

The Relationship between Stock Return Volatility and Trading Volume in Amman Stock Exchange, Jordan

Nada Ibrahim Abu Aljarayesh, Dr. Sari Sulaiman Malahim, Shadi Yousef Al-Abdallah

Master in Finance and Banking Sciences, Yarmouk University
Assistant prof. Financial and Business Administration and Computer Science Department,
Al- Zarqa University College, Al-Balqa Applied University, Jordan
Instructor, Financial and Business Administration and Computer Science Department,
Al- Zarqa University College, Al-Balqa Applied University, Jordan
Corresponding Author: Nada Ibrahim Abualjarayesh

ABSTRACT: *The three main objectives of the study have accomplished by the analysis; is to examine the relationship between stock return and trading volume in Jordan ASE market. Plus to conclude whether the relationship of trading volume and stock return on Jordan ASE market is reliable with the weak-form of the efficient market hypothesis (EMH). Least, the relationship between stocks return volatility and trading volume in Jordan ASE market has been investigated. The experimental results verify a significant positive relationship between stock return and trading volume. Thus, the first objective is satisfied. Second objective is proven that ASE market is contradicted with the weak-form of EMH. The results of the GARCH (1,1) model illustration that the ASE displays strong volatility persistence and that the past volatility be able to explicate the current volatility.*

KEYWORDS: *GARCH , Jordan ASE Market, Stock Return, Trading Volume, volatility,*

Date of Submission: 30-03-2018

Date of acceptance: 14-04-2018

I INTRODUCTION

Rapidly developing emerging stock markets such as Amman Stock Exchange (ASE) market would be fundamentally affected. Emerging stock markets re-count with highly volatility stock return in line for to low down stock market volume (Attari et al., 2012; Hsieh, 2014). In developed markets there is a negative relationship between expected volume and stock return volatility which is associated to the ineffectiveness in those market place (Girard and Biswas, 2007).

In several literatures as (Ying, 1966; Crouch 1970; Westerfield 1977; Tauchen and Pitts, 1983; Chen et al., 2001; Sabri, 2008, Al-Jafari and Tliti, 2013) price and trading volume are rigorous used in price-volume relationship analysis and discovered to be simultaneous. Chen et al. (2001) refer to trading volume as the daily number of shares traded and volume has predictive power for stock returns volatility unrelatedly of the measure of volatility utilized. According to Hsieh, 2014 voluminous professionals and academics believe that trading volume is a vital technical indicator to portion the strong point of the market. Meanwhile trading volume includes valuable evidence about stock behavior. Putatively there are abundant ins and outs that market participants detect trading volume. Signifying the market place in which it's liquid or not. And so, low price volatility is matching with high volume; meaning that the market is highly liquid. While, high price volatility is related with low volume representing that the market is illiquid (Tapa, A and Hussin.M, 2016).

Additionally, according to Attari et al. (2012), they standing that higher returns inspire the investors to spend their money (invest) and surge the capital inflow, while in volatile situations the returns are not certain and inflexible to predict effecting investment in the long run. Conversely, Fama (1970) prominence that current stock prices are mirror all security market information as well as the historical chain of prices, rates of return, and trading volume. He suggested the efficient market hypothesis (EMH). It argues that looking into the relationship of trading volume and stock returns will not help investors in realizing unusual rate of return.

Since the studies on such relationship on ASE market are relatively rare, this study is kind on examining the price/returns-volume-volatility relationship on Jordan market. This study consequently aims to explore empirically the price-volume-volatility relationship on Jordan ASE market. This study challenges to study all listed companies in ASE.

1.2. Problem Statement

Relative to that a quantity of studies have tried to found the empirical and theoretical formation on the association between stock return and trading volume such as Ying (1966), Crouch (1970b), Westerfield (1977), Rogalski (1978), Brailsford (1996), Tauchen and Pitts (1983), Karpoff (1987), Chen et al. (2001), Lee and Rui (2002), Kamath and Wang (2006), Sabri (2008), Pathirawasam (2011), Darwish (2012) and Al-Jafari and Tliti (2013) confirmed strong relationship between stock return and trading volume. However, the relationship is still vague on the whole in emerging market due to some drawbacks. Due to that emerging stock market like Jordan is subject to high risk and return, highly predictable and high volatility compared to the developed markets. Thus, this study attempt to investigate the relationship of trading volume and stock return volatility in the companies listed in the ASE market.

