The effect of trading volume on stock return: Evidence of shanghai and Shenzhen stock exchange

Abdelhak BENAMEUR
University of Tlemcen
Algeria
abdelhakbenameur77@gmail.com

Zineb BENKHEDDA
University of Tlemcen
Algeria
zbenkhedda13@gmail.com

R.M.BENBOUZIANE
University of Tlemcen
Algeria
mbenbouziane@gmail.com

Received: 02/06/2022 *Accepted*: 05/08/2022 *Published*: 31/08/2022

Abstract :
This study examines the effect of trading volume on stock return of shanghai (SSE) and Shenzhen stock exchange (SZSE) in the Chinese market. The data set comprises daily composite index from 04/01/2007 to 27/12/2019 for shanghai stock exchange, while Shenzhen stock exchange (SZSE) from 12/27/2012 to 27/12/2019, using the augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test, Descriptive statistics and jarque-bera test. Moreover, Granger causality tests were used to check the causality relationship between trading volume and stock returns. Furthermore, the study test the causality of cross-markets SSE and SZSE. Thestudy choose a GARCH (2,2) model to test the contemporaneous and lagged relationship for last 5 days between trading volume, stock return and volatility. The results of granger causality test found that there is a positive and significant causal impact in only one direction from the trading volume to the stock return in the Shanghai stock exchange while in the Shenzhen stock exchange there is a significant and positive causal impact from stock returns to the trading volume. The GARCH (2,2) model results show that there is significant and positive contemporaneous relationship in SSE and negative contemporaneous relationship in SZSE. Thus, there is no lagged relationship between the variables which means that the mixture distribution hypothesis is applicable in the Chinese markets as well the information arrive simultaneously; the trading volume and return are affected by the arrival of new information to the stock market, the Chinese market is efficient not affected by historical information (Semi strong level of efficiency).

***Key Words*:** stock return, trading volume, efficient market, SIAH GARCH (2.2)
JEL Classification : G12, G15

* Corresponding author: Abdelhak BENAMEUR (*abdelhakbenameur77@gmail.com*)

Introduction :

Financial markets play a crucial role in the modern economic systems; it has reaching implication on macroeconomic stability and financial performance. Therefore, it is in the interest of the financial system to achieve efficiency in the dynamics of financial markets.

Financial markets act as a go- between investors and corporations, in order to help the corporation's in attracting funds for their investment operations, furthermore help the investors to gain benefits. Where the main objective of investors is to achieve the highest return with the lowest risk but with the developments that we observe in the stock markets, the opening of markets to foreign investors increase the number of transactions, fluctuating prices requires the investors to follow the

movements of prices and know all the information related to stocks to determine the right decision avoiding the risk.

Moreover, trading volume is an important indicator for the investor to understand the dynamic of markets, for achieve their objectives and determine the right decisions.

The relationship between trading volume and stock return refers to the concept of the efficiency of the stock market depends on how quickly new information is reflected in stocks prices. Thus, the stock returns are commonly noisy, subsequently; to have a proper understanding of the microstructure of the stock markets it is essential to undertake the dynamics of stock return and trading volume. Several theories have emerged to explain the relationship between trading volume and stock return under the assumption of information hypotheses, including Sequential information arrival hypothesis (SIAH) which was presented by Copeland (1976), then Tauchen and Pitts (1983) and Grammtikos and Saunders (1986). According to this model, the information reaches to the traders in the market in a sequential manner. Therefore the adjustment of prices is stages according to the new information, as a result of sequential information arrival, there are several temporary conditions of balance before reaching the final balance, also take in Mixture of distribution hypothesis (MDH) that was presented by Clark (1973), Epps and Epps (1976), Harris (1986) and Campell, et al. (1993). According to this model, the trading volume and return is affected by the arrival of new information to the stock market. Moreover, the information reaches to all investors at the same time simultaneous. As a result, the prices will be speedily adjusted according to this information so that make the market balanced, and there will be no opportunity to use the information of return to predict the trading volume or vice versa. This model assumes that trading volume and return are based on a mixing variable. This measures the rate of arrival information to the market. Therefore, the model considers the trading volume, as a proxy variable that reflects the extent of agreement or disagreement regarding the interpretation of the information contained in the market. These results in the arrival of information from the presence of external variables vary according to time.

Thus, The main research questionis : "What is the effect of trading volume on stock return in the Chinese markets?"

