The Relationship between Trading Volume and Stock Return. Evidence

from Pakistan stock exchange.

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بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

Dedication

**This dissertation is lovingly dedicated to
my parents and all relatives.**

Acknowledgment

Firstly, I start the of name of ALLAH.

I would like to express my sincere gratitude to my advisor Dr. Abdul Rashid for the continuous support of my MPhil/MBA eighteen-year study and related research, for his patience, motivation, and immense knowledge. His guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my eighteen year master study.

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ABSTRACT

The main objective of the study is to investigates the relationship between trading volume and returns of the Pakistani market for the period of 1st September 2013 to 30th October 2018. The Dickey-Fuller test is applied to test the stationarity of the time series data of the Pakistan stock exchange (PSE-100). The ARCH and GARCH-M models are used to test the relationship stock return, volatility and trading volume. The results indicate that there is evidence of first order autocorrelation in market return and individual stock returns. The results of Granger Causality test suggest that there is feedback relationship between the market return and volume. However, in case of individual stock returns the evidence indicates that stock return causing volume while trading volume cause returns. The empirical results verify that there is significant interaction between trading volume and return volatility when volume has been taken in to variance by using of GARCH-M model. The findings suggest that there is significance effect of the previous day trading volume on the current return and this implies that previous day returns and volume have explanatory power in explaining the current market returns. The presence of significant autoregressive process of first order in the GARCH-M model indicates that the relationship of firm's volume with the future lags of return.

Chapter 1

Introduction

1.1. Back Ground of Study

The present study examine the effect of trading volume on volatility of the Pakistan stock exchange and using model to see what extent the stock market's response to the arrival of new changed when trading commenced. Further we investigate the contemporaneous relationship between stock returns volatility and trading volume. Trading volume does not affect stock price directly, but it has a huge impact on the way that share move. Investors who look at thinly traded stocks need to be of the heighted volatility involved they buy. Stock's price in the short run is supply and demand. Different investors make a variety of assessments of a company's future prospects and therefore assign values to stock that differ. When one investor is willing to buy shares at a price at which another is willing to sell, then both see an opportunity from a trade.

The relationship between return risk trading volume of Pakistan Stock Exchange (PSE). The causal as well as contemporaneous relationship had been investigated by using GARCH and Granger causality tests. The main purpose to impart inside knowledge of the relationship between volume and returns and support the investors and other stakeholders in Pakistan in making investment decisions. This study had open new dimensions of research for future researchers as PSE is the biggest and best performing stock market of the country (Attri et al, 2012).

In study of the financial market drew four main reason the price and trade volume is why important. First provide the financial market information. Second combination of the trade volume and price data to described suggestion important event for studies.

Third it gives the perception in the discussion process of price over the empirical sharing of unpredictable assets. Finally, prices of the future market up and down impacts on trade volume in coming contract, Karpoff (1987).

In financial studies, the linkage between return, volatility and trading volume is a central issue as it, e.g., provides insights into the microstructure of financial markets. The price-volume relationship is seen as, it is related to the role of information in price formation, (Wiley and Daigler, 1999). Trading volume is defined as the number of shares traded each day and is an important indicator in technical analysis as it is used to measure the worth of stock price movement either up or down (Abbondante, 2010).

Investors' motive to trade is solely dependent on their trading activity; it may be to speculate on market information or portfolios diversification for risk sharing, or else the need for liquidity. These different motives to trade are a result of processing different information available. In consequence, trading volume may originate from any of the investors who may have different sets of information. As various studies reported, the information flow into the market is linked to the trading volume and volatility see, Gallant, Rossi, and Tauchen, (1992). Thus, since the stock price changes when new information arrives, there exists a relation between prices, volatility and trading volumes see, Lamoureux and Lastrapes, (1990), and Wang, (1995).

Moreover, numerous studies suggest that there are high correlations of returns across international markets see, e.g., Connolly and Wang, (2003). There is some overlapping trading period and multiple listings of the same securities; thus, traders in one market draw inferences about the market simply by focused on price movements in other markets King and Wadhwani (1990).

Thus, it is logical to consider the fact that recent international financial markets process continuous trading and uninterrupted transmission of information in their day to day trading activity, which is reflected by returns, volume and volatility (Lee and Rui, 2002).

The variation in stock market and trading volume was influenced by the flow of information. The higher of trading volume, the slimmer is the spreads, as a result there is less slippage, and volatility is low. Dealers keep a close eye on trading volume because it reflects the dynamic inter play between informed traders and unaware traders who network with each other in the market place in light of their trading strategies own and ultimately set market clearing amounts.

Terms as the critical part of information Trading volume in the stock market because it any activates or deactivates the price movements. Stock prices are regularly influenced by positive trading volume through the available set of related information in the market. A revision in investors' expectation usually leads to an increase in trading volume which in the end reflects the total of investors response to news. The relationship between stock returns and trading volume and volatility as well investigated area in developed markets. The study exploring by influence the causal relationship among trading volume the returns and applied the GARCH-M model for at firm level market.

The main attention of the study is to explore dynamic dealings between return, volume and volatility both at the market level and at firm level for the Karachi Stock Exchange, the main equity market of Pakistan for the period July 1998 to oct 2008 The study also investigates the causal relationship between stock returns and trading volume and in the second stage. The return distribution is time variable in nature because as latest information come to the investor updates the mean and change of return delivery. Therefore, in the third stage the volatility behavior of stock returns is

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examined where trading volume and past remaining error and past volatility are used as information set (Mubarik and Javid, 2009).

The relationship between the trading volume, stock prices and returns in which they have taken the manufacturing sectors of the Pakistan stock exchange, this studied examined the relationship between stock returns and stock volatility, trading volume of the financial sectors of the Pakistan stock exchange in which banking sectors attention in specific. It explained the relationship between trading volume and stock returns this study in unique a way, stock volatility by sole concentration on the one field of the Pakistan stock exchange that is banking sectors.

This time period data was used in the would make enable to understand the dynamic of these relationship in the Pakistan stock exchange. Some researcher was conducted in this area in the established markets of the world so their huge importance sufficient wide spread and development and extensive research still in processed in this area. Available of limited research work analyzed the relationship between stock returns, trading volume and volatility with reference stock market of Pakistan. The Pakista stock market was this time largest stock market of Pakistan and activities usually judge by the PSE-100 index, before the merge of three market. (Hussain et al, 2014).

The relationship between trading volume and stock price there were discussed the four reasons, firstly it tells us about the financial market structure, secondly it is important for event studies, thirdly it is an essential part of speculation and last but not the least, it also offers insight into future markets (Karpoff, 1987).

The trading volume and stock return evidence from Pakistan's stock market. purpose of this paper is to empirically examine in the Pakistani's stock market dynamic (causal) relation between returns stock market, trading volume, and

volatility. Researchers had studied the return, volume relationship from different perspectives and in different markets (Khan and Rizwan 2008).

The trading volume impact on stock return and volatility: Nigerian stock market. The financial market further divided in capital market use for the long run investment and money market help and utilized sharing short term and funds done insurance and transaction of financial tools.

