

Analysis of Relationship between Stock Return, Trade Volume and Volatility: Evidences from the Banking Sector of Pakistani Market

Shajar Hussain (Corresponding author)
MPhil Scholar, Pakistan Institute of Development Economics
Po Box No 1091 Islamabad 44000, Pakistan
E-mail: shajarzafar@gmail.com

Hassan Jamil
MPhil Scholar, Pakistan Institute of Development Economics
Po Box No 1091 Islamabad 44000, Pakistan
E-mail: hassanjamilfc@gmail.com

MaazJaved
MPhil Scholar, Pakistan Institute of Development Economics
Po Box No 1091 Islamabad 44000, Pakistan
E-mail: maazjaved_13@pide.edu.pk

Waqar Ahmed
MPhil Scholar, Pakistan Institute of Development Economics
Po Box No 1091 Islamabad 44000, Pakistan

Abstract

This research is aim to investigate the relationship between the stock return, trade volume and volatility of the Pakistani banking sector listed in the Karachi Stock Exchange. The study is aimed to take a sample period from Jan 2012 to June 2014. The estimation techniques applied to check the volatility by ARCH and GARCH. To test the relationship between the stock return, trading volume, the technique of VAR applied. The results show the causal relationship between the stock return and the trade volume. The variance equation of the GARCH Model shows the interaction between the trading volume and stock return. The results show that previous day volume has significant effects on the current stock return, it shows that the both the last days return and volume has power to effect the current returns.

Keywords: Pakistan Banking Sector, VAR, ARCH-GARCH, Volatility

1. Introduction

Stock Exchange is a place where shares (securities) of different companies are bought and sold among different investors. Agents who are selling and buying these shares are known as investors. The stock market reacts (positively or negatively) on the basis of the information that is coming in and out from the market. As a result of this information, the trade volume increases in the market which decreases the spreads as well as volatility. Volatility is basically a rate at which the price of a stock moves up and down. On the other side, trading volume is basically the total quantity of the stock (share) bought and sold in the stock market by the investors. The trading volume has a very important role in the stock market. Majority of investors keep a close eye on it because it is a kind of clue for the uninformed investors from the informed investors that if there is something going to happen in the stock(s). Informed investors are those investors which have some inside information related to the stock(s) which has not been spread across the market. As a result of this inside information, the trade volume increases which gives the signal to the other investors that something is going to happen in the price(s) of the stock(s). Usually investors take the unusual increase in the trade volume in a positive way which increases their expectations about the stock(s). As a result, the investors react to it which increases the trade volume and thus, influenced the stock prices.

In Pakistan, research has been conducted to find the relationship between the trading volume, stock prices and returns in which they have taken the manufacturing sectors that are registered at the Karachi Stock Exchange. To fill the gap, this study analyze the relationship between stock return, trade volume and stock volatility of the financial sector of the Karachi Stock Exchange in which Banking sector is being focused in particular. This study is unique in a way that it explores the relationship between stock return, trade volume and stock volatility by only focusing on the single sector of the Karachi Stock Exchange that is banking sector. Moreover, the time period of data used in this study is the most recent which would make enable us to understand the recent dynamics of these relationships in the Karachi Stock Exchange. Many researches have been conducted in this area in the developed markets of the world because of their huge importance. Plenty of developments and extensive research in this area of study is still in progress. However, a very limited research work is available to

analyze the relationship between stock return, trade volume and stock volatility with reference to the Pakistani stock market. The Karachi Stock Exchange is the largest stock exchange of Pakistan and its performance is usually judged by the KSE100 index.

The purpose of this study is to find and analyze the relationship between stock return, trade volume and stock volatility for the Karachi Stock Exchange. The time frame of this study is from Jan 2012, to June 2014. The study will find the causal relationship between trading volume and stock returns as well as the stock returns volatility.

To reveal the relationship between the stock return, trade volume and volatility on the banking sector of the KSE following hypothesis will be tested.