To deal with the main question we must answer some questions:

- What is the effect of trading volume on stock return volatility in the Chinese markets?
- Which hypothesis is applicable in both shanghai and Shenzhen stock exchange MDH or SIAH?
- Is there a causality relationship between trading volume and stock return in the Chinese markets?
- Is there a relationship between cross markets Shanghai and Shenzhen stock exchange?

Research hypotheses:

- Trading volume has positive significant effect on stock returns in the Chinese markets.
- Trading volume has positive significant stock return volatility in the Chinese markets.
- Trading volume and stock return have a bi-direction causality relationship in the Chinese markets.
- A\Trading volume has positive significant contemporaneous effect on stock returns in the Chinese markets (MDH).

B\ Last 5 days lagged of Trading volume has positive significant effect on stock returns in the Chinese markets (SIAH).

- There are relationship between cross markets shanghai and Shenzhen stock exchange.

I. Literature Review

The relationship between trading volume and stock return has numerous studies. The researchers have been interest in this subject for many years. Therefore we will present an empirical review about the subject of our research that has relation trading volume-return.

(Mishra, 2004) Analyzes the relationship between stock returns and trading volume, employed daily data of some Indian IT sector stocks. The data covers four years during the period from 1st Jan 2000 to 31st Dec 2003; set includes 7 major firms among the cluster of 20 firms comprising the CNXIT Index of NSE. The researcher checked for both, the contemporaneous and causal relationship between stock returns and trading volume using ARCH and Augmented Dickey-Fuller statistics. The results found an asymmetric V-shaped contemporaneous relationship between returns and volume and a causal relationship between absolute returns and trading volume (Absolute return Granger causes volume). In addition, found that lagged volume as significant predictive power for current absolute return and vice-versa.

(Medeiros & Doornik) Explore the empirical relationship between stock returns, return volatility and trading volume in Ibovespa stock exchange of Brasilia. The data covers the period (2000 -2005). The results show that there is in the cross-correlation analysis a significant contemporaneous relationship between return volatility and trading volume. But, a simultaneous equation analysis found that returns depend on trading volume and the higher trading volume is related with an raise in return volatility and that this relationship is asymmetrical. The GARCH (1,1) model estimation of stock returns and volatility find there is ARCH effects & high hysteresis in conditional volatility. If trading volume included as a proxy for arrivals of information in the conditional volatility equation the hysteresis of variance will decline. The GARCH estimate provides little support for MDH, since the inclusion of volume in the variance equation results in a rather weak coefficient and does not mitigate the powerful effects of the ARCH observed in the restricted variance equation. The Granger-causality test, found that there is no causality

between trading volume and stock returns. However, trading volume and return volatility is strongly obvious in both directions, which indicates that the arrivals of information might flow simultaneously more than sequentially to the market. Also, there is a significant contemporaneous and dynamic relationship between these variables.

(Ullah & Rizwan, 2008) Examine the causality and the contemporaneous relationships of stock returns, trading volume & volatility of stock index in the Pakistan's stock exchange. The data obtained from Karachi stock exchange (KSE-100 Index) during the period (2001 – 2007). The results of conducted study showed that a positive contemporaneous relationship between variables does exist and that after taking heterosckedasticity into consideration return preserves. In addition to thisin other words, volume is caused by return with the theoretical models which imply that future prices are affected by volume information.

(Pathirawasam, 2011) Aims to studies the relationship between trading volume and stock returns, includes all the listed stocks within the CSE covers 266 firms from 2000-2008. The study showed that stock returns are positively correlated with the contemporary change in volume. Moreover, it has been found that the change in trading volume in the past is negatively correlated with the return.

(Attari, Rafiq, & Awan, 2012) Examine the The dynamic relationship between stock volatility and trading volume. The data sample used in this study includes the weekly stock price index and the trading volume of the KSE 100 index from 2000 to 2012. GARCH results indicate a significant positive relationship between volume and returns. This relationship is of great importance to individuals from the perspective of investment and policy making, where volume reflects information about market expectations, and its relationship to price may have significant implications for trading, speculation, forecasting and hedging activities. In addition, there was a two-way causality between size and yield, ie, that the volume had a bi-directional effect on the return of Pakistan. But there is no causal relationship between change in size and return.

(K.Ravichandran & bose, 2012): This study examined the relationship between trading volume and stock returns volatility in US stock market covers the period (2005 – 2011). The research aims to test the hypothesis which assumes that volatility stocks price when moving downwards is larger than upwards. The results found that the new information has an effect on the volatility of the trading volume. In addition, the past information coefficient is statistically insignificant and put forward that past information is not influence the trading volume volatility. As a result of the study found that systematic variations in trading volume are implies to be caused just by the arrival of new information. Accordingly the study concludes that bad information precedes more effect on volatility of the stock return and trading volume.