The relation between price changes and trading volume: A Study in Indian stock market. Again, the study used variance decomposition technique to compare the degree of explanatory power of the trading volume over stock return and the evidence supports the influential role of the trading volume in the Indian stock market. Further Johansen's co integration analysis demonstrate. The study concludes that stock price changes in any direction have information content for upcoming trading activities

1.2. Problem Statement

As the trading volume and stock returns are consider very crucial element of the Pakistan stock exchange recourse trading volume and stock volume effect the firm performance. This study is to show that how the relationship between trading volume and stock returns as significantly impact on each other.

1.3. Research Question

What is the relationship between trading volume and stock return?

What is the relationship between stock return and trading volume?

What is the relationship between market volume and market return?

What is the relationship between market return and market volume?

1.4. Hypothesis

H_0 = There is a no relationship between market volume and market return.

H_1 = There is relationship between market return and market volume.

H_0 = There is a no relationship between trading volume and stock return.

H_1 = There is a relationship between stock return and trading volume.

1.5. Contribution and Research Gap

After keen observation on literature about the relationship between trading volume and stock returns, we found that there is no academic research exist in the context of Pakistan focus on these industries such as Auto-mobile assembler, Auto mobile parts and accessories, Miscellaneous and Pharmaceuticals. Therefore, to the best of my knowledge this study will bridge the gap.

1.6. Objective of the Study

The relationship between trading volume and stock returns is research area there is not enough literature available on the Pakistani market perspective. To examine the linkage between trading volume and stock returns this study strive to fill our research gap between trading volume and stocks return of the four manufactures sectors of the Pakistan stocks market (PSE).

Our research manufacture sectors,

- First Automobile assembler.

- Second Auto-mobile parts & Accessories,

- Third Miscellaneous,

- Fourth pharmaceuticals.

- To explore dynamic interaction between trading volume and stock returns, volatility in the market level for the PSE.

- To analyze the dynamic contact between trading volume, stock returns and volatility at firm level for PSE.

1.7. Significance of the Study

This study emphasis on the linkage between returns and trading volume in stock exchange of Pakistan. The main purpose of the study is to convey information about the trade volume and returns. To support the stockholder and investor make decision of investment in Pakistan stock market. PSE are the largest market for investor in the investment.

The following four points are considered significant in discussion the price-volume relationship in Pakistan stock exchange limited.

- First, it gives a better understanding of the microstructure of the stock markets.

- Second, it demonstrates the rate of information flow to the market and how the information is disseminated and how it influences market, stock return by first order autocorrelation, Granger causality test based on VAR, GARCH-M models. The GARCH model specifies a symmetric volatility response.

- Third, the paper uses exponential GARCH models to give new insight in the asymmetric effects of volatility, including trading volume, and their impact on stock returns.

- Finally, our policy maker of stock exchange of Pakistan, inform the investor and public about the investment decision helpful and beneficial investment in PSE-100.

1.8. Structure of the Thesis

Chapter 1, Introduction, back ground of study, problem statement, research question, hypothesis, contribution and research gap, objective of the study, significance of the study, structure of the thesis. Chapter 2, Literature review,

summary of the literature. Chapter 3, Research methodology, data, Economic methodology and model specification, returns series, volume, stationary test, first order autocorrelation market return, granger causality test base on var, GARCH in mean. Chapter 4, Result and discussion, Summary statistic of the market returns, Stationarity test of market PSE-100, Evidence from first order auto correlation in market return, Granger causality test based on autoregressive analysis, Evidence on the return and volume by GARCH-M model, Results of augmented dickey fuller Unit root test, First order autocorrelation in stock returns, Granger causality between stock return and trading volume based on F-test, Evidence on the volume, returns and volatility by GARCH-M model, Chapter 5, Conclusion, Key finding, Limitation, Future direction policy.

Chapter 2

2.1. Literature review

Attari et al. (2012) studied the dynamic relationship between stock return, volatility and trade volume for periods Jan 2000 to march 2012. Here are investigate the relationship among both dependent variables return and independent variable trading volume. This paper was investigated the dynamic relationship between volume, returns popular the framework of Pakistani market. Chose the list companies of Pakistan stock exchange (PSE-100) In this period was show the positive rapport between volume, volume that indicating increasing market goes with in increasing volume and vice versa. Atttari et al. were used the ARCH and GARCH technique on PSE-100 and the outcomes shows positively significant association between returns and trade volume.

Timothy and Brailford (1994) investigated the relation among returns and volume, Australia stock market for the period was 1994. In this paper was used the different techniques. This paper discussed the volume and price variation, the results show that volatility is positively same to volume and much of the frequency in the excesses of the distribution of change price can be calculate for by the equal of trade volume.

Betta (2013) studied the relation both trading volume and returns, this paper debate Nairobi Securities Exchange use 20-share index NSE is stock of Africa. There are used of some models such as ARCH model outcome of some model is significant and insignificant on the performance of firm. NSE is one of the liveliest financial securities market place in America. Nairobi Securities Market are known into eleven independent market serving including: Agriculture marketable and services, tele and tech, manufacture Allied, banking, Automobile and accessories, insurance energy, and petroleum and blue chip companies on solid position and continual outcome in financial reports.

Nishat (2001) worked on trade volume also several link in stock returns in Pakistan

period Dec 1991 to Dec 2001. There is the correlation among the trading volume and stock returns. The results was shows that the non-informational trade has a significance outcome on price and trade movement in add to present returns, nonlinear trading volume and instability. There is the positive autocorrelation between future returns and presents returns. The correlation become negative when present returns are weighed by a change in the trading volume. Non-information trade was significant effect. Some result was found in pre-nuclear test period the insignificant and weak result were found in post nuclear test period.

Rizwan and khan (2007) analyzed volume and stock returns Pakistan stock exchange (PSE-100 Index) used for period May 2007 to January 2001 had used GARCH models used the feedback significant and positive. Moreover used VAR was used to find the response relationship, which implies that there is a bidirectional linked relationship between volume and returns.

Ahmad and Khan (2007) examined the effects returns and the trading volume of in Pakistan stocks market used data PSE-100 Index for 2007. Used the GARCH, Regression Model there was the positive contemporary and causal relationship b/w trading volume, returns. The focus about the trading volume is useful in estimate of returns in an active environment. There are between the mutually volume and stock returns positive and significant relationship.

Javid and Mubarik (2008) investigated the relationship between returns and volume: Evidence Pakistani stock exchange (PSE-100 Index) there was used seventy from and three manufacturing sectors and used MDH, GARCH, GARCH.M Models. Pakistani stock market was study explore the returns and the volatility, trading volume base on daily data of the market explain in simple words there are significance results shows there evidence of first order autocorrelation in market returns and individual returns and individual

volume.

Hussain and Jamil (2014) examined the relationship between returns, volume and instability Evidence for Pakistan banking sectors. The expert objective to explore the relationship among the returns, volume and volatility of the Pakistan banking sector listed Pakistani stocks. The projected technique applied to check the volatility by ARCH, GARCH and VAR. There were show the positive relationship among the variables the above techniques were applied for different test performance also positive and significant.

Darwish (2012) studied among the stock returns and volume the stock exchange of Palestine, forth period Oct 2000 to August 2010. Study of the underlying relation among returns and the volume and used the Model GARCH (1,1) the result was positive contemporary relation, the test results of Granger causality indicates that there is bidirectional Granger causality among trade volume and return of stocks.