Ho1: There is no significant relationship between the stock return and trade volume.

Ho2 : There is no significant relationship between the trade volume and volatility.

Ho3 : There is no causal relationship between the stock return and trade volume.

Ho4 : There is no dependency of the stock return and previous trade volume.

Ho5 : There is no dependency of the trade volume and the previous day return.

The financial sector study will help towards understanding the behavior of the financial stocks. This study will be beneficial to the individual investors including existing as well as the perspective investors for the diversification. The researcher, bankers and financial analyst will be benefited as well academicians.

The future research can be further done in the various sectors comparatively between the other sectors as well the by using various machine based methods to predict the relationship between the stock return , trade volume and volatility to benefit the perspective as well the existing investors in the market.

This study is organized as follows. The literature review discusses in the section 2. Data and methodological framework discusses in the section 3. The empirical findings of this study discusses in the section 4. The section 5 which is the last section of this study discusses the conclusion of the study.

2. Literature Review

Earlier extensive studies have been conducted to examine the relationship between stock return, trade volume and volatility. The main focus of the studies on the stock volume and returns remained on the hypothesis the latest news and effects on the flows. If the investors in the market are expecting good news, the stock prices will rise and if they are expecting bad news, the stock prices goes down and equilibrium sets on the new level of information so that we can measure the future volume form the past volatility as they move together provided evidence from the Bollerslev and Jubinski (1999). And earlier studies based on this hypothesis that is mixture of Distribution (MDH). Another hypothesis is used by the Smirlock and Starks (1985) and Darrat et al. (2003) to predict the current volume and volatility relationship based on the lagged values of the volatility. This hypothesis is known as sequential information arrival hypothesis (SIAH). According to (SIAH) the traders don't respond equally to any information to make the expectations which tends to incomplete equilibrium. All traders in the market tend to respond on the signals of the information simultaneously which enables to predict the volume accurately. Bhar and Mailairis (1998) evidenced that the price is the determinant of the volatility and also that the change that occur in the price process explained the change in the volatility. The relationship between prices and volatility also explained by the Suominen (2001) that suggest that the price changes are not enough to predict the volatility as well as the information that affects the trade volume, is also required. Mustafa and Nishat (2008) has also explained other factors that affect the volatility and volume other than the information that are short selling and majorly by the inside trading by the players.

Many Studies used the ARCH and GARCH to test the conditional volatility in returns effected by the trading volume as well the previous day trading has significant effect the current market returns as evidence through the studies earlier including the Lamoureux and Lastrapes (1990), Mubarik and Javed (2009), Kwon and Sun (2009) and Tissaoui and Aloui (2014). The accuracy is 55% measured by the previous day data to predict the stock prices by the Kwon and Sun (2009). Univariate ARCH models to measure the major factors that contribute towards the stock returns also the trading volume both in case of sequential or instantaneous flow as suggested by the Tissaoui and Aloui (2014). The findings of the above literature comprises of the previous day return has the explanatory power of the trade volume and previous day volume to stock return in case of individual stock. Also there is lagged relationship between the stock return and trade volume and the credence of the significant relationship between the trading volume and volatility.

3.Data and Methodology

The main variables of our research are stock returns, trading volume and volatility. We took the daily data of stock returns (closing prices) and trading volume of all listed banks in Karachi stock exchange. The data taken on daily basis for the period Jan 2012 to June 2014, the most recent period to check the recent trend in the Pakistani market. Data source is KSE (Karachi Stock Exchange).

The return is taken as log first difference of closing price of stocks at each day. Stock return is how much you

gain by trading the stock.

$$R_t = \ln(P_t) - \ln(P_{t-1})$$

Where R_t is the stock return at t time, $\ln(P_t)$ is the log of the current day price and $\ln(P_{t-1})$ is log of previous day price.