1.3. Research Objectives

This study aims to examine the nature of relationship between trading volume and stock return for all the companies listed at the ASE. The research questions in this study: Is there a relationship between trading volume and stock return in ASE? Is there a statistical relationship between stock returns volatility and trading volume? In addition to that, is ASE efficient market at weak level?

The research approaches in three-essential objectives:

1. To investigate the relationship between trading volume and stock return/stock return in ASE.
2. To scrutinize the stock return volatility and trading volume in ASE.
3. . To terminate whether the relationship of trading volume and stock return on ASE is reliable with the weak-form of the EMH.

1.4 Value of the Study

This study reports inside knowledge of the relationship between volume and returns to practitioners, researchers and policy makers. Understanding the relationship between returns and trading volume in financial markets be capable of assist the investors in making investments decisions in ASE. Since trading, speculation, forecasting and hedging activities are vital implication; trading volume replicates information about market prospecting, and its connection with prices. This study will offer extra shrewdness and release original scope of research for future researchers as ASE is an essential stock market. The researchers and scholars can utilize this research as a resource of indication for further study or as a resource of awareness. The study will be of importance to the financial managers and economic policy makers since improving the stability and efficiency of stock markets is essential.

1.5 Hypotheses of the study

H1: There is no statistical significant positive relationship between stock return and trading volume.

H2: There is no statistical relationship between stock return volatility and trading volume.

H3: ASE is not efficient at weak level.

II LITERATURE REVIEW

Since academic and realistic perspective; trading volume and stock returns (returns volatility) are both and at the same time determined by the identical marketplace dynamics. Consequently the price-volume relationship has received extraordinarily vast attention by market practitioners and academics. Huge numbers of researches have been examined the relationship between trading volume and stock price (returns) in different standpoints moreover a collection of systematic methods has been employed.

Karpoff (1987) recorded four significance of price-volume relationship. First, price-volume relationship makes available handy into the composition of financial markets. Next, it is crucial to result studies' researcher to depict assumption since they employ a mixture of price and volume data. Third, it is significant to discuss over the experimental distribution otherwise approximate prices as through price-volume relationship. Finally, price-volume relationship provides important inferences for study into prospect markets. As a result, Karpoff (1987) experienced the asymmetric price-volume relationship found few suggestions and here revealed that the relationship of volume/price is primarily diverse for positive and negative in price varies.

A number of studies that examines the price-volume relationship on China stock market. A study by Chen and Zhou (2001) perceives three imperative subjects on Chinese stock market contains of the performance of stock returns, volatility, and trading volume. They used monthly time series of stock index returns, returns volatility, and trading volume volatility. In addition today by day stock indices and trading volume for Shanghai stock exchange and Shenzhen stock exchange. Since vector auto regression analysis, they revealed a strong autocorrelation, a strong positive simultaneous relationship and a positive immediate relationship between returns and volume volatility.

A further research on rising Brazilian (Bovespa) stock market via De Madeiros and Van Doornik Bernandus (2006) who tried to assess the experimental association between stock returns, return volatility and trading volume for 57 companies in that exacting stock market. As of the investigation, they create a strong simultaneous and dynamic relationship between stock returns, return volatility and trading volume. It means understanding of one variable may develop other variables predict.

Moreover, Pisedtasalasai and Gunasekarage (2007) examined the fundamental and dynamic relationship along with returns, return volatility and trading volume for the equity markets of Indonesia, Malaysia, the Philippines, Singapore, and Thailand. They vindicated a strong asymmetric relationship between stock returns and trading volume in which it described that returns are vital in forecasting stock return future dynamics plus those of trading volume. On the other hand, trading volume depicted a limited contact on the potential of dynamics of stock returns.

Sabri (2008) is paying attention to check up the impact of trading volume and stock price volatility in the Arab global. The study employed eight Arab stock markets using monthly data from 1994 to 2006. The objective of the study was: how to determine changes in trade volume might influence the volatility of stock prices. The result shows that both trading volume and stock price volatility improved with the concern of a new fact in the common of the Arab stock markets. Further, the volume-stock price movements set up to be notably incorporated in support of each and every one elected markets. Lastly, the correlation among volume and price movement is superior in lubricate Arab states than the non-lubricate Arab states stock markets.

