the stock price trend can be understood. So, the stock volume is an important basis for the analysis of the main behavior to determine the stock price trend.

Research methods

In this paper, the research data basically belong to the time series data, such as stock price, volume, etc., this article will use the simplest linear regression equation model to study the relationship between the volume and price of the stock market. First, set up an economic model (that is, a linear regression equation), the sample data for ADF unit root test, to determine its (stock price, volume growth rate, the chain volume growth rate) stability, Jay's test of the correlation between stock prices and volume. We'll all use Eviews software to figure out the result, because Eviews is relatively quick and easy to work with time series data.The data used in this paper are the samples of Shanghai Composite Index, Shenzhen Composite Index and GEM Index respectively. The sample interval is from September 2010 to September 2017, and 80 samples are selected for each index stock, which can prove the transaction more accurately The relationship between quantity and stock price.

The domestic research on the relationship between stock price and volume is mainly conducted on the basis of individual stock or a composite index of large-cap stocks to get the relationship between stock volume and stock price and its characteristics.And this article is totally different from this article is to select the stock market shares to volume relationship analysis, and then use Eviews (Econometrics Views, econometrics software package) software to build a linear regression equation model, through the ADF test, Granger Causality test and assumed a univariate linear regression equation to find out the difference between the volume relationship between different sections, and then you can understand the Shanghai Stock Exchange Index, the Shenzhen Composite Index and the GEM volume relationship.

2. DESCRIPTION OF VOLUME RELATIONSHIP

Volume relationship between the Shanghai Composite Index

As can be seen from Figure 2.1, the rectangle data represents the monthly average share price of the Shanghai Composite Index. From January 2013 to April 2017, the monthly average share price of the SSE Composite Index has basically remained steady, but from the beginning of 2015 to June 2015 There is a substantial rise.From June 2015 onwards to February 2016 there is a sharp downward trend.The polyline in Figure 2.1 represents the monthly transaction volume of the Shanghai Stock Exchange. From 2013 to 2014 and from 2016 to 2017 (though it is up, it does not show a large increase), the poll line has basically remained relatively stable during the year. By the same time around 2015, The monthly turnover of stock has a rapid and substantial increase. Taking into account the second half of 2014, China's stock market is ushering in an unprecedented bull market, the Shanghai index rose from 2201 points in July 2014 all the way up to 4615 points in June 2015, in which investors buy their shares crazy. The stock market then started to fall sharply until April 2016 when the Shanghai Composite Index remained at around 3000. The frenzied trading in the stock market was stopped and the events just led to the irregular movement of the stock turnover represented by the line segment in Figure 2.1.

As can be seen from Figure 2.2, the growth rate of the volume of the ring is often larger than the growth rate of the price of the ring is also larger, and Figure 2.1 stock prices and stock volume increased substantially the same period of time, indicating the Shanghai Stock Index stock market prices And the stock volume has a certain correlation between.

Volume relationship between the Shenzhen Stock Index

The changes in Figure 2.3 and Figure 2.1 are basically similar. Before the second half of 2014, the volatility of the stock price and stock volume of the Shenzhen Composite Index was not significant and remained relatively stable around 8,000 points until 2014 From the second half of the year to October 2015, the Shenzhen Composite Index also experienced the same ups and downs as the Shanghai Composite Index market. At first, it rose insanely and then swung back to about 8,000 points.However, after January 2016, the share price of the Shenzhen Composite Index maintained a slow upward trend and has remained steady since then. However, it should be noted that the trading volume of the stock has been significantly aggravated after the bull market.In Figure 2.4, the volatility of the stock volume ring in the Shenzhen Stock Index is significantly larger than that of the stock price. And there is no obvious correlation between the stock price chain and the volume ring ratio from Figure 2.4.

From this we can see that in the Shenzhen Stock Exchange index market, the correlation between the stock price and the stock volume is obvious when the stock price rises, but it is not obvious after the rise, and the stock price chain is compared with the stock volume ring The correlation is not obvious at all.

GEM volume and price relationship

As can be seen from Figure 2.5, the changes in the stock price and the stock turnover in the GEM are different from those in the SSE and the SSE, and the stock price and stock volume have also gone through two rounds between late 2014 and early 2016 Big rise and fall.After the bull market, both the stock price and the stock turnover of GEM refer to those before the bull market, but the stock prices have gradually stabilized. However, the volatility of stock turnover was significantly greater than that before 2014.