The trading volume is taken as log of daily turnover of each stock. The trade volume high lights the liquidity of stocks and how much trade is done in terms of shares in a day. I will take daily turnover of banks.

$$V_t = \ln(V_{it})$$

Where V_t is market return at time (t) and $\ln(V_{it})$ is the log of individual stock (i) return at (t) time

For stationarity of the time series data, ADF (Augmented Dickey Fuller) test used. To check the auto correlation between the stock return and trade volume the Durbin Watson test will be applied on the residuals.

VAR (Vector Autoregressive model) used to capture the linear interdependencies among the time series data of between stock return and trade volume.

To test the causal relationship Engle Granger causality test that will reveal whether the stock returns is useful in forecasting the volume or otherwise.

And volatility defines the fluctuations in the stock that how much changes occurred in the stock during a particular period of time. If the volatility is high in the stock investors avoid trading in the stock. High volatility of stock considered to be risky. To test the relationship between stock return and volatility we will use ARCH and GARCH model as suggested by the earlier studies as well the recent literature as evidenced the Mubarik and Javed (2009) and Al-Jafari and Tliti (2013).

4. Results and Discussion

VAR shows following results that depicts there is a positive relationship between trading volume and stock returns. Summary statistics is given in Table 01.

According to the table all coefficient values are positive which shows the positive relation between stock return and trading volume. Lag length criteria is selected by SC (Schwarz information criterion) which suggest three lags and VAR of order five is estimated. For causality test GRANGER causality test is done and by this the null and alternative hypothesis for two cases is tested. The GRANGER causality test results shown in Table 02. That previous return has a significant and a positive impact on today's volume but previous volume has not a significant impact on today's return. The causal relationship shows that the stronger impact of stock returns to volume rather than volume to returns.

Results indicate that the trading volume is not causing the stock returns but it is the stock return which causes the trading volume in financial sector. In first case alternative hypothesis is not accepted and in the second we rejected null hypothesis so the result shows that causation is from stock returns to trading volume.

The next we applied GARCH (1,1) and the results are as follows

Conditional mean Equation:

Dependent Variable: DSR				
Method: ML - ARCH (Marquardt) - Normal distribution				
Included observations: 617 after adjustments				
Convergence achieved after 17 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1) + C(7)*DTV(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000990	0.000506	1.956156	0.0504
DSR(-1)	0.182710	0.052349	3.490268	0.0005
DTV(-1)	-0.001415	0.000981	-1.442471	0.1492

Conditional variance Equation:

C	1.14E-05	3.45E-06	3.306038	0.0009
RESID(-1)^2	0.197082	0.043517	4.528886	0.0000
GARCH(-1)	0.741153	0.050694	14.62026	0.0000
DTV(-1)	-7.87E-06	1.03E-05	-0.762681	0.4457
R-squared	0.040654	Mean dependent var		0.001181
Adjusted R-squared	0.036571	S.D. dependent var		0.012666
S.E. of regression	0.012432	Akaike info criterion		-6.064036
Sum squared resid	0.072643	Schwarz criterion		-6.002485
Durbin-Watson stat	1.944684			

According to the conditional mean equation tells us that returns are determined positive and significant as the p-

value of DSR (-1) is 0.0005 and the coefficient value is 0.182710 by past returns however past volume does not affect the returns because the trading volume determined negative and insignificant as the p-value is 0.1492 and the coefficient is -0.001415.

Conditional variance equation shows that volatility is determined error square and the previous volatility as ARCH & GARCH are significant and positive but the volume is negative and insignificant. The Durbin-Watson stat value is 1.944684 which is near to two and shows that there is no problem of autocorrelation. The results show by the ARCH-GARCH Model that there is significance relationship of interaction between the volume and volatility. Our findings and results are supported by the earlier works done in the same context by the Mustafa and Nishat (2006) and Mubarik and Y.Javed (2009) for the Karachi Stock Exchange in the Pakistan.