Mpofu (2012) analyzed the relationship between trading volume and stock returns in the JSE South Africa securities exchange of the period July 1988 still June 2012, Mpofu was used different method a GARCH, Autocorrelation and regression there shows the positive effect among the trading and stock returns. It was found that past returns were not effect significant by change in volume.

Kalu et al. (2011) determined the relation among stock returns volatility and trade volume in Niagiria stock market. Kalu were used the GARCH X (1,1) GARCH (1,1) models was display the relationship among volume and returns volatility is helpful so statistically significant. There was result as significant among and the volume, returns and volatility though the result do' not the hypothesis support that resolve the instability dissolves with addition of volume of the conditional variance equation, this outcome is reliable none the less of the distribution.

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Rashid (2007) studied of the price and volume for evaluation use Granger causality test. There were discussed the result of Granger causality tests provide strong and positive significant results.

Tripathy (2010) investigated the relationship between changes price, trading volume study on the stock market of India. Many Method was used like Bivariant regression models. VAR and IRF test of johanen's Co integration. Indicates there is causality bi-directional among stock earnings volume and volatility. Study used the variance breakdown method to associate of the degree of descriptive power the volume completed stock returns and the provisions the powerful part the volume in market stock of India.

Campbell et al. (1992) examined the trading volume and derail correlation in stock there was used different model used QGARCH, several correlations, heterogenous-against model. Campbell used some year data and show different outcomes in every year. Changing predictable returns reward market for playing this character the methods suggest that a stocks prices devalue on high-volume day is extra probable than the price of stock weaken on low-volume with an increase in the predictable return of stocks.

Using daily data Tapa and Hassin (2015) investigated the returns and volume in the Malaysia ACE market for the periods 2009 to 2015. Tapa and Hussin was used the actual market hypothesis. The experimental outcomes show a significance positive coexistent between returns of stock and volume, it was arranging that the solid significant positive contemporary relations between stocks returns and of volume. While there were significant negative contemporaneous relations between stocks returns and previous historical trading volume.

Lasmanah and Bagja (2013) studied the abnormal returns and stock trading volume analysis on the company taking stock split at stock exchange Indonesia. There was used

hypothesis testing and t-test paired sample. The study analyzes the different in irregular returns and volume before and after split event on the company listed that average irregular return and stocks trading volume motion during occurrence period, there were no significant difference between irregular return and stocks volume action before and later doing a stock split on the companies listed in stock exchange Indonesia.

Iqbal and Riaz (2014) investigated the of empirical association between stocks returns, volatility and volume: United Kingdom market, there was used different models ARCH, GARCH and VAR. The study suggested that at the markets level there were positive modern suggestion among returns, trade volume for the stock advise positive contemporary relationship in two returns and volume. Studies recommend that past trade volume does not source returns but there is suggestion found that past return cause trade volume, this suggest there is no bidirectional association found among volume and returns for the market and separate stock market.

The study by Pathira wasam (2008) examined the relationship between volume and stock returns, there was used the stock exchange of Colombo. This paper GKM hypothesis were used the author examine of the 266 companies for analysis and the results were positive co relationship amongst stock returns and volume. According to this study, traditional procedures have been broadly adopt of literature (Titman and jegadees 1993) trade volume-based on trading strategies. Study show results volume so helpful associated with stock returns of the contemporary historical data of the relations were so negative when the past volume is related with returns.

Mahajan and Sindh (2006) investigated the relation among returns and volume, volatility dynamic of the stocks market of Indian. In this discussed the deferent

models ARCH and GARCH, test of linear Granger causality. This paper analyzed between trading volume volatility, stock returns were among the all results was positive effects.

Tripathy (2010) examined the relation between changes of price and trading volume this paper was used the deferent using model of bivariate regression, VECM Model VAR, IRF and test johansen's co integration, variance decomposition method, Phillipe-person ppt test, kpss test, extreme test of eigen value, vector error of correction model, Jarque bera statistic test. The studied was investigated relation between returns, volume using data of five years check the deferent test and instrument of statistic and the outcome among as well and positive relationship. Find the results as a significant relation between the return variability and volume and indicate that information may flow instantaneously rather than successively into the market.

Burhan et al. (2010) analyzed the relationship between risk-returns and trade volume in the PSE. This paper had investigated 98 companies in the PSE-100 relationship among stock returns and risk returns empirically tested. Among the relations of returns and systematic risk beta is positive, the relationship among the trading volume and returns also positive and significance.

To the test causal relationship, Abbondente (2010) investigated the trading volume and stock indices of a test technical analysis of the three main stock markets and stock exchange of New York, NASDAQ and Dow jones stock index. The results of the deferent test and methods of the analysis of while trading volume and individual stock prices and the variable positive relationship.

Gursoy *et al*. (2006) examined the volume and stock market volatility: Evidence from evolving stock markets. This paper used deferent diagnostic test first, second,

and third. The results of all stock market indices in the sample display instability resolve, trading volume was adjusted in the equation of conditional variance, as a substitution for equation flow of information the controlled level reduction as observed in the fluctuation resolve of six market indices, this finding is reliable with the argument the result of this paper significance and positive.

Anifowse and Suleiman (2012) analyzed the causal relationship between stock return, trading and volatility in Nigerian market. The used of Gngle-Grabger causality test on effect on the relations among the stocks return and volume positive conclusion of models results.

The study of Chines energy sector by Fan *et al.* (2002) studied the stocks returns and trading volume relation and policy while conclusion of the case of energy sector. This paper was analyzed the volume and returns at both collective and company arguments in china, also examine effect of continuously changes in the stock market in normal and in the energy sector in specific. It was found the temporary relations between volume and returns was irregularly positive v-shaped, with answers of trading volume to the increasing return being stronger than that weaken returns. It was found of significance Granger-case among the trade volume and stock returns.

Brialsford (1996) investigated Positive and contemporary relation between absolute price variables. This paper gives mixed result between stock returns and trading volume. Ching (2014) studied the causal relationship of stock returns, trading volume and instability observed indication from the Asian listed physical estate companies. This paper analysis among of the financial variables causal relations, the

prof implement was trading volume help and explore the stock return indirectly by leading volatility and stock return. Trade volume were not help to directly coming stocks returns, in the list of portfolio four countries south Asian country were found more openly connected then studies other three country. Amongst the four countries South Asian, Singapore only settled country, significant action were create to play, its that fiscal variable taking logical power for other countries.

The study by Kumar and Singh (2008) investigated the stock market of India dynamic relationship between stock returns, trading volume and fluctuation show in the Indian stock market, this paper was examined the 50-stock market of India. The relation between volatility, stock returns and trading volume in the stock market of Indian result were positive and significant. Epps (1977) examined the relationship between trading volume and stock returns. In this paper were used different methods ARCH, Granger causality test. This paper shows the positive and significance effects.

The study by Ahmad (2008) analyzed the impact of stock price and volatility, trading volume on the Arab economy. Using data monthly data period (1994 to 2006). The volume and prices of stocks fluctuation raised with concern the phenomena in most stock market of Arab. The prices of stock and trading volume volatility were created significantly and positive effect in Arab markets.

Pathirawasam (2011) examined the stock market of Colombo. The objective of study to evaluated the relationship among trading volume and stock return, examined the past volume of trade positively change in linked with stock returns there were indicated the negative and insignificance effect in the stock market of Columbo.