In addition, Figure 2.5 GEM refers to the stock price and volume changes in the same stock, up and down the time period is basically the same, you can see in the GEM market stock prices and stock volume between a certain Correlation.However, as shown in Figure 2.6, GEM did not find a clear synchronization between the sequential growth of the stock price and the sequential growth of the stock volume, and did not find consistent volatility.

In summary, the GEM market comparison of the Shanghai Stock Index
and the Shenzhen Stock Index stock price and the correlation between
the volume of the transaction is much more obvious, but the Shanghai
Composite Index and the Shenzhen Composite Index, the same stock price chain and stock transactions The correlation between the amount
of ring is not obvious.

3. EMPIRICAL ANALYSIS OF THE IMPACT OF VOLUME ON STOCK PRICE

Data Sources

Under normal circumstances in the stock market, the stock index level for each different section is the average stock market that can represent this section.Therefore, the data used in this paper are selected from the Shanghai Composite Index, Shenzhen Component Index and GEM Index respectively. The sample interval is from September 2010 to September 2017, with 80 samples for each index stock.Selected indicators are mainly open, close, the amount of change, the lowest, highest, volume (hand), the amount of the transaction (million). Data are from the East Fortune Network.

Model introduction

Model principle

（1）The principle of linear regression equation

Regression analysis is a statistical analysis that determines the quantitative relationship between two or

more variables that are interdependent.The purpose of the regression analysis method is to fit a series of influencing factors and the results, fit an equation, find out the influence law of the influencing factors on the result through regression, and then predict the influence law by applying this equation to other similar events.If you include only one independent variable and one dependent variable in the regression analysis, and the relationship between the two variables can be approximated by a straight line, we call this regression analysis a univariate linear regression analysis.

The univariate regression linear analysis method includes two assumptions:

First, assume that the regression model is set correctly. The independent variables have a linear relationship with the dependent variables, that is, the variables selected by the model and the functional forms of the model are correct.The correct choice of model variables refers to the fact that there is neither multiple choice of irrelevant variables nor important missing variables in setting the overall regression function.The function form of the model selection is correct. It means that the function form that we set in the overall regression equation happens to be the function form that appears between the independent variable and the dependent variable.

Second, it is assumed that the value of the independent variable is fixed, a non-random data.Variables can be repeated or even infinitely sampled many times, and take a fixed number of samples.As the number of sample samples increases several times, the sample variance of the dependent variable approaches a non-zero constant.

Come to the conclusion: $E（Y_t）=\beta_1+\beta_2 X_t$

（2）Granger causality test principle

The Granger causality test first assumes that all the information about these two variables is included in the time series of the explanatory variable Y and the explanatory variable X.The test requires estimation of the regression of two models (1) and (2):

$$Y_i=\sum_{i-1}^{q}\partial_i X_{t-i}+\sum_{i-1}^{q}\beta Y_{t-1}+u_{1t}$$

（1）

$$X_{\mathrm{i}}=\sum_{i-1}^{s}\lambda_i X_{t-i}+\sum_{i-1}^{s}\delta_j Y_{t-1}+u_{2t}$$

（2）

In the formulas (1) and (2),Assume that u_{1t} and $\mathrm{u}_{2\mathrm{t}}$ are not related，Moreover, Y in formula (1) is related to itself and the past value of X, and X in formula (2) is related to the past values of itself and Y.

The null hypothesis of equation (1) isH_0: $\partial_1=\partial_2=....=aq=0$.

The null hypothesis of equation (2) isH_0: $\delta_1=\delta_2=...=\delta_{\mathrm{s}}=0$.

By analyzing the statistical significance level of lag coefficient estimation of (1) and (2),It can be seen that: (1), if the estimate of X coefficient in equation (1) is statistically not significant as a whole, and the estimate of Y coefficient in equation (2) is statistically significant as 0, X is the cause of Y changes.

If the lagged coefficient estimates of Y in (2) are statistically significant non-zero as a whole, while the coefficient estimates of X in formula (1) are statistically significant non-zero as a whole, Y is said to cause changes in X;

If the coefficient of lagged X in formula (1) is statistically significant non-zero as a whole, and lagged coefficient of estimate Y in formula (2) is statistically significant non-zero as a whole, it is said that X and Y Mutual causation

If the lagged coefficient estimates of X in Eq. (1) are statistically significant zero as a whole and lagged coefficient estimates of Eq in Eq. (2) are statistically significant zero as a whole, then X and Y are independent of.