Pathirawasam (2011) assessed Colombo stock exchange for the period 2000 to 2008 in order to meet the purposes of the research. He investigated the relationship between trading volume and stock returns. This investigation found that recent trading volume change is positively correlated with the stock returns. However, the relationship between past era trading volume change and contemporary period stock returns is negatively linked.

Hsieh (2014) showed assessment in order to discover how information about trading volume is valuable in assessing future stock return and return volatility. Consequently, daily data from seven Asian listed real estate markets; Hong Kong, Japan, Malaysia, Philippines, Singapore, Taiwan and Thailand to inspect the synchronous and causal relationships between stock return, return volatility and trading volume inside and through these countries markets. Simultaneous relationships revealed a positive and strongly significant relationship in all seven markets. A slight opposite signal stated for causality relations whereby volume Granger-causes stock returns in much slighter level than stock returns Granger-causes volume.

Sun and Li (2015) set organized the three financial variables; stock return, volatility and trading volume in a concurrent proposal model in order to scrutinize the dynamic special effects. They find that the three variables are interrelated. Though, only volatility has positive effects simultaneous relationship on returns. The researchers similarly verified the variables in single equation model and discovered that: return is negatively affected by simultaneous volatility, volatility is negatively affected by simultaneous returns and positively affected by simultaneous volume and, volume is positively affected by simultaneous volatility.

III DATA AND METHODOLOGY

Data collection process expresses how the data were composed and treated. For the reason of this study, the dataset covers daily stock return and trading volume of 138 companies listed in the ASE market starting from 2006 to 2016.

Daily data were selecting in this investigation because of the undersized market, thin trading and to avoid the day-of-the-week effect (Darwish, 2012). On the other hand, Daily returns are at least roughly normally distributed.

Descriptive Statistics Analysis

The primary step is to estimate daily stock returns from 2006 to 2016 where the stock return is definitely the same as the natural logarithm of the first variation of closing stock price every day as show in the following equation (1):

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \quad (1)$$

Where R_t represents the daily stock return; P_t is the general free float index at day t , and; P_{t-1} is the general free float index at the end of day $t-1$.

Trading volume is the mainly regularly used in literatures and has special version and calculation. For instance, Jain and Joh (1988) and Lee and Rui (2002) calculated raw value of trading volume. Saatcioglu and Starks (1998) employed trading volume as market turnover and Chen and Zhou (2001) considered logarithm of raw

volume. Thus, trading volume in this study is as well used as natural logarithm of trading volume at time t as showed in Equation (2). The operation of natural logarithm on trading volume will develop the normality (Al-Jafari and Tliti, 2013).

$$V_t = \ln(V_t) \quad (2)$$

Where V_t is the trading volume at time t . To keep away from heteroscedasticity both variables stock return and trading volume must be changed into natural logarithm.

Correlation Test

The correlation between stock return and trading volume is examined in this study. If positive correlation is initiated to exist, there is also an opportunity of causality to exist between the variables. The correlation is significant at 10% level.

(Regression Analysis - Ordinary Least Square (OLS) Method)

The idea of performing the regression analysis utilizing OLS method is to testing the simultaneous as well as the lagged relationship between stock return (volatility) and trading volume. Assuming Lee and Rui (2000) multivariate model, the relationship between trading volume and stock return is worked out in the following formulas:

$$R_t = B_0 + B_1 V_t + \varepsilon \quad (3)$$

Where, R_t is the stock return, β_0 is the coefficients of concerned variables, and ε is the error term at time t .

Subsequently, to examine the consequence of trading volume on stock returns volatility, GARCH models (Generalized of the Autoregressive Conditional Heteroskedasticity) in the context of Bollerslev (1986), which is a generalization of the ARCH model advanced via Engle (1982), are used. Even though the purpose of the GARCH model is to investigate volatility, correct condition of the conditional mean is crucial. For this objective, Rachev et al. (2007, p. 293) suggested that if the conditional mean is not identified effectively, then the construction of reliable approximations of the accurate conditional variance would not be probable, statistical implication, and experimental investigation might be incorrect. So that, the residuals of a fit distinguished contingent mean model is a white noise. To distinguish the right restrictive mean of the ASE return, an AR (p) in the mean model of GARCH (1, 1) display is included. Therefore: the examination covers the model which is proposed by Brailsford (1996) in evaluating the connection between stock return instability and exchanging volume. Condition (4) offers the formula:

:

$$R_t = R_{t-i} + \varepsilon_t \quad (4)$$

$$\varepsilon_t \sim N(0, \sigma_t^2)$$

$$\sigma_t^2 = \omega + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \quad (5)$$

Where: R_t is the daily rate of return, R_{t-i} is the AR (p) term in the mean equation in order to account for the time dependence in returns; ω is the constant variance that corresponds to the long run average, α_1 refers to a first order ARCH term which transfers news about volatility from the previous period, and β_1 , the first order GARCH term.

IV RESULTS AND DISCUSSION

This research argues the outcomes from the analysis for the relationship between trading volume and stock return in ASE market. It involves of the descriptive statistics analysis, correlation result and regression result. Table (1) provide a descriptive statistics. The descriptive statistics result of stock return and trading

volume of ASE market are offered above (Table 1). It includes the mean, median, maximum and minimum value, standard deviation, skewness, kurtosis and Jarque-Bera (JB) test of normality (Figures 1 and 2).

Summary of Descriptive Statistics Table (1)

	LN_VOLUME	LN_RETURN
Mean	14.74482	-0.000295
Median	14.96266	0.000000
Maximum	21.95088	0.046857
Minimum	1.609438	-0.045255
Std. Dev.	2.696053	0.009004
Skewness	-0.659125	-0.323503
Kurtosis	3.839883	7.870340
Jarque-Bera	249.0015	2460.149
Probability	0.000000	0.000000
Sum	36065.83	-0.721965
Sum Sq. Dev.	17771.98	0.198233
Observations	2446	2446

Negative and low stock return's mean of -0.000295 is associates with less volatility (Figure 3) of the series (consistent with low standard deviation; 0.009004). The wide gap between maximum and minimum value (max; 0.046857, min;-0.045255) of stock return indicates that there is a high variability in stock return changes in the ASE market. Meanwhile stock return represents a negative skewness -0.323503 of indicating a right tail of distribution which interpreting that the data are not fairly asymmetry. Kurtosis value is which 7.870340 is >3, showing that it is a leptokurtic distribution, sharper than a normal distribution, with values concentrated around the mean and thicker tails. Furthermore, significant JB value (2460.149) explains the deviation of normal distribution thus rejecting the null hypothesis.

On the other side, trading volume reports high standard deviation of 2.696053 which relates to high mean of 14.74482 indicating highly volatility in trading volume series (Figure 3). Moreover, trading volume is left skewed (negative value of -0.659125) indicating the left tail is long relative to the right tail and kurtosis value (3.839883) is slightly higher than 3 implying that volume series have fat tails than a normal distribution. It is consistent with JB test that shows the data is not normally distributed since both the skewness and kurtosis are not equal to zero. Thus, these two series reject null hypothesis that the series is normally distributed.

In conclusion, the descriptive statistics analysis discloses much more volatility in trading volume compared to stock return. The result shows that stock return is not normal with leptokurtic curves which in fact consistent with mixture of distributions. On the other hand, trading volume is closer to normality with high volatility.

Figure (1&2) Normality distribution for stock return and Trading Volume in ASE market for the period 2006 to 2016