(Zada, 2012) Investigate the factors affecting trading volume in the saudi stock market the relationship between trading volume, on one hand, and stock returns, volatility, and the annual earnings announcements, on the other, in the financial stock market. The empirical evidence by OLS regression analysis indicated that

there exists a significant positive relationship between trading volume and stock return, and their volatility. Furthermore, Granger causality results showed evidence of causation between trading volume and stock return. The results of Vector Autoregression (VAR), on the one hand, provided evidence of dynamic relationship between trading volume and stock return. The empirical evidence of GARCH model indicated the existence of positive contemporaneous relationship between trading volume and stock return conditional volatility. The findings showed that the relationship between trading volume and stock return is rejected by MDH, thereby indicating that the Saudi Stock Market is not semi-strong efficient. Finally, evidence of no relationship existed between trading volume and annual earnings announcements using company size and unexpected returns as determinants to examine such relationship.

(El-Ansary & Atuea, 2012) The objective of the study is to examine the relationship between trading volume and stock return within the Egyptian stock exchange. The sample data consists of twenty six out of thirty firms listed in EGX 30 Index; the data set includes daily number of traded stocks of the twenty six firms, number of outstanding stocks for each company, daily number of transactions and the corresponding daily closing price for each stock from 2001 to 2010. The results found that there are a contemporaneous and positive correlation between trading volume and return. Thus, found that there are weak high significant contemporaneous relationships between variables which indicate that trading in the Egyptian security market is noise trading, as well the historical data of trading volume for previous 5 days helps to predict the future return. Despite the fact that one must not only rely on trading volume to forecast return since it explains extremely small measurement of change in stock return. Furthermore, the Egyptian securities market is informational inefficient for the reason that the information reach to the market sequential not simultaneous as well as there is much noise and speculative trading.

(ÇELİK, 2013) Examined the New Evidence on the Relation between Trading Volume and Volatility and the exits of Mixture of Distribution Hypothesis and Sequential Information Arrival Hypothesis in Istanbul Stock Exchange (ISE). Using daily data during the period (2005- 2010). Two sub-samples are used to consider the effect of Global crisis. As a result of HARX-RV model, found positive and statistically significant relation between information arrival and volatility both in before crisis and crisis period. In pre-crisis period the trading volume decreased when included, the persistence of volatility. Although she find no causality relation between volatility and volume in pre-crisis period, bidirectional relationship between volatility and volume is found in crisis period. Therefore, their results differ across two sub-periods. She concludes that MDH is valid only in pre-crisis period. However, cannot strongly reject the SIAH in crisis period. These findings are not consistent with those of Kıran (2010) who conclude that MDH and SIAH are not valid in Istanbul Stock Exchange (ISE) and Boyacıoğlu et al. (2010) who reject the MDH and SIAH in ISE. Overall the results are supportive of MDH in before crisis period. This may reflect that the arrival of new information is

simultaneously available to all traders and so volume and volatility moves synchronously.

(Kang, Choi, & Yoon, 2013) Examine the dynamic and the impact of trading volume on the persistence of the time-varying conditional volatility of returns, for domestic and cross-country markets. Used daily market price index and trading volume data from four Asian stock exchanges: Japan (NIKKEI 225), Hong Kong (Hang Seng Index, HSI), Korea (Korea Composite Stock Price Index, KOSPI), and China (Shanghai Stock Exchange Index, SSEI). Used data from 2 January 2004–28 September 2012 for all indexes except for SSEI, for which we used data from 23 September 2005 to 31 December 2012. The results showed that returns led to Granger causality of the stock market in all markets. In addition, trading volume leads to Granger causality of the Hong Kong market, and helps predict returns volatility in the Hong Kong and China markets (and vice versa). The model of persistence of stock returns when trading volume is included in both the mean equation and conditional variance for all stock returns. The coefficients of regressing returns on trading volume were both positive and significant for the Korean and Chinese markets, negative and significant for Hong Kong, and insignificant for Japan. When we incorporated trading volume in the volatility equation, the coefficient was statistically significant for all stock markets. These results suggest that contemporaneous volume significantly explains volatility. They also found that the GARCH effect still remained for all market returns. This implies that the volatility of returns is not totally explained by trading volume. Second, regarding cross-country relationships, Hong Kong financial market variables, in particular Hong Kong trading volume, have extensive predictive power for the financial markets of Japan and Korea. Third, cross-country interactions are weak, and Japan's international stock market is substantially influenced by market variables outside of the stock markets of Korea, Hong Kong, and China.