Lamoureux and Lapes (1990) the relationship of price and market returns and market volume. This paper were used the GARCH and ARCH model the results

significant and positive. The study by Zahoor *et al.* (2014) investigated the relationship between stock return, trade volume activeity and stocks market of Pakistan. Using the non-financial firm of Pakistan, In this paper performance of the trading activity extremely correlated. There are used the different methods of SPSS and results were positive and significance.

Sterks and Smirlock (1985) examined the Granger causality test on individual stock returns data were used for investigate results. The results indicate strong positive change of price and trading volume and both lagged relations. The analysis of the trading volume and price relation in evolving markets. There are discussed the different countries Hungry, Russia and Poland preceding to continuous test of Granger Causality. There are most of bidirectional and most of the Countries some country feedback there were significance results shows.

Sabri (2008), investigated the price volatility impact on trading volume Economy of Arab. The country of Palestine daily data was used from (1994 to 2006) selected all market the price of market was highly co related measure significantly integrated. while This paper was used the different method, and results were significance.

Gul and Javid (2009) analyzed the stock return a case of PSE. The daily data were using for performance among the trading volume and stock exchange. The stock exchange shows Positive, significant effect crossways three alternate portion of daily trading volume. Traded the daily number of shares, the daily shares monition was in the trading volume. There was positive and significance found correlation among the combined index and three measure of data of volume by stock market of Pakistan.

Nathan and Chorida (2000) examined the relationship between short term trading volume, stock return and arrange that play significance character circulating an

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extensive arrange of information of market. Worked on the time series data Conditional heteroskedasticity recognize to whether trading volume continues information about stock return. This article methods was indicates positive results.

Ravichandran (2012) investigated link between stock return and volume of trading volume of US market. There were used different Models or Methods ARCH and GARCH, TGARCH, EGRACH, and PGARCH etc. This paper discussed were different mode. This paper studied generate bad news more effect on fluctuation of stock returns and trade volume. This paper was indicated negative and insignificance relation of trading and stock returns.

Javid (2007) investigated that the stock market and up down shock evidence from Pakistani firms (PSE-100). There were worked on sixty firms of the Pakistan stock exchange. Discussed the many sectors of the stocks there were fluctuation in the market stock returns and stock volume, this the PSE show the positive and negative effect in market. The increase prices of the steel and cement, Banking sectors and food etc. while observed that investors had expected of the future demand of investment in these sectors. Moreover, there is no significant increase in the fluctuation, the Pakistani market after the shock in the stock market as well as recover the market volatility.

Gul and Javid (2009) examined the relationship between trade volume and stock exchange activity from Pakistan stock exchange. This paper discussed the serial co relation of aggregate stock exchange index and all three measure of the volume. There was used the three independent variable and one dependent variable. This paper was used the correlation among the variables. There was usage variable on test for results

against the data the results were significance.

2.2. Summary of the literature

Date	Author	Topic	Data Type	Measure of Volume	Model
2017	Shersha	Relationship between trade volume and stock returns.	Nepalese stock exchange	Daily	ARDL
2015	Tapa and hassin	The relation link between return and volume.	Malaysia stock market	Daily	Granger, VAR
2014	Iqbal and Riaz	Empirical link among returns, volume and volatility.	United Kingdom market	Daily	ARCH, GARCH,VAR
2013	Lasmanah and Bagja	Work on abnormal returns and stock.	Stock market of Indonesia	Daily	T-test paired sample
2013	Betta	Relation among both trading and volume.	NSE of Africa	Daily	HAR_RV, HARX-RV
2012	Choi et al.	Relation b/w trade volume and stock returns.	Koreon stock market	Turn over	EGARCH, GTR
2012	Attri et al.	Dynamic link b/w stock and volume, volatility.	PSE-100	Daily	GARCH, ARCH
2012	Darwish	The relation examine the returns and trading volume and stock exchange Palestine.	Palestine stock exchange	Daily	GARCH (1, 1) Granger causality
2012	Mpofu	Link between trade volume, returns of stock.	JSE South Africa	Daily	Auto correlation GARCH
2011	Kalo el al.	Relation among return, volatility and volume	Nigeria stock exchange	Daily	GARCH X(1,1), GARCH (1,1)
2011	Sabbaghi	Relationship between Trading Volume and Asymat volatility in the Koreon stock market.	G5 stock market	Weekly data	GARCH

					Cont'd
2010	Mahajan and Sindh	Examine the relation bet change of price and volume.	Foreign market	Daily	Bivariate regression, VECM Model VAR, IRF and Co integration decomp-test, ppt, kpss, vector correct- modol J B test etc.
2010	Tripathy	Relation among changes price, trading volume.	Stock of India	Daily	VAR and IRF test johanen's Co integration, Causality bi-direction
2009	Mubarik & Javid	between trade volume and stock returns and volatility.	PSE 100	Daily	VAR ,Granger.GARCH etc
2009	Kumar et al.	The dynamic link b/w price and trade volume: Evid Indian stock mkt	S&PCNY Nifty Index	Daily num of transition	OLS, GARCH and VAR
2008	Mustafa & Nishat	Link between trade volume and stock returns	Panal data	Daily	VAR First Auto co relation Granger, GARCH
2008	Kamath	The Price-Volume Relationship in the Chilean Stock Market.	Santiago stock index	Daily & weekly	OLS and VAR
2008	Pathirawasm	Link amid trade volume, return.	Stock market of Colombo	Daily	GMM Hypothesis
2008	Deo et al.	The Empirical Relationship between Stock Returns, Trading Volume and Volatility: Evidence from Select Asia-pacific Stock Market.	India, Taiwan etc stock markets indices	Daily	OLS, VAR and EGARCH
2007	Rashid	volume and stock prices	PSE-100 firm level	Daily	Granger causality
2007	Rizwan and Khan	The connection among returns and returns	PSE 100	Daily	VAR, GARCH
2007	Floros and Vougas	Trading Volume and Returns Relationship in Greak stock market.	Greek stock index	Daily	VAR, GARCH
2002	Lee and Rui	Dynamic link b/w stock returns and Trading Volume: Cross country	New yark stock exchange	Daily	GMM, GARCH, VAR

					Cont'd
2001	Rui et al.	The Dynamic Relation between Stock Returns Trading Volume, and Volatility.	New York, Tokyo, London	Daily	OLS, EGARCH & VAR
1996	Andersen	Return Volatility and Trading Volume: An information Flow of Stochastic volatility.	Comman stock IBM	Num of shares traded dailty	GARCH & GMM
1994	Brailford	Link between trade volume and returns.	Stok market of Australia	Daily	VAR and GARCH
1992	Campbell	The link b/w trading volume, returns and correlation.	Stock market Newyark	Yearly data	QGARCH
1992	Grossman	The linkage between return, correlation and volume.	New yark stock exchange	Quarterly	QGARCH, Several correlation, hetro-gen Model
1992	Rossi et al.	Stock Prices and Volume.		daily share traded	VAR and ARCH
1990	Lamoureux and Lastrapes	Stock Return and Volume effects.	20 stocks in the US mkt	Traded daily share	GARCH
1987	Harris	Transaction Data Tests of the Mixture of volatility.	Individual NYSE stocks	Num of transactions	OLS

CHAPTER 3

Research Method

3.1. Research Methodology

In this chapter we will briefly define the methodology we adopted to convey this research. Each and every single step has been briefly discussed. First step is data and after that market level methodology and next is firm level methodology has been discussed in the following below:

3.2. Data

The key attention of the study is used the volume as trading performance that have explanatory power in addition to historical returns, and analyze the stock return, trading volume relationship. Since relationship between the daily returns variance and unobservable mixing variable cannot be easily estimated. a proper proxy is required. Trading volume could serve as a proxy measure for unobservable amount of info that flow in market. As this study uses the information for Market return, Market volume at PSE-100 and 42 companies of four sectors stock returns and trading volume. The daily Time series data were applied over the period of 1st September 2013 to 30th October 2018. To test the nexus between stock returns, Trading volume in case study of Pakistan stock exchange. The data has been collected from Business Recorder and Pakistan stock exchange market at PSE 100. By Mubarik and Javid (2009), Wasu (2011).