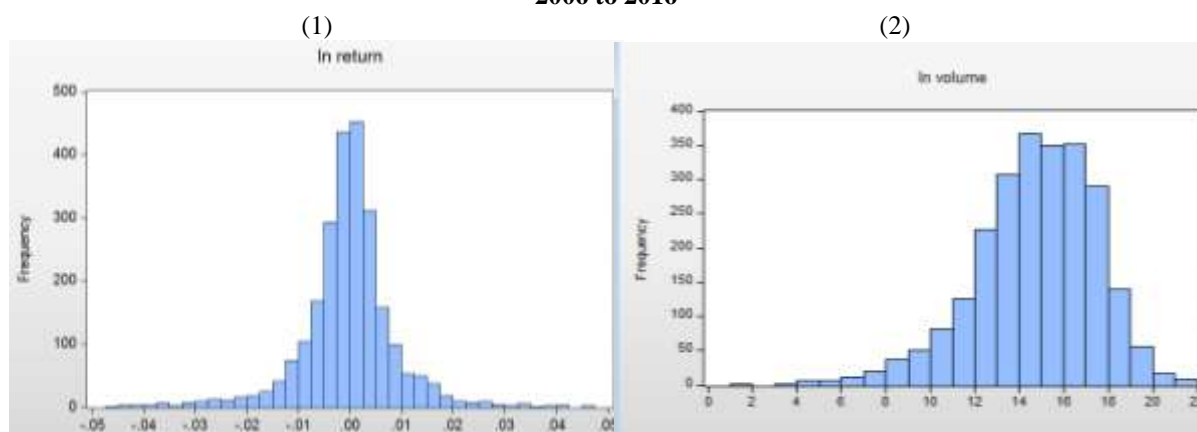
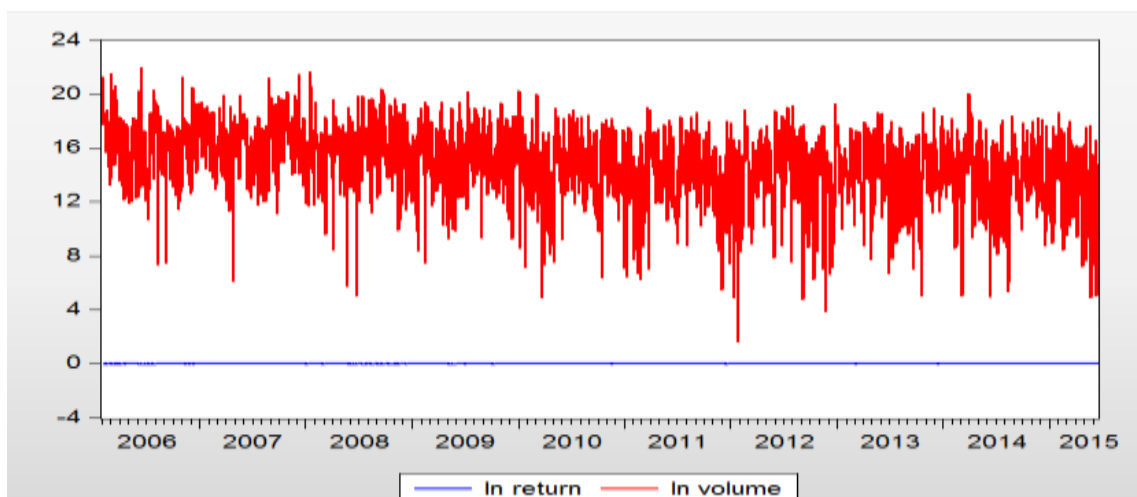


Figure (3): The movement of stock return and trading volume in ASE market for the period 2006 to 2016



The correlation between stock return and trading volume in ASE market for the given period is discussed based on Table 2. It clearly shows that stock return and trading volume are positively correlated at 0.015632. This weak correlation suggests that the forecast of one variable can't be improved by the knowledge of the other variable. However, to investigate in depth the relationship between stock return and trading volume in ASE market, this study suggests for further analysis.

Table (2): Correlation between Stock return and trading volume

Variables	Trading volume	Stock return
Trading Volume	1	0.015632
Stock Return	0.015632	1

Table (3): Regression result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_VOLUME	5.22E-05	6.75E-05	0.772908	0.4397
C	-0.001065	0.001012	-1.051827	0.2930
R-squared	0.000244	Mean dependent var		-0.000295
Adjusted R-squared	-0.000165	S.D. dependent var		0.009004
S.E. of regression	0.009005	Akaike info criterion		-6.581255
Sum squared resid	0.198184	Schwarz criterion		-6.576511
Log likelihood	8050.875	Hannan-Quinn criter.		-6.579531
F-statistic	0.597387	Durbin-Watson stat		1.552257
Prob(F-statistic)	0.439651			

Table 3 reports the evidence of relationship between current stock return (R_t) and current trading volume (V_t) as presented in Equation (3) above. It found a positive coefficient of 5.22E-05 which is significant at 2% level indicating that stock return has positive relationship with trading volume.