3.2.2Model establishment

The univariate linear regression model assumes that the dependent variable Y is mainly influenced by the independent variable X. Only one independent variable is involved in the regression, and an approximate linear function exists between the two variables.The univariate linear regression model is a simple linear regression model that involves only one independent variable's regression function:

$$Y_t = \beta_1 + \beta_2 X_t + u_t \quad (3)$$

Y_t and X_t in equation (3) are the t-th observations of Y and X, respectively. β_1 and β_2 are called regression functions and are the parameters of the model. U_t is the random variable of the error term, obeying the normal distribution,Reflects the effect of random factors other than the linear relationship between Y_t and X_t on Y_t ,which is not explained by the linear relationship between Y_t and X_t.

However, in the study of real life problems, the objects that we often study are complex and changeable, and the changes may be very much or even infinitely complicated, with unimaginable complexity.Therefore, it is impossible to obtain all the values of the dependent variable Y, and only a large amount of data can be obtained, so that an accurate overall regression function can not be obtained.Therefore, in the face of practical problems, we need to use known sample information to estimate the regression function if we want to conduct research.

In the regression model we assume that the expected value of u_t is equal to 0,So, $E(Y_t) = \beta_1 + \beta_2 X_t$,In other words, The expected value of Y_t is a linear function of X_t and the equation describing how the expected value of the dependent variable Y_t depends on the independent variable X_t is a regression equation so that the form of this univariate linear regression equation is:

$$\hat{Y}_t = \hat{\beta}_1 + \hat{\beta}_2 X_t \quad (4)$$

$\hat{Y}_t$ in equation (4) is the Y value corresponding to X_t, $\hat{\beta}_t$ and $\hat{\beta}_2$ are estimates of the overall regression functions β_1 and β_2 ,In the sample regression function, $\hat{\beta}_1$ represents the intercept coefficient which is the intercept of the estimated regression equation on Y, and $\hat{\beta}_2$ represents the slope of the slope coefficient which is the slope of the straight line and represents the average change value of Y for each unit of change in X.

Model Application and Testing

ADF unit root test

The premise of Granger causality test is that the time series of each index is stable, so unit root test should be performed on each data before Granger causality test.Since there is a unit root that is a non-stationary time series, the easiest way to test unit roots for Eviews is to use the ADF to test it.We find that if we do unit root tests directly, we will find that they are not stable at all, so we make a first-order difference.Table 3.1 shows the ADF test results of the first-order differences between the opening, the lowest, the stock turnover and the stock turnover of the Shanghai stock index, the Shenzhen stock index and the gem stock index.

As can be seen from Table 3.1, the data of the three index blocks after ADF unit root test,Among them, the absolute value of the ADF test values of the Shanghai Stock Exchange Index, the Shenzhen Component Index and the GEM are greater than the absolute values of the critical values at the significance levels of 1%, 5% and 10%.Prove that the Shanghai Composite Index and the GEM can reject the null hypothesis,Therefore, the Shanghai Composite Index, the Shenzhen Composite Index and the GEM data can do a one-way difference analysis (only the turnover and volume, with the lowest

price, the opening price, closing price and the relationship between price movements.)

Granger causality test

Using the Eviews software to conduct the Granger causality test with the lag coefficient of 2, the following analysis conclusion is obtained from the monthly stock price and the monthly turnover of the Shenzhen Stock Exchange, Shanghai Stock Index and GEM in September 2010 to September 2017.(X = stock price, Y = turnover amount)

Taking GEM as an example, the first pilot hypothesis Y (stock turnover) that is not Granger causality time for X (opening price) is 78 and the effective observation sample for F test is 5.25024 , A significant value of 0.0074.That is, at the 10% level of significance, it is impossible to reject the Granger causality where the null hypothesis Y is not X, that is, the Granger causality on the 10% level of significance of the stock turnover not the stock priceFrom the second conclusion from the null hypothesis, we can see that the significant Prob value of X with respect to Y is 0.0074, which is almost 0 significant level,It can be concluded that under any significant condition, Granger causality, where X is not Y, can be rejected, that is, the opening price of the GEM has a causal relationship with the turnover of the stock, and the turnover varies with the opening price.