(Tapa & Hussin, 2016) Aims to investigate the relationship between stock return and trading volume and conducting is the relationship between variables is consist with weak form efficient markets hypothesis of ACE Malaysian market from August 2009 to December 2015 based on the framework of AR-GARCH model, The result shows that there are a positive and significant contemporaneous relationship between variables. Therefore, the Malaysian ACE market is contradicted with the weak-form of EMH; mean while there is a significant negative contemporaneous relationship among return and past period trading volume. In addition, there is only positive insignificant relationship between trading volume and stock return. Moreover, trading volume and stock return volatility exhibits a significant negative relationship, and asymmetry relation is proved to exist between trading volume and stock return volatility indicating that news is having impact on trading volume.

2. Research methodology:

2.1. The sample data:

Data set includes daily data of the composite index, which includes two types of shares A and B. Data concerning Shanghai stock exchange (SSE) is obtained from the site https://fred.stlouisfed.org from 04/01/2007 to 27/12/2019, while Shenzhen stock exchange (SZSE) data from 12/27/2012 to 27/12/2019 is collected from investing.com.

2.2. Research variables:

The dependent variable (Stock return): Returns are usually defined as the difference between closing and opening price which is divided on the opening price. In this study, the stock return will be calculated as natural logarithm of the first difference of daily closing price, by dividing the Log of closing price in period t on the Log of closing price in period t-1 as follows:

$$R = \ln (cl_t / cl_{(t-1)})$$

R: return for composite index

cl_t: daily closing price in period t

$cl_{(t-1)}$: daily closing price in period $t-1$

The independent variables (Trading volume): is defined as the level of trading activity in a security market, whether buying or selling for a security in a specific period.

In some previous studies, the trading volume was calculated as natural logarithm of the first difference of daily trading volume as (Choi, Kang, & Yoon, 2013) like the following:

$$vol = \ln (vol_{(t)} / vol_{(t-1)})$$

vol: logarithm trading volume of composite index

$vol_{(t)}$: trading volume in period t

$vol_{(t-1)}$: trading volume in period $t-1$

2.3 The Arch/ GARCH model:

ARCH and GARCH models have turn out to be important models in the examination of time series data, in financial applications. These models are particularly helpful when the objective of the research is to study and predict volatility. The least squares model is to determine how the variable will change in response to a change in some other variable. Moreover, the researchers in the case of the forecast and analyze the size of the errors of the model they used the ARCH/GARCH models and standard tools. The basic of the least squares model assumes that, the expected value of all error terms the squared is similar at any given point. This assumption is homoskedasticity furthermore this assumption is the principal of ARCH/GARCH models. Data in which the variances of the error terms are not equal, the error terms might reasonably be expected to be larger for some points or ranges of the data than for others, are said to suffer from heteroskedasticity. The standard warning is that in the presence of heteroskedasticity, the regression coefficients for an ordinary least squares regression is still unbiased, but the standard errors and confidence intervals

estimated by conventional procedures will be too narrow, giving a false sense of precision. Instead of considering this as a problem to be corrected, ARCH and GARCH models treat heteroskedasticity as a variance to be modeled. (Engle)

3. Results and findings:

3.1 Unit root test

For checking the stationary of returns and trading volume for both stocks exchange, two different kinds of tests will be used: the augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test where the Null hypothesis indicates the existence of the unit root in series. If the results are less than the critical value which is (-3.43% at level 1%, -2.86% at level 5%, and -2.56 at level 10%) , the null hypothesis will be rejected.

Table 1 Results of the augmented Dickey-Fuller (ADF) test

ADF Unit root test at level

		RETURN		TRADING VOLUME	
		SSE	SZSE	SSE	SZSE
With constant	t-statistic prob.	-57.3737 0.0001 ***	-31.7630 0.0000 ***	-26.0925 0.0000 ***	-33.2299 0.0000 ***
With constant & trend	t-statistic prob.	-57.3635 0.0000 ***	-31.7763 0.0000 ***	-26.0876 0.0000 ***	-33.2171 0.0000 ***
Without constant & trend	t-statistic prob.	-57.3834 0.0001 ***	-31.7368 0.0000 ***	-26.0972 0.0000 ***	-33.2379 0.0000 ***

*** : Significance at level 1%

Table 2 the results of Phillips-Perron (PP) test

PP unit root test

		RETURN		TRADING VOLUME	
		SSE	SZSE	SSE	SZSE
With constant	t-statistic prob.	-57.1750 0.0001 ***	-31.8472 0.0000 ***	-128.7860 0.0001 ***	-62.0251 0.0001 ***
With constant & trend	t-statistic prob.	-57.1655 0.0001 ***	-31.8542 0.0000 ***	-128.7771 0.0001 ***	-62.0337 0.0001 ***
Without constant & trend	t-statistic prob.	-57.1840 0.0001 ***	-31.8914 0.0000 ***	-128.7832 0.0001 ***	-61.6761 0.0001 ***

*** : Significance at level 1%

3.2 Descriptive statistics:

Table 3 the descriptive statistics of return and trading volume

Variables	Return		Trading Volume	
	SSE	SZSE	SSE	SZSE
Mean	6.80E-05	0.000648	0.000141	-0.001589
Median	0.000609	0.002014	-0.008241	-0.003583
Maximum	0.127408	0.063202	1.400356	1.380349
Minimum	-0.115957	-0.086010	-1.219015	-2.281501
St Dev	0.019301	0.017354	0.194717	0.175079
SKewness	-0.573370	-1.091290	0.425919	-1.568538
Kurtosis	8.226694	7.247288	5.274892	31.25446
Jarque-Bera	3190.232	1156.308	657.4433	40980.23
Probability	0.0000000 ***	0.000000 ***	0.0000000 ***	0.000000 ***
Observation	2674	1217	2674	1217

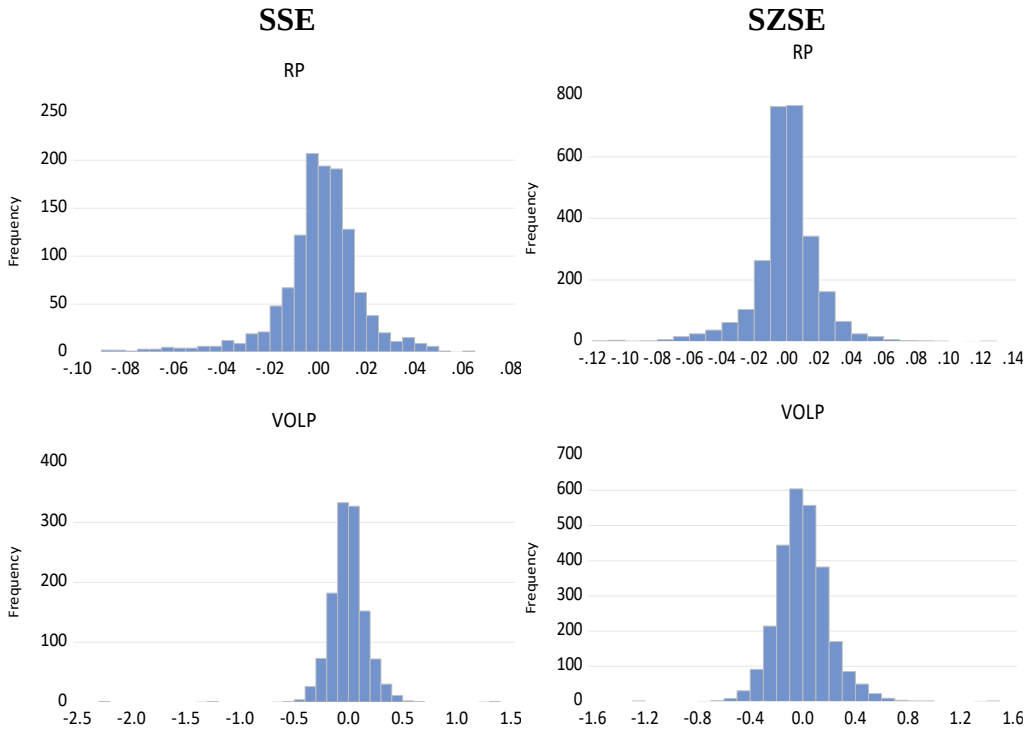
This table summarizes the descriptive statistics of the Study variables. By analyzing the results of returns, we found that the average return of the SZSE is greater and positive than the SSE which is negative. The wide range of SZSE is trapped between two values (-0.086010, 0.063202) with a standard deviation 0.017354. On the other hand, in SSE the wide gap is between (-0.115957, 0.127408) with a standard deviation 0.019301. According to skewness, both stock exchange (SZSE & SSE) are negative. The kurtosis is positive for both stocks markets and larger than 3. This assumes that returns are not normally distributed. Through **Jarque-Bera test** of normality we found that null hypothesis of normality distribution is rejected.

This table also shows the results of trading volume where it was noticed that the average trading volume of the SSE is greater and positive than the SZSE which is negative. The wide range of SZSE is trapped between two values (-2.281501, 1.380349), with a standard deviation 0.175079 while for SSE the wide gap is between, (-1.219015, 1.400356) with a standard deviation 0.194717. Using skewness, we found that stock exchange SZSE is negative while SSE is positive. The kurtosis is positive for both stocks markets and larger than 3 which mean that the distribution of trading volume is not normal. Through Jarque-Bera test of normality we found that null hypothesis of normality distribution is rejected.

3.3 Standard Normality distribution for stocks return, trading volume:

From the graph, it can be noticed that the curve is high in the middle of the distribution which called leptokurtic distribution. In addition to this, tails are thin than normal distribution for all variables in both stocks exchange which in fact matches with mixture of distributions (MDH) model.

Curve 1 normality distribution of trading volume and stock return.



Volp: trading volume. Rp: stocks returns

3.4 Correlation between stock return and trading volume:

Table 4 Correlation between stock return and trading volume

Variables SSE	Trading volume	Stocks return		Variables SZSE	Trading volume	Stocks return
Trading volume	1.000000 Prob. ……	0.279726 Prob. (0.0000)		Trading volume	1.000000 Prob. ……	0.0699442 Prob. (0.0147)
Stocks return	0.279726 Prob. (0.0000)	1.000000 Prob. ……		Stocks return	0.069942 Prob. (0.0147)	1.000000 Prob. ……

The table represents the correlation between the trading volume and return of the two markets according to the specific period of study. The results indicate that there is a weak correlation between the variables in which the shanghai stock exchange (SSE) is correlated at 0.279726%, Significant at 1%. As for the Shenzhen stock exchange (SZSE), it is correlated at 0.0699442%, significant at 5%. This

weak correlation indicates that the forecast of one variable cannot improve knowledge of the other variable.

3.5 Causal relationship between return and trading volume:

Null hypothesis:

- Vol does not granger cause R
- R does not granger cause Vol

Table 5 Causal relationship between stock return and trading volume

	Hypothesis	Comments	f-statistic	Prob.
SSE	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$\overset{GC}{\text{Vol}} \rightarrow \text{R}$	20.6067	1.10^{-09}
	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$\overset{GC}{\text{R}} \rightarrow \text{Vol}$	0.65940	0.5172
SZSE	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$\overset{GC}{\text{Vol}} \rightarrow \text{R}$	0.86993	0.4192
	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$\overset{GC}{\text{R}} \rightarrow \text{Vol}$	56.5533	$3.\ 10^{-24}$

The table shows the granger causality test between the trading volume and stock return in two markets. Initially, the researcher tested if the trading volume cause stock return and vice versa. According to the results, it was found that there is a positive and significant causality effect in only one direction from the trading volume to the stock return in the Shanghai stock exchange which means that trading volume has predictive power for future stock return. On the other side, in the Shenzhen stock exchange, there is a significant and positive causality effect from the return to the trading volume which means that the return contains information of predictive strength for future trading volume in the SZSE markets.

3.6 The causal relationship of the cross markets:

Previous studies examined the causality relationship of the trading volume and stock return cross countries. The same principle was applied by the researcher to study the causality relationship between trading volume and stock return cross markets.

Table 6 the causal relationship of the cross markets

	Hypothesis	Comments	f-statistic	Prob.
SSE	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$Vol_{SSE} \overset{GC}{\rightarrow} R_{SZSE}$	1.02030	0.3608
	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$R_{SZSE} \overset{GC}{\rightarrow} Vol_{SSE}$	0.37135	0.6899
SZSE	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$Vol_{SZSE} \overset{GC}{\rightarrow} R_{SSE}$	0.62802	0.6457
	$H_0: \forall \beta_j, \beta_i = 0$ $H_1: \exists : \beta_j, \beta_i \neq 0$	$R_{SSE} \overset{GC}{\rightarrow} Vol_{SZSE}$	0.43763	0.5338

Vol_{SSE}: Trading volume of shanghai stock exchange, Vol_{SZSE}: trading volume of Shenzhen stock exchange

R_{SZSE} : Return of Shenzhen stock exchange, R_{SSE}: return of shanghai stock exchange.

The table represents the granger causality test between the trading volume and stock return in the two cross markets. It shows the causality test between trading volume of the Shanghai market with the stock return of Shenzhen market, and stock return of Shanghai market with trading volume of Shenzhen market. Accordingly, the results show that there is no causality between SSSE and SZSE. This means that the variables of shanghai stock exchange have no ability to predict the variables of Shenzhen stock exchange.