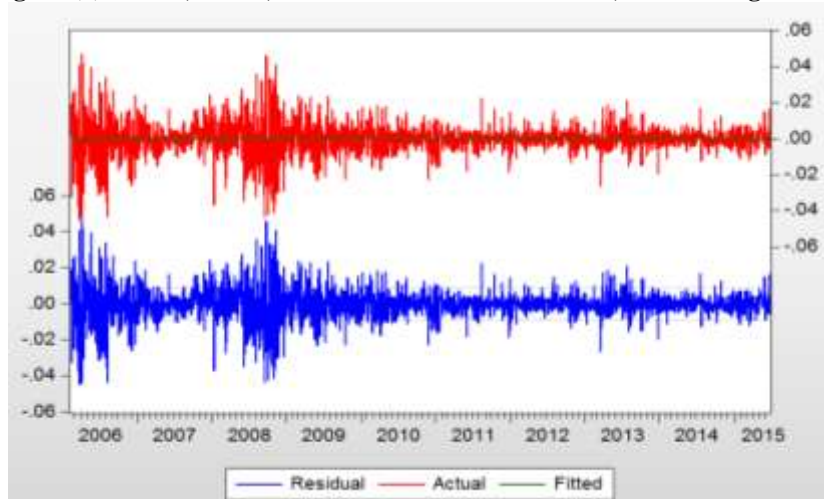
On the other hand, positive T-test value (0.772908) that explains that one single variable is significant to interpret the other one single variable. F-test is significant and reliable as the value is lower than 2 (0.597387) explaining that the variables are not jointly significant. In addition to that, adjusted R-squared is also very small at (0.000244) only. This study cannot reject Hypothesis 1 because the coefficient is significant. The P-value is significant at 1% level for all variables signifying that this study rejecting the Hypothesis 0 that there is no statistical significant positive relationship between stock return and trading volume.

In conclusion, the result confirms the evidence of positive and significant relationship between stock return and trading volume which verify past findings by Tauchen and Pitts (1983), Chen et al. (2001), Kamath and Wang (2006), and Attari et al. (2012) and that rising market goes with rising volume and *vice versa*. Though, the finding of Ying (1966) and Pathirawasam (2011) suggest that the relationship between current stock return and historical trading volume is significantly negative symptomatic of that an rise in trading volume is usually supplemented by a drop in stock price/return.

Table (4): The Relationship between Trading Volume and Stock Return Volatility

Variable	Coefficient	Std. Error	z-Statistic	Prob.
LN_VOLUME	2.58E-06	4.03E-05	0.064156	0.9488
C	-7.11E-05	0.000595	-0.119419	0.9049
Variance Equation				
ω	9.66E-07	1.26E-07	7.690556	0.0000
α_1	0.101076	0.009324	10.84019	0.0000
β_1	0.881622	0.009311	94.68997	0.0000
R-squared	-0.000825	Mean dependent var		-0.000295
Adjusted R-squared	-0.001234	S.D. dependent var		0.009004
S.E. of regression	0.009010	Akaike info criterion		-7.160093
Sum squared resid	0.198396	Schwarz criterion		-7.148232
Log likelihood	8761.793	Hannan-Quinn criter.		-7.155782
Durbin-Watson stat	1.551459			

Figure (4) Actual, Fitted, and Residuals of stock return, and trading volume



This segment offers the evaluations of GARCH models along with a brief argument of the results. The estimations for the GARCH models fitted to the ASE return series are presented in Table 4. The results form for the level (GARCH 1,1) model. The assessments for the objective model illustration that coefficients of all the three parameters in the conditional variance equation (ω , α_1 and β_1) are highly significant, at 95% confidence level, as measured by their z -statistic and marginal significance level. The sum of $\alpha_1 + \beta_1$ (0.982698) shows a high degree of persistence of past volatility in elucidation current volatility of the ASE returns. The evaluations likewise beat the non-negativity constrictions of the GARCH model with $\omega > 0$, $\alpha_1 > 0$, $\beta_1 > 0$, and $\alpha_1 + \beta_1 < 1$.

Adjusted R-squared is significant and reliable 11.8673% which explained that GARCH model is significant and the variation of trading volume is relatively higher proved by the model. Therefore, hypothesis 2 is rejected that there is no statistical relationship between stock return volatility and trading volume.

To achieve the goals of the study, there is a strong statistically significant relationship between stock return and trading volume; and trading volume and stock return volatility reveals a negative relationship.