By the same token, at 10% level of significance, it can not be denied that the Granger causality of assuming Y1 (the monthly growth rate of the monthly stock turnover of SME) is not X1 (the monthly stock price difference of SME),We can reject the assumption that X1 is not the Granger causality of Y1.It can be drawn, the GEM refers to the monthly stock turnover and foot the same price with the change in the price of stock changes in the changes.

3.3.3 A linear regression model results

In the stock market, there is certainly a relationship between the stock price and the stock volume.In China's stock market, fluctuations in stock prices affect the volume of stock transactions. It can be proved that the trading volume of China's stock market is closely related to the price changes. The stock volume changes with the stock price.Can make the stock volume as the dependent variable Y, the stock price as the independent variable X, the Shanghai Composite Index, Shenzhen Component Index, the stock index refers to the GEM and the stock turnover into our estimate of a linear regression equation (4),Use Eviews software to get the univariate regression equation of stock turnover and stock price.Using the Eviews software operation yields the following result.

Take the above index as an example, Prob values are less than 5% of the significance level, you can according to Coefficient on the independent variable X figures come

(1) the relationship between the trading volume and turnover of the Shanghai Composite Index and the opening price and the lowest price

Shanghai Stock Index stock turnover with the opening of a dollar regression equation is:

$$Y = 407453.8X$$

The one-way regression equation of the stock turnover and the lowest price of the Shanghai Composite Index is:

$$Y = 446816.5X$$

The one-way regression equation of the stock turnover and the opening price of the Shanghai Composite Index is:

$$Y = 1849660X$$

The one-way regression equation of the stock turnover and the lowest price of the Shanghai Composite Index is:

$$Y = 2071012X$$

(2) the relationship between the trading volume and turnover of the Shenzhen Component Index and the opening price and the lowest price

Shenzhen Securities Index of the stock turnover with the opening price of a dollar regression equation is:

$$Y = 78477.61X$$

Shenzhen Securities Index of the stock turnover with the opening price of a dollar regression equation is:

$$Y = 92740.77X$$

The one-way regression equation of the stock turnover and the opening price of Shenzhen Component Index is:

$$Y = 306693.8X$$

The one-way regression equation of the stock turnover and the lowest price of the Shenzhen Component Index is:

$Y = 616485.0X$

(3) GEM Index Stock volume and turnover amount and the opening price and the lowest price relationship

GEM refers to the amount of stock turnover with the opening price of a dollar regression equation is:

$Y = 29365.28X$

GEM refers to the amount of stock turnover with the lowest price of the dollar regression equation is:

$Y = 61617.00X$

GEM refers to the stock volume with the opening price of a dollar regression equation is:

$Y = 7468.967X$

GEM refers to the stock volume with the lowest price of the dollar regression equation is:

$Y = 73782.89X$

The R-squared test of each model shows that the correlation between the stock turnover and the stock turnover of the Shanghai Stock Exchange Index, the Shenzhen Stock Exchange and the Growth Enterprise Market, and the opening price and the lowest price are basically small.(Because we have to consider too many things, and we did not consider so many things, and we take the amount is particularly large, so the final conclusion is so big)

4. CONCLUSION AND SUGGESTION

Empirical conclusions

In this paper, we select the Shanghai Stock Exchange Index, the Shenzhen Stock Exchange Index and the ChiNext Index to select the target of the price-volume relationship. The selected time period is the stock price and the trading volume in the 80 months from September 2011 to September 2017.

The main research of this paper is the relationship between the volume and the volume rate of the chain growth rate of the stock price and the share price and the volume growth rate of the volume,Through the ADF test to test the data of the three plates is stable;By Granger causality test the causal relationship between the volume of three plates;And use the univariate linear regression model to get a more in-depth understanding of the relationship between the stock price and the stock volume of the three sectors in China's stock market.Through this series of analysis we got the following conclusions:

1. According to ADF's test, I found that the stock price in China's stock market remained stable on the whole. The opening, closing, trading volume, minimum, maximum, trading volume and turnover in China's stock market are both Smooth processThere is a correlation between the stock price and the stock volume in the Chinese stock market,Shanghai Composite Index Market> Shenzhen Component Index Market> The GEM, the opening price and the lowest price all have a linear relationship with the transaction volume and turnover.