3.3. Econometric Methodology and Model Specification

The first step is to estimate individual firm market returns (r_m) and stock return (r_m) where the PSE-100 is market index. For stock return (R_t) log first difference of

the each day closing price. The trading volume (V_t) is define as the log of daily turn over. The methodology has been divided into two markets. There is Market level methodology and after that as Firm levels methodology has been discuss in the following below:

3.4. Return series

The financial series at level are trendy in nature. It is impossible to estimate a robust model if the series is trendy. To deal with trend we used the log difference return. By Following Mubarik and Javid (2009) Wusu (2011), Mustafa and Nashat (2008).

3.5. Return

$$t = (P_t / P_{t-1}) \tag{1}$$

P_t = Closing stock price index series at level i.e. Exchange rates at the end of time t.

P_{t-1} = First lag of closing stock price index series.

3.6. Trading Volume

$$V_t = \ln(T_t) \tag{2}$$

T_t = Turn over series at level i.e. trading volume at the end of time t.

we detrended the trading volume by regressing the volume on time and time square and extract the residuals which show detrended trading volume.

$$V_t = \alpha + \beta_1 t + \beta_2 t^2 \tag{3}$$

3.7. Stationary test

We check stock returns, market return, stock volume and market trading volume

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for stationary by applying Augmented Dickey Fuller (ADF) test.

$$\Delta Y_t = \alpha + \beta t + \gamma Y_{t-1} + \delta_1 \Delta Y_{t-1} + \ldots + \delta_p \Delta Y_{t-p} + \varepsilon_t$$

(4)

ΔY_t = is a time series with trend decomposition.

t is the time trend, α is a constant, β is the coefficient on a time trend and p the lag order of the autoregressive process. The number of augmenting lags (p) is determined by minimizing the Akaike Information Criterion (AIC). The null hypothesis is that the series yt needs to be differenced or detrended to make it stationary can be rejected if γ statistically significant with negative sign.

3.8. First order Autocorrelation Market return

We observe whether the stylized fact relating to market return and market volume exists in case of Pakistan for we check the contemporary autocorrelation by following Bohl and Henke (2003) by Mubarik & javid(2009) model as shown below:

$$R_t = \alpha + \varphi R_{t-1} + e_t \qquad\qquad (5)a$$

$$R_t = \alpha + \rho V_{t-1} + e_t \qquad\qquad (5)b$$

$$R_t = \alpha + \varphi R_{t-1} + \rho V_{t-1} + e_t \qquad\qquad (5)c$$

3.9. Granger causality test: based on (VAR)

To investigate causal relationship between stock returns and trading volume Engle-Granger Causality test is applied by following Chen *et al.* (2001) Mubarik & javid bivariate auto regression model, as shown below:

$$R_t = \alpha + \phi R_{t-1} + \beta V_{t-1} + e_t \qquad\qquad (6)$$

$$V_t = \alpha + \gamma R_{t-1} + \rho V_{t-1} + e_t \qquad\qquad (7)$$

If β coefficients are statistically significant then past values of volume and return yield a better forecast of future return and trading volume causes stock return. The F-test is used to test the hypothesis that β = 0. If ρ different from zero, the return causes volume. If β and ρ different from zero, there is a feedback relation between stock returns and trading volume. The Vector Autoregressive (VAR) method is used for estimation and model with one lags is selected on the basis of Schwarz Bayesian (SBC) Criteria.

3.10. GARCH in Mean

To measure the persistence in the conditional variance GARCH-M model is used. Fama (1965)) have observed that periods of instability in stock price changes are followed by periods of stability and its unconditional distribution of price changes has tick tails. Autoregressive Conditional Heteroskedasticity (ARCH) model of Engle (1982) characterizes the error term conditional on information set. It can mimic the clustering of large shocks by exhibiting large (small) errors of either sign to be followed by small (large) errors of either sign. The GARCH-M model introduced by Engle, Lilen and Robins (1987) then makes the return of stocks dependent on the time-varying risk premium, when the conditional variance of an asset directly $e_e$influences the conditional mean. In GARCH-M model residuals are decomposed into heteroskedastic and homoskedasticity and express conditional moments because they provide close and parsimonious approximation to the form of heteroskedasticity typically encountered with stock market data. Therefore GARCH(1,1)-M model given below is most suitable choice to investigate the relationship between volatility and stock return using trading volume as information set:

$$R_{it} = \alpha_0 + \alpha_1(L)r_{t-1} + \theta\sigma_t + e_t \qquad (8)$$

$$\sigma^2{}_t = \beta_0 + \beta_1(L)\,\epsilon^2{}_{t-i} + \beta_2(L)\sigma^2{}_{t-i} + \beta_3 V_{t-1} \qquad (9)$$

In equation (8) autoregressive in the mean return is allowed, θ gives the estimate of risk premium for facing variance risk and all other variables remain the same. The conditional variance in modeled in equation (9) including past error terms, past variances and volume influencing the variance. The β_1 measures the effect of past error square on volatility, β_2 measure the effect of past volatility and β_3 capture the effect of past volume on volatility and the effect of past volume on volatility and volume of the stock traded. The trading volume is used as an unobserved measure of information that flows into the market as an information arrival component.

Chapter 4

Results and Discussion

Market level Analysis

We start our analysis of PSE-100 market summary statistic has been estimated in order the high returns and riskiness through standard deviation and mean respectively. Results are show below in table 4.1.

Table 4.1: Summary statistic of the market returns

	Mean	Std. Devi	Skewness	Kurtosis	J, Bera	Pro	Observation
r_m	0.00024	0.0204	-0.313	5.488	1622.6	0.0000	1276
v_m	10.56	0.5931	-5.864	38.61	86593	0.0000	1276

[1] the summary statistic tells us about sample data information.

Table 4.1 shown the results of summary statistic that the PSE-100 market index. the trading volume results show more volatile with a standard deviation 0.020 and return value 0.59 very high which show the PSE-100 is low risky. There is the evidence negative skewness of stock returns -0.313 and trading volume -5.86. there are exceed the normal value of kurtosis of three for stock return and trading volume. The kurtosis returns 5.4 and volume 38.6 accept and greater the normal value. the According to the Jarque-Bera test the series is non-normal and series of jarque-Bera status have high significance results and 1% level hypothesis accept.

Table 4.2: Stationarity Test of Market PSE-100

	r_m	V_m
PSE-100 index	-20.2359*	-15.0055*

* show significance at 1%.

Table 4.2 PSE-100 index data for market return (r_m) market volume (V_m) are not

stationary at level, for stationarity we take lag there our data is first difference.

Table 4.2 describe the results of ADF test for market returns and market volume series. According to test of ADF, we reject of the H_0 hypothesis which requires difference or detrended of a data, therefore market returns and detrended market volume of above series are stationarity clearly. Augmented Dickey Fuller (ADF) test show the market returns value -20.23 and market volume -15.00 both are stationary, Yonis (2013), Mubarik and javid (2009).

Table 4.3: Evidence on the First order Autocorrelation in market return

Autocorrelation is a measure of the internal correlation within a time series. It is a way of measuring and explaining internal association between observations in a time series.

	C	$r_m(-1)$	$V_m(-1)$	R^2
r_m	0.05473**	0.05473**		0.1299
r_m	0.00912**		0.00088***	0.1510
r_m	-0.0088	0.0544**	0.00085**	0.2190

*,**,***, shows level of significance at 10%, 5%, 1% respectively

Table 4.3 show relationship between return and volume first auto co relations of stock market. in 1% percent increase in previous day market returns lead to increase 0.055% current day market returns. there R square 12% change accruing in current day market returns due to previous day market returns. In 1% percent increase in previous day market volume lead to increase 0.0008% increase in current day returns series. R square increase 15.1 % percent the regression current day market volume

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due previous day return. In 1 % percent change in current market return lead to 0.054 % returns series. And 1% percent change in market volume lead to 0.0008% and current market series. R square 21% change accruing in current market returns and market volume due to previous day returns. (Mubarik and Javid 2009).

Table 4.4: Granger Causality Test Based on Vector Autoregressive Analysis

Granger causality is a way to investigate causality between two variables in a time series. The method is a probabilistic account of causality; it uses empirical data sets to find patterns of correlation Causality is closely related to the idea of cause-and-effect.

Volume Cause Return		Return Cause Volume	
C	-0.0020*	C	-0.0088
	(0.058)		(0.0116).
	[-0.034]		[-0.758]
α_1	0.1168**	λ_1	0.0544**
	(0.140)		(0.027)
	[0.834]		[1.944]
β_1	1.0005*	δ_1	0.0008*
	(0.00549)		(0.001)
	[182.180]		[0.778]

*,**,***, shows level of significance at 10%, 5%, 1% respectively.

λ_1 and β is coefficient are statistically significance than past values of volume and return yield is better forecast of future return and trading volume causes stock return. δ_1 is for difference.

Results of table 4.4 contemporaneous relation between trading volume and return based on vector auto regressive (VAR) model based on F-test outcomes show that market return cause market volume and market volume cause by market return. In this study Vector Auto Regressive (VAR) method is used for estimation model with one (1) lag have been selected on the basis of Schwarz Bayesian criteria (SBC). These results suggest there is feedback mean (volume Cause return and return cause volume), system of the Pakistani stock market both influence each other market volume and market returns. These results are consistence with other markets emerging Indonesia and Hong Kong, Taiwan and Malaysia Doe el al. (Mubarik & Javid, 2009).

Table 4.5: Evidence on the Returns and Volume by GARCH-M Model

GARCH Models Best for Asset Returns, GARCH processes are widely used in finance due to their effectiveness in modeling asset returns and inflation. GARCH aims to minimize errors in forecasting by accounting for errors in prior forecasting and, thereby, enhancing the accuracy of ongoing predictions

	Mean equation			Variance equation					
	C	**r_m(-1)**	**GARCH-M**	**C**	**ARCH(α)**	**GARCH(β)**	**α+ β**	**V_{t-1}**	**R2**
PSE-100	-0.013** (0.113)	0.0012** (0.111)	1.621** (0.31 7)	0.1510* (0.003)	0.179* (0.000)	0.802* (0.000)	0.981	0.0407** (0.159)	0.0034

*,**,***, shows level of significance at 10%, 5%, 1% respectively.

The relationship between market volume, volatility and market returns is examine by assessing GARCH (1, 1)M model with volume in restricted equation variance. Show mean equation there is first order significance autocorrelation is exist. since the

standard deviation of coefficient is not significance the mean equation this suggest that the variance in risk is no compensation in Pakistani market. Kasman and Baklaci (2003) similar conclusion in come up in case of Turkish market. Through GARCH (1,1)-M model estimated the conditional variance. GARCH(1,1)M model using the trading volume for measure as unobserved information that moment or flow in to the market. the GARCH-M equation parameterize conditional variance, at intercept of these equation show the volatility of position of price remain constant over time. autocorrelation of order one positive results indicates. significance level 1 percent ARCH (1) and GARCH (1). The show equation estimates of lag square residual past variance have significant effects on conditional variance. Lag volume showing is also significance and positive effect on volatility in instance of total market.

Firm level analysis

Table 4.6: Result of Augmented Dickey fuller Unit Root Test

S. No	Company	Log difference	Log difference
1	AGTL	-19.2**	-9.477**
2	ATLH	-20.68**	-11.36**
3	DFML	-19.3**	-8.728**
4	GHNL	-18.43**	-10.75**
5	GAIL	-20.33**	-6.195**
6	HINO	-18.12**	-8.334**
7	HCAR	-17.54**	-7.46**
8	INDU	-18.2**	-12.92**
9	MTL	-20.3**	-9.547**
10	PSMC	-18.92**	-9.94**
11	SAZEW	-18.24**	-8.547**
12	AKDCL	-30.31**	-7.375**
13	AKGL	-23**	-7.466**
14	HADC	-13.66**	-3.556**
15	MACFL	-6.194**	-7.876*
16	MWMP	-18.4**	-3.797
17	OML	-21.09**	-9.347**
18	PACE	-21.5**	-6.743**

			Cont' Tab 4.6
19	PHDL	-14.84**	-14.58*
20	PSEL	-28.09**	-5.008**
21	SHFA	-18.07**	-12.52**
22	STPL	-20.26**	-7.015**
23	SPEL	-18.31**	-10.09*
24	TPLP	-21.88**	-10.5**
25	TRIPF	-17.54**	-10.03**
26	UBDL	-31.1**	-2.686
27	UDPL	-20.18**	-10.06**
28	AGIL	-20.18**	-11.11**
29	ATBA	-20.47**	-12.43**
30	BWHL	-18.93**	-11.45**
31	BELA	-28.17**	-6.912**
32	EXIDE	-11.76**	-5.43*
33	GTYR	-20.57**	-9.005**
34	THALL	-10.53**	-11.75*
35	FEROZ	-18.46**	-10.74**
36	GLAXO	-21.28**	-8.328**
37	HINOON	-2.571	.7.890*
38	IBLHL	-19.58**	-8.912**
39	OTSU	-19.14**	-10.63**
40	SAPL	-18.17**	-13.76**
41	SEARL	-19.88**	-10.26**
42	WYETH	-14.94**	-7.432*

*,**,***, shows level of significance at 10%, 5%, 1% respectively

The Augment Dickey Fuller (ADF), statistic used in the test is a negative number. The more negative it is the strong the rejection of the hypothesis that there is a unit root at some level of confidence. Table: 4.6 Results of the following series trading volume and stock returns all company are not stationary at level. That individual trading volume and stock return for stationarity by applying the Augmented Dickey Fuller – Unit Root Test. There are all value of trading volume and stock returns series are stationary at first difference.

Table 4.7:

First Order autocorrelation in Stock Returns

S.no	Company	$R_t(-1)$	R^2	S.no	Company	$R_t(-1)$	R^2
1	AGTL	0.1537*	0.1236	22	STPL	0.0791**	0.1062
2	ATLH	0.0572**	0.1032	23	SPEL	0.0492	0.2024
3	DFML	0.1065**	0.0113	24	TPLP	0.0091	0.10008
4	GHNL	0.2697*	0.1726	25	TRIPF	0.1508**	0.2327
5	GAIL	0.0171	0.1002	26	UBDL	-0.316*	0.1002
6	HINO	0.2099*	0.1440	27	UDPL	0.0977*	0.1095
7	HCAR	0.2297*	0.1526	28	AGIL	0.0578**	0.2033
8	INDU	0.1547*	0.1239	29	ATBA	0.1051*	0.1510
9	MTL	0.1280*	0.1163	30	BWHL	0.1639*	0.2368
10	PSMC	0.2157*	0.2463	31	BELA	-0.385*	0.1605
11	SAZEW	0.2056*	0.2422	32	EXIDE	0.2499*	0.0625
12	AKDCL	-0.4158*	0.1729	33	GTYR	0.0633**	0.1040
13	AKGL	-0.0564**	0.1037	34	THALL	0.1702*	0.0289
14	HADC	-0.0539**	0.1129	35	FEROZ	0.2674*	0.2171
15	MACFL	0.16592*	0.0267	36	GLAXO	0.1351*	0.1182
16	MWMP	0.0407	0.1087	37	HINOON	0.1947*	0.0379
17	OML	-0.0099	0.10008	38	IBLHL	0.2115*	0.1447
18	PACE	0.0168	0.20028	39	OTSU	0.1645*	0.1270
19	PHDL	-0.0370	0.21136	40	SAPL	0.2935*	0.0986
20	PSEL	-0.4071*	0.16575	41	SEARL	0.1188*	0.0140
21	SHFA	0.05115**	0.00261	42	WYETH	0.2651*	0.0704

*,**,***, shows level of significance at 10%, 5%, 1% respectively

Table 4.7 To check autoregressive effect in stock returns there are most of the stock 36 Companies out of 42 Companies. There are 36 companies statistically positive of the first order autocorrelation. Let suppose company one AGTL we explain further 1% percent change in previous day stock returns lead to increase 0.153% current day stock returns. There are six companies statistically insignificant results show. I explain negative company results OML 1% percent change in previous day stock returns lead to decrease negatively -0.0099% change in stock returns. There are 6 company results is insignificance.

Table 4.8:

Granger Causality between Stock Returns and trading Volume Based on F-test

Company	rt →Vt	Comp	Vt-→rt	Comp	Bi-direction	Comp	No Causality no relation
ATLH	2.181*	AGTL	9.670*	PSMC	2.001**, 2.140**	GHNL	5.19*, 13.10*
DFML	6.093*	GAIL	1.669*	AKDCL	0.104***, 0.072***	HINO	4.96**, 5.94**
HADC	0.323**	STPL	0.016***	AKGL	0.540**, 0.620**	SAZEW	1.30**, 7.92*
UBDL	0.537**	TRIPF	1.512**	MWMP	0.005***, 0.194***	PACE	4.26**, 6.76*
HCAR	5.303**	SEARL	2.240*	OML	0.287***, 0.053***	SHFA	6.01*, 4.30**
INDU	6.576**	UDPL	4.062**	PHDL	0.125***, 0.010***	SPEL	3.51**, 6.08*
MTL	5.852**	AGIL	10.69*	PSEL	0.083***, 0.161***	EXIDE	9.45*, 13.21*
MACFL	11.48*			OTSU	0.158***, 1.241***	SAPL	4.090*,10.37*
TPLP	3.217**						
ATBA	9.120*						
BWHL	4.504**						
BELA	0.065**						
GTYR	16.544*						

							Cont' Tab 4.8
THALL	3.803**						
FEROZ	14.041*						
GLAXO	26.255*						
HINOON	9.122*						
IBLHL	14.446*						
WYETH	5.317*						

*,**,***, shows level of significance at 10%, 5%, 1% respectively

Table 4.8 discussed the causality between the trading volume and stock returns on base F-Test to test null hypothesis that return do not cause volume and volume do not cause return. There are discussed four categories 1st rt →Vt returns cause volume and 2nd Vt-→rt volume cause returns 3rd feedback bi direction 4th no causality. Now come to 1st rt →Vt stock return granger cause trading volume the table shows the volume is influence by returns for more stocks there 19 stocks of companies ATLH, DFML, HADC, and UBDL etc. and Vt →rt the trading volume Granger cause of stock returns accept in the following 7 stocks companies AGTL GAIL, STPL, TRIFP, SEARL, UDPL, AGIL. 3rd Feedback or bi-direction note that there is a bi-direction relationship between trading volume and stock return in the following 8 stocks of companies PSMC, AKDCL, AKGL, MWMP, OML,PHDL, PSEL, AGIL. 4TH No causality there is no Granger cause on the trading volume in return, and no Granger cause return on trading volume and no relationship there is shown eight stocks companies GHNL, HINO, SAZEW, PACE,SHFA etc. Manex Yonis (2005).

Table 4.9:

Evidence on the volume, Returns and Volatility by GARCH-M Model

	Mean equation			Variance equation					
Company	C	$R_t(-1)$	GARCH-M	C	ARCH A	GARCH B	$\alpha+\beta$	V_{t-1}	R^2
AGTL	-0.0004	0.0717**	0.518	0.00015	0.53*	0.32*	0.85	0.0037	0.0013
ATLH	0.010*	0.010	-0.000005	0.00003	0.10*	0.79*	0.90	0.001	0.0106
DFML	0.024**	0.082	-20.56*	0.00	0.00	0.98*	0.98	-0.003**	0.0049
GHNL	-0.005*	0.102*	8.017	9.66*	0.29*	0.001*	0.30	-0.027*	0.012
GAIL	-0.001	-0.004*	-0.34	2.14	0.20*	0.69**	0.89	0.002	0.031
HINO	-0.00009**	0.088**	0.98	0.71*	0.41*	0.58*	0.99	-0.0015***	0.052
HCAR	0.0012	0.19*	-0.76	0.33**	0.11**	0.82*	0.94	-0.00067	0.078
INDU	-0.001**	0.07**	4.76**	0.16	0.17*	0.82*	0.99	-0.0004	0.062
MTL	0.007*	0.012	0.0069	0.006	0.09*	0.79*	0.89	-.00003*	0.075
PSMC	-0.0008	0.16*	2.14	0.50	0.20*	0.70*	0.91	0.000009	0.044
SAZEW	-0.0029	0.19*	3.13	0.15	0.12*	0.79*	0.71	0.000089	0.03
AKDCL	0.0036	-0.097	-0.0017	.000079*	0.95*	0.59*	1.55	0.005*	0.0001
AKGL	0.02	0.04	-0.07	0.005	0.13	0.75*	0.90	0.0034	0.0038
HADC	0.011*	0.01	-0.000048	0.0023	0.101*	0.80*	0.90	-0.00032*	0.0025
MACFL	-0.001	0.13*	1.56	0.86	0.17*	0.72*	0.8991	-0.00077	0.022
MWMP	0.011*	0.01	-0.00004*	0.0033*	0.10**	0.80*	0.90	0.0002*	0.0004

							Cont' Tab 4.9	
OML	-0.0004	-0.019	0.013	8.24	1.00	0.35	1.35	-0.0028	0.0039
PACE	-0.0045*	-0.0043	1.97**	0.65**	0.11*	0.84*	0.95*	0.00033**	0.021
PHDL	0.0031	0.026	0.021	0.014	0.095**	0.79*	0.894*	0.000092**	0.00147
PSEL	0.0062*	0.010	-0.00015	0.042*	0.11*	0.78*	0.89	-0.00025*	0.00083
SHFA	0.0048*	0.0097	-0.000005	0.0091*	0.0989*	0.803*	0.902	-0.000198*	0.0175
STPL	0.00092	0.059	-0.87	0.91	0.073	0.85*	0.927	-0.0017	0.0301
SPEL	-0.0018**	0.061**	1.924**	1.107**	0.168*	0.67*	0.845	0.00061*	0.015
TPLP	0.052	0.23	0.46	0.23	0.68	0.31*	0.99	0.0034*	0.0007
TRIPF	-0.0019*	0.098*	2.26	0.72*	0.129*	0.732*	0.861	0.0012*	0.0251
UBDL	0.0099*	0.13**	-0.13*	0.07*	0.21*	0.77*	0.98	0.00073*	0.0006
UDPL	0.0056	0.0O32	0.041	0.039	0.46	0.43*	0.89	0.002	0.0057
AGIL	-0.0024	0.004	5.46	1.57	0.29*	0.44**	0.73	0.045*	0.043
ATBA	0.00068	-0.002	-0.98	0.23*	0.097*	0.90*	0.997	0.0017*	0.02
BWHL	0.0033	0.006	-0.0004	0.008	0.099*	0.80*	0.90	-0.0001*	0.017
BELA	-0.0004	-0.14*	0.0013	0.88*	1.00**	0.61*	1.61	-0.0027	0.0015
EXIDE	-0.001	0.13*	0.79	0.21**	0.178*	0.792*	0.971	-0.0002	0.035
GTYR	-0.00064	0.071**	0.81	1.29**	0.31*	0.51*	0.83	-0.00079	0.047
THALL	-0.0026	0.13*	7.87	0.63	0.12*	0.72*	0.85	-0.00062	0.053
FEROZ	-0.000033	0.23	0.294*	0.19	0.111*	0.86*	0.972	-0.00046	0.030
GLAXO	0.0099*	0.01	-0.000005	0.000042	0.10*	0.80*	0.90	0.00099*	0.057

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							Cont' Tab 4.9	
HINOON	0.00026	0.13*	0.602	0.24*	0.251*	0.737*	0.988	-0.0011*	0.046
IBLHL	-0.0014	0.24	1.02	0.062	0.461	0.523	0.984	0.046	0.033
OTSU	-0.0014*	0.045*	0.34*	1.54**	0.566*	0.312**	0.878	0.072	0.0078
SAPL	-0.0090*	0.19*	12.95	0.94	0.155*	0.713*	0.868	-0.000016	0.0027
SEARL	-0.001	0.13*	2.57**	0.775*	0.24*	0.67*	0.92581	-0.00078	0.0049
WYETH	0.0017*	0.30*	-8.59*	0.0066**	0.22*	0.78*	1.012	0.00010*	0.0013

*,**,***, shows level of significance at 10%, 5%, 1% respectively

GARCH process are abroad used in practically in finance due to success in modeling assets inflation and returns. Aims of GARCH to minimize errors in estimating or future prediction by accounting for mistakes and, thereby enhancing accuracy of ongoing predictions.

Table 4.9 shows findings of relationship between trading volume, returns and volatility. The GARCH are two type one is mean equation and second variance equation. GARCH (1,1) MODEL results discussion: Variance equation: There are three distribution in the study (Gaussian distribution normal) under this distribution ARCH GARCH are significant, it's the previous day's stock return info can influence or effect today. Under this distribution GARCH and ARCH significant.

The allow mean equation the auto regressive with the GARCH mean equation, there conditional variance is predict by GARCH (1,1) model using trading volume as mean unseen measure of info that movement into market. The conclusion indicates existence pf first order auto regressive process. The from shows that miss expertise as

conducted in information sets during period have constant effect on future path of returns. In simple words fluctuation in the rate of returns experienced in a period have a inflexible relationship with future returns. The results of AR (R_{t-1}) with the GARCH (1,1) model suggests that in all stock is exists first order auto correlation, GARCH equation parameter conditional variance. This equation intercept shows the portion of price up down and constant over the time.

The ARCH (α), GARCH (β) effect are found to be present significance level 1 perent indicates the lag square residual and lag variance and lag volume have significance effect on the conditional variance at firm level regard GARCH m term fifty percent stock investor get reward or incentive for variance of risk (28 out of 42 stock). So, the significance of GARCH model indicates the significance of the variance risk is compensated by Pakistani markets. The trading volume influence the variance risk as well as and past error and past variance, (Mubarik & Javid., 2009).

Chapter 5

Conclusion

5.1 Key finding

This study is an attempt to establish a relationship between trading volume and stock returns, volatility. We collect our data from business recorder website. Using the time series daily data of the described market by Pakistan stock exchange, (PSE-100 index), and on the market level and firm level in case of Pakistan market. The sample size includes of forty-two firms of the four Pakistani manufacturing sectors for

time and period of 1st September 2013 to 30th Oct 2018. There are 5 years data and

total 1278 observation. Similar procedure one used Mubarik & Javid (2009). Initially, we checked the stationarity of the time series data. There are most of variable not stationary at level while we have used the Augment Dickey Fuller unit root test for stationarity. After ADF test for all variable have stationary first difference.

Second the results indicate there is evidence of first order autocorrelation in market return and individual stock returns. The findings suggest that there is significant effect of the previous day trading volume on the current return and this implies that previous day returns and volume has explanatory power in explaining the current market returns.

Third, the findings suggest that there is significant effect of the previous day trading volume on the current return and this implies that previous day returns and volumehas explanatory power in explaining the current market returns. The results of Granger Causality test suggest that there is feedback relationship between market return and trading volume. However, in case of individual stock returns the evidence indicates stronger return causing volume than volume causing returns.

Fourth, GARCH-M Model the empirical results verify that there is significant

interaction between trading volume and return volatility when volume is entitled into variance equation of GARCH- M model.

Finally, Diagnostic test that done for the GARCH modle fit or not for the following series data. The results of our study supported by previous empirical evidence by (Baklaci and kasman., 2003) for Turkish market (Doe et al., 2008) for Asia Pacific market, (Mustafa and Nishat., 2006), (Mubaril & Javid., 2009) for Pakistani market.

5.2 Limitation

- We collect the four sector and total fifty-seven companies but there in fifteen have ARCH effect.

- In case of Pakistan stock exchange (PSE-100) some firms data not available.

- Fluctuation in our data is more because the internal political instability.

- Mostly data is fluctuated because political instability and election