3.7 Determination of the (p. q) GARCH order:

To determine the (p. q) order for the GARCH model, the researcher relied on the value of Akaike info criterion, (AIC) and Schwarz(SW) Hannan-quinn (HQ) test in which the results show that the best model is GARCH (2.2).

Table 7 determination of the (p. q) GARCH order

(p. q)	AIC	SW	HQ
(1.1)	-5.626619	-5.613400	-5.621836
(1.2)	-5.606228	-5.593009	-5.601446
(2.1)	-5.629301	-5.613879	-5.623722
(2.2)	*-5.633492*	*-5.615867*	*-5.627115*

3.8 Results of GARCH (2.2) model:

This study used the OLS estimation. Therefore, the study tested the hetoreskedasticity and the autocorrelation, where the results showed that the study model suffers from the hetoresckedasticity problem. So in this case, empirical studies used the ARCH/GARCH model because this type of model accepts the hetoresckedasticity and the autocorrelation problem.

The equation of the study as the following:

$$R_t = \int(V_t, h_{t-1}), \quad h_t = \int(V_t)$$

Table 8 Results of GARCH (2,2) contemporaneous and lagged relationship

		Contemporaneous relationship				Lagged relationship of 5 days			
		SSE		SZSE		SSE		SZSE	
		Coef	Prob	Coef	Prob	Coef	Prob	Coef	Prob
Mean Equation	C	0.000107	0.6323	0.000481	0.1775	0.000272	0.2288	0.000459	0.2758
	γ_1	0.018884	0.0000	-0 .008658	0.0000	-0.000459	0.7158	-0.003597	0.2273
Variance Equation	C	1.08E-06	0.0001	1.48E-05	0.0000	4.04E-08	0.0317	2.11E-06	0.4137
	α_1	0.150031	0.0000	0.151274	0.0000	0.104020	0.0000	0.033223	0.1324
	α_2	-0.096699	0.0000	0.222503	0.0001	-0.100470	0.0000	0.016656	0.7821
	β_1	1.196236	0.0000	0.500494	0.0000	1.805118	0.0000	0.725785	0.6453
	β_2	-0.252526	0.0012	0.111886	0.1002	-0.808855	0.0000	0.214667	0.8864
	γ_2	6.65E-05	0.0000	0.000210	0.0000	5.56E-06	0.0332	-2.11E-05	0.3522

According to GARCH, the results of the mean equation show that trading volume has a positive and significant effect on stock return in contemporaneous relationship in shanghai stock exchange thus negative significant effect on Shenzhen stock exchange. Moreover, the conditional variance trading volume has a significant impact on the volatility of the stock returns.

Furthermore, the lagged relationship of trading volume of 5 days indicates that trading volume has not a significant on stock return as far as the mean equation is concerned while the variance equation shows that trading volume is not significant in the volatility of the stock exchange for Shenzhen stock exchange, Thus significant in shanghai stock.

4. Discussion of findings:

Trading volume granger cause stock return in shanghai stock exchange.Return granger cause trading volume in Shenzhen stock exchange.

Trading volume has a positive significant effect on stock return in the contemporaneous relationship in shanghai stock exchange and negative in Shenzhen stock exchange.

Trading volume is not significant on the stock return in the lagged of 5 days which means that investors cannot predict from historical data of trading volume.

Mixture distribution hypothesis is applicable in Shanghai and Shenzhen stock exchange which means that the trading volume and stock returns is affected by the arrival of new information to the stock market. Furthermore, the conditional variance trading volume has a significant impact on the volatility of the SSE stock returns which mean SIAH also applicable.

The hypotheses:

H1: A. we accept the first hypothesis trading volume has positive significant effect on stock return in shanghai stock exchange.

B. trading volume has negative significant effect on stock return in Shenzhen stock exchange.

H2: A. Contemporaneous trading volume has positive significant stock return volatility in the Chinese markets.

B. lagged last 5 days trading volume has positive significant stock return volatility in Shanghai stock exchange. However, not significant stock returns volatility in Shenzhen stock exchange.

H3: A. trading volume granger cause stock return in Shanghai stock exchange.

B. stock return granger cause trading volume in Shenzhen stock exchange.

H4: A\Trading volume has significant contemporaneous effect on stock returns in the Chinese markets (MDH).

B\ Last 5 days lagged Trading volume has not significant effect on stock returns in the Chinese markets (SIAH).

H5: There are no relationship between trading volume and stock return in the cross markets shanghai and Shenzhen stock exchange.