5. Conclusion

The study conducted on the Karachi Stock Exchange 100 index on the whole Banking Industry from the Jan2012 to June 2014 to analyze the relationship between stock return, volume and volatility. The results show that previous day volume has significant effects on the current stock return, it shows that the both the last days return and volume has power to effect the current returns. The causal relationship shows that the stronger impact of stock returns to volume rather than volume to returns. The results show by the ARCH-GARCH Model that there is significance relationship of interaction between the volume and volatility. Our findings and results are supported by the earlier works done in the same context by the Mustafa and Nishat (2006) and Mubarik and Y.Javed (2009) for the Karachi Stock Exchange in the Pakistan.

References

- Mubarik, Fauzia. and Javed, Attiya Y. (2009), 'Relationship between Stock Return, Trading Volume and Volatility: Evidence from Pakistani Stock Market', *Asia Pacific Journal of Finance and Banking Research*, Vol. 3, No. 3.
- Barclay, M.J. and Hendershott, T., (2003), 'Price Discovery and Trading After Hours' *The Review of Financial Studies*, Vol.16 (4), 1041-1073.
- Bhar, R. and Malliaris, A. G., (1998), 'Volume and Volatility in Foreign Currency Future Markets', *Review of Quantitative Finance and Accounting*, Vol.10, pp. 285-302.
- Bollerslev, J. and Jubinski, D., (1999), 'Equity trading Volume and Volatility, Latent Information Arrivals and Common Long Run Dependencies', *Journal of Business and Economic Statistics*, Vol.17 (1), 9-21.
- Suominen, M., (2001), 'Trading Volume and Information Revelation in Stock Markets', *The Journal of Financial and Quantitative Analysis*, Vol.36 (4), 545-565.
- Mustafa, K. and Nishat, M., (2008), 'Trading Volume and Serial Correlation in Stock Returns in Pakistan', *Philippine Review of Economics*, Vol.45 (2).
- Lamoureux, C.G. and Lastrapes, W.D., (1990), 'Heteroskedasticity in stock Return Data: Volume versus GARCH Effects', *The Journal of Finance*, Vol. 45, 221-230.
- Kwon, Y. K., & Sun, H. D. (2011, August). A hybrid system integrating a piecewise linear representation and a neural network for stock prediction. In *Strategic Technology (IFOST), 2011 6th International Forum on* (Vol. 2, pp. 796-799). IEEE.
- Gamzo, R. A. (2014). *Algorithmic trading, market efficiency and the momentum effect* (Doctoral dissertation).
- Al-Jafari, M. K., & Tliti, A. (2013). An empirical investigation of the relationship between stock return and trading volume: Evidence from the Jordanian banking sector. *Journal of Applied Finance & Banking*, 3(3), 45-64.
- Tissaoui, K., & Aloui, C. (2014). Public and private information: Lessons from the emerging Tunisian stock market. *International Journal of Management Science and Engineering Management*, (ahead-of-print), 1-30.
- Sindhu, M. I., & Waris, F. (2014). Overconfidence and turnover: Evidence from the Karachi Stock Exchange. *European Journal of Business and Management*, 6(7), 128-135.

Table01 VAR Summary Statists

DTV(-1)	-0.370137	-0.000410
	(0.04584)	(0.00119)
	[-8.07492]	[-0.34475]
DTV(-2)	-0.221916	0.000437
	(0.04584)	(0.00119)
	[-4.84103]	[0.36755]
DSR(-1)	5.871175	0.200244
	(1.81280)	(0.04699)
	[3.23874]	[4.26115]
DSR(-2)	-1.377617	0.054576
	(1.81147)	(0.04696)
	[-0.76050]	[1.16221]
C	-0.003204	0.000883
	(0.02223)	(0.00058)
	[-0.14412]	[1.53164]

Table 02Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
DTV does not Granger Cause DSR	615	0.37044	0.7744
DSR does not Granger Cause DTV		4.65324	0.0032

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