3, the Chinese stock market volume and turnover of the stock contains important information related to price changes, which are basically causal relationship。

Suggestion

In order to improve the stability and effectiveness of the stock market, and make investors more profitable, this paper puts forward the following suggestions through conclusions:

1.Investors with strong risk appetite preferred GEM stocks, the Shanghai Composite Index and Shenzhen into more comparable to the GEM refers to the change is more stable, usually do not have the kind of ups and downs, relative to the GEM, they can be promptly made reaction.

2.Investors should buy shares by analyzing the historical price of the stock, the ability of enterprises, etc. to determine the future trend of stock prices, do not necessarily die in accordance with the amount of stock transactions to judge,Because the stock transaction amount fluctuates with the fluctuation of stock price, it does not have obvious expectation.

3.Investors should also make a judgment on their own psychological expectations and learn more about the relationship between stock and other assets through various kinds of knowledge.

Table 3.1 Uniform Difference ADF Unit Root Test Results of Shanghai Composite Index, Shenzhen Component Index and ChiNext Index

		ADF test statistic	1% level	5% level	10% level	Prob.*
The Shanghai Composite Index	opening	-6.236281	-3.516676	-2.899115	-2.586866	0.0000
	Lowest price	-6.702524	-3.516676	-2.899115	-2.586866	0.0000
	Volume	-4.453506	-3.519050	-2.900137	-2.587409	0.0005
	Turnover	-7.450332	-3.517847	-2.899619	-2.587134	0.0000
Shenzhen Composite Index	opening	-7.423587	-3.516676	-2.899115	-2.586866	0.0000
	Lowest price	-6.382832	-3.516676	-2.899115	-2.586866	0.0000
	Volume	-8.405712	-3.517847	-2.899619	-2.587134	0.0000
	Turnover	-7.219477	-3.516676	-2.899115	-2.586866	0.0000
GEM refers to	opening	-7.011698	-3.516676	-2.586866	-2.586866	0.0000
	Lowest price	-6.078064	-3.519050	-2.900137	-2.587409	0.0000
	Volume	-8.599724	-3.517847	-2.899619	-2.587134	0.0000
	Turnover	-7.286045	-3.516676	-2.586866	-2.586866	0.0000

Table 3.2 Shanghai and Shenzhen 300 refers to the small and medium sized refers to the GEM and the stock price Granger causality test analysis results

		obs	F-Statistic	Prob.
The Shanghai Composite Index	Turnover does not Granger Cause Opening price	78	19.1408	2.E-37
	Opening pricedoes not Granger Cause Turnover		0.62324	0.05390
	Turnover does not Granger Cause Closing price	78	1.61317	0.2063
	Closing price does not Granger Cause Turnover		9.18704	0.0003
	Turnover does not Granger Cause Lowest price	78	0.97216	0.3831
	Lowest price does not Granger CauseTurnover		3.26308	0.0439
	Turnover does not Granger Cause Quote change	78	1.129940	0.2789
	Quote change does not Granger Cause Turnover		4.22052	0.0184

	Volume does not Granger Cause Opening price	78	12.2401	3.E-05
	Opening price does not Granger Cause Volume		0.57170	0.5671
	Volume does not Granger Cause Closing price	78	0.61927	0.5411
	Closing price does not Granger Cause Volume		4.40753	0.0156
	Volume does not Granger CauseLowest price	78	4.52721	0.0140
	Lowest price does not Granger Cause Volume		1.22136	0.3008
	Volume does not Granger Cause Quote change	78	0.72761	0.4865
	Quote change does not Granger Cause Volume		2.28361	0.1092
		obs	F-Statistic	Prob.
Shenzhen Composite Index	Turnover does not Granger Cause Opening price	78	13.4134	1.E-05
	Opening pricedoes not Granger CauseTurnover		0.57886	0.8960
	Turnover does not Granger Cause Closing price	78	0.10993	0.8960
	Closing price does not Granger Cause Turnover		7.86758	0.0008
	Turnover does not Granger CauseLowest price	78	2.89764	0.0615
	Lowest price does not Granger Cause Turnover		0.84274	0.4347
	Turnover does not Granger Cause Quote change	78	0.58241	0.5611
	Quote change does not Granger Cause Turnover		4.18473	0.0190
	Volume does not Granger Cause Opening price	78	12.2401	0.2527
	Opening price does not Granger		14.7282	4.E-06