Recommendations:

Recommendations for Chinese markets:

- Disseminate the information of listed companies in the stocks market.
- Publish daily data of the companies.
- Publish more information
- Pay more attention in organization of the markets to avoid crises.

Recommendations for investors in the Chinese market:

- The investors should not rely on the historical data to predict or forecast
- prices.
- The investors should pay attention to the current prices before taking the
- Decisions.

Conclusion:

Our research within the framework aimed to examine and analyze the effect of trading volume on stock returns in the Chinese markets. Using Daily data for composite index which contain two types of shares: shares A for Chinese investors and B for both foreign and the Chinese investors, During the period 2007 until 2019 for shanghai stock exchange and 2012 until 2019 for Shenzhen stock exchange.

To answer the main hypotheses of the research study, the researchers used GARCH (2, 2) model and granger causality test. The results show that there are positive significant contemporaneous relationships between trading volume and stock returns in Shanghai stock exchange which support the empirical results of (Dehua, Xiao, & Wei, 2018)the prediction of MDH of Contemporaneous correlations between return volatility and trading volume and negative in Shenzhen stock exchange. In addition to this, Mixture distribution hypothesis is

applicable in Shanghai and Shenzhen stock exchange which means that the trading volume and stock return are affected by the arrival of new information to the stock market and the traders can easily enter and exit the Chinese market. Furthermore, the information reaches to all investors at the same time. The conditional variance results of SSE also showed that SIAH is applicable. From these results, we suggest to the future researchers to take information flow as proxy to sight how it access to the market.

References :

- Attari, M. I., Rafiq, S., & Awan, H. M. (2012). The Dynamic Relationship Between Stock Volatility And Trading Volume. *Asian Economic and Financial , 2* (8), 1085-1097.
- ÇELİK, S. (2013). New Evidence On The Relation Between Trading Volume And Volatility. *Business and Economic Research , 3* (1), Turkey.
- Chen, C. S., So, M. K., & Chiang, T. C. Evidence of Stock Returns and Abnormal Trading Volume:A Quantile Regression Approach. Hong Kong.
- Choi, K.-H., Kang, S. H., & Yoon, S.-M. (2013). Relationship between Stock Returns and Trading Volume: Domestic and Cross-Country Evidence in Asian Stock Markets. *International Conference on Economics and Business Administration* (pp. 33-39). BUSAN: the National Research Foundation of Korea Grant funded by the Korean.
- Dehua, S., Xiao, l., & Wei, i. (2018). Baidu news information flow and return volatility: Evidence. *Economic Modelling* , 127-133.
- El-Ansary, O., & Atuea, M. (2012). The Effect of Stock Trading Volume on Return in the Egyptian Stock Market. *International Research Journal of Finance and Economics* , 152-167.
- Engle, R. *GARCH 101: An Introduction to the Use of ARCH/GARCH models in Applied.* New York, Stern School of business , America.
- Fan, X., Graenewld, N., & wu, y. (2003). *The stock return-volume relation and policy effects.* Australia.
- K.Ravichandran, & bose, s. (2012). relationship between stock return and trading volume. *Research journal of business management* , 30-39.
- Kang, S. H., Choi, K.-H., & Yoon, S.-M. (2013). Relationship between Stock Returns and Relationship between Stock Returns and Evidence in Asian Stock Markets. *Economics and Business Administration*, (pp. 33-39).
- Medeiros, O. R., & Doornik, B. F. *The Empirical Relationship between Stock Returns, Return Volatility and Trading Volume in the Brazilian Stock Market.*
- Mishra, V. (2004). *The Stock Return-Volume Relation :Evidences from Indian IT Industry*. Department of Economics: Monash University - Faculty of Business and Economics.
- Pathirawasam, C. (2011). The Relationship Between Trading Volume and Stock Returns. *Journal of Competitiveness* , 41-49.

- Tapa, A., & Hussin, M. (2016, April 11-13). the relationship between stock return and trading volume in malaysian ACE Market. *International Journal of Economics and Financial Issues* , 271-278.
- Ullah, S., & Rizwan, F. (2008). trading volume and stock returns: Evidence from Pakistan's. *International Review of business research papers , 4* (2), 151-162.
- YasserAlmishal, D., SuhairBakleh, D., & Aldeki, R. G. (2015). The Impact of Volatilities Stock Return on Trading Volume in Financial Markets "An Empirical Study in Damascus Stock Exchange ". *Tishreen University Journal for Research and Scientific Studies , 37* (4), 433-447.
- Zada, R. A. (2012). *Factors Affecting Trading Volume in the Financial Stock Market.* cairo: cairo university.