V. CONCLUSION

Revising the price/return-volume construction has extensively been used by market investors in order to realize the market responses as well as to gain excess return in their investment. As Karpoff (1987) has supplied the four importance's to explain the price/return-volume relationship, this relationship is also subject to the uncertainty in price movement (random walk theory). Efficient weak-form market hypothesis suggests that the market is efficient where past information on stock price and trading volume cannot be used in forecasting future stock price thus there is no form of technical analysis can be efficiently used to support investors in making trading decisions.

It has been experimental that past studies consider the price/return-volume relationship in various aspects such as empirical relation and asymmetry relation. Therefore this study attempts to examine the relationship between stock return and trading volume in ASE market for the period 2006 to 2016. It concludes that there is a strong significant positive relationship between stock return and trading volume. Furthermore, to illustrate a conclusion, price/return-volume relationship is primarily different for positive and negative price changes (Karpoff, 1987).

REFERENCES

- [1]. Al-Jafari, M.K., Tliti, M. (2013), An empirical investigation of the relationship between stock return and trading volume: Evidence from the Jordanian banking sector. *Journal of Applied Finance and Banking*, 3(3), 45-64.
- [2]. Attari, M.I.J., Rafiq, S., Awan, H.M. (2012), The dynamic relationship between stock volatility and trading volume. *Asian Economic Financial Review*, 2(8), 1085-1097.
- [3]. Chen, C., Zhou, Z.G. (2001), Stock returns, volatility, and trading volume: Evidence from the Chinese stock markets. *International Journal of Business*, 6(2), 68-85.
- [4]. Chen, G., Firth, M., Rui, O. (2001), The dynamic relation between stock returns, trading volume, and volatility. *The Financial Review*, 36(3), 153-174.
- [5]. Crouch, R.L. (1970), A nonlinear test of the random walk hypothesis. *American Economic Review*, 60(1), 199-202.
- [6]. Darwish, M.J. (2012), Testing the contemporaneous and causal relationship between trading volume and return in the Palestine exchange. *Interdisciplinary Journal of Contemporary Research in Business*, 3(10), 55-62.
- [7]. Fama, E.F. (1970), Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25(2), 383-417.
- [8]. Girard, E., Biswas, R. (2007), Trading volume and market volatility: Developed versus emerging stock markets. *The Financial Review*, 42, 429-459.
- [9]. Hsieh, H.C.S. (2014), The causal relationship between stock returns, trading volume and volatility. *International Journal of Managerial Finance*, 10(2), 218-240.
- [10]. Kamath, R., Wang, Y. (2006), The causality between stock index returns and volumes in the Asian equity markets. *Journal of International Business Research*, 5, 63-74.
- [11]. Karpoff, J.M. (1987), The relation between price changes and trading volume: A survey. *Journal of Financial and Quantitative Analysis*, 22(1), 109-125.
- [12]. Pathirawasam, C. (2011), The relationship between trading volume and stock returns. *Journal of Competiveness*, 3, 41-49.
- [13]. Rogalski, R.J. (1978), The dependence of prices and volume. *The Review of Economics and Statistics*, 60(2), 268-274.
- [14]. Sabri, N. (2008), The impact of trading volume on stock price volatility in the Arab economy. *Journal of Derivatives and Hedge Funds*, 14(3-4), 285-298.
- [15]. Sun, M.Y., Li, J.F. (2015), A simultaneous equations model of returns, volatility, and volume with intraday trading dynamics. *Accounting and Finance Research*, 4(2), 50-59.
- [16]. Tapa, A and Hussin, M. (2016), The Relationship between Stock Return and Trading Volume in Malaysian ACE Market. *International Journal of Economics and Financial Issues*.
- [17]. Tauchen, G., Pitts, M. (1983), The price variability-volume relationship on speculative markets. *Econometrica*, 51(2), 485-505.
- [18]. Westerfield, R. (1977), The distribution of common stock price changes: An application of transactions time and subordinated stochastic models. *The Journal of Financial and Quantitative Analysis*, 12(5), 743-765.
- [19]. Ying, C.C. (1966), Stock market prices and volumes of sales. *Econometrica*, 34(3), 676-686.

Nada Ibrahim Abualjarayesh. "The Relationship between Stock Return Volatility and Trading Volume in Amman Stock Exchange, Jordan." *International Journal of Business and Management Invention (IJBMI)*, vol. 07, no. 04, 2018, pp. 13-20.