	Cause Volume			
	Volume does not Granger Cause Closing price	78	0.20816	0.8126
	Closing price does not Granger Cause Volume		3.02850	0.0545
	Volume does not Granger CauseLowest price	78	6.8200	0.0019
	Lowest price does not Granger Cause Volume		0.42533	0.6563
	Volume does not Granger Cause Quote change	78	0.15965	0.8527
	Quote change does not Granger Cause Volume		2.25346	0.1123
		obs	F-Statistic	Prob.
GEM refers to	Turnover does not Granger Cause Opening price	78	15.1123	3.E-06
	Opening pricedoes not Granger Cause Turnover		3.30543	0.0422
	Turnover does not Granger Cause Closing price	78	0.40740	0.6669
	Closing price does not Granger Cause Turnover		9.74032	0.0002
	Turnover does not Granger CauseLowest price	78	0.33542	0.7161
	Lowest price does not Granger Cause Turnover		5.28024	0.0072
	Turnover does not Granger Cause Quote change	78	0.61788	0.5419
	Quote change does not Granger Cause Turnover		5.97388	0.0040
	Volume does not Granger Cause Opening price	78	5.25024	0.0074
	Opening price does not Granger Cause Volume		5.67227	0.0074
	Volume does not Granger Cause Closing price	78	2.12201	0.1271
	Closing pricedoes not Granger Cause		7.53439	0.0011

	Volume			
	Volume does not Granger CauseLowest price	78	4.28429	0.0174
	Lowest price does not Granger Cause Volume		1.40359	0.2523
	Volume does not Granger Cause Quote change	78	0.43477	0.6491
	Quote change does not Granger Cause Volume		0.95113	0.3910

Table 3.4 Shanghai Composite Index, Shenzhen Component Index and the GEM return results

The Shanghai Composite Index

		Coefficient	t-Statistic	Prob.	R-squared
Turnover	Opening price	407453.8	3.865322	0.0020	0.162504
	Lowest price	446816.5	3.433073	0.0010	0.131161
Volume	Opening price	1849660	2.044614	0.0443	0.050738
	Lowest price	2071012	1.866387	0.0657	0.042618

Shenzhen Composite Index

		Coefficient	t-Statistic	Prob.	R-squared
Turnover	Opening price	78477.61	4.213500	0.0001	0.185127
	Lowest price	92740.77	3.932465	0.0002	0.165260
Volume	Opening price	306693.8	2.013651	0.0475	0.049196
	Lowest price	616485.0	3.377437	0.0011	0.1227384

GEM refers to

		Coefficient	t-Statistic	Prob.	R-squared
Turnover	Opening price	29365.28	3.503785	0.0008	0.135983
	Lowest price	61617.00	5.382301	0.0000	0.270814

Volume	Opening price	7468.967	0.200085	0.0419	0.000504
	Lowest price	73782.89	1.344292	0.0828	0.022635

REFERENCES

[1] Li Shangli, Sun Shaolong. The volume probability model is used to explain the price fluctuation [D]. Shijiazhuang University of Economics Business School. 2011.

[2] Zheng. Effect of stock price fluctuation on turnover--an empirical analysis on stock Exchange in Hong Kong [j].2009.34-36.

[3] Dong Xiuliang, Wu Ren water. Is the trading volume suitable as a proxy variable for stock price fluctuation information? [J]. Quantitative economic, techno-economic Studies, 2008, (1). 134-137.

[4] Wang Junpo, Dengshuhui. The influence of interest rate and turnover on stock price fluctuation the application of-garch correction model [J]. Theory and practice of Systems Engineering, 1999 (9). 7-9.

[5] Shengjianping, Gaofang Min. Empirical study on the correlation between turnover and rate of return [J]. Forecast, 2000, (5). 18-19.

[6] Zhao Chunquang, Bang Junli. An empirical study on the relationship between stock price and turnover [J]. Financial Science, 2001, (6): 47-52.

[7] Jinneng, Xu Bing. Turnover and stock price nuclear regression analysis model [N], Journal of Taizhou University, 2003, (6). 2-3.

[8] Zheng. An empirical study on the relationship between stock price fluctuation and turnover in Shenzhen [J], financial sight, 2009, (3): 26-27.

[9] Louging. A study of the relationship between stock price and turnover [J], financial overview, 2014.40-43.

[10] Yinglouyan. Study on the relationship between quantity and price of Chinese stock market [D], Northeastern University of Finance and Economics. 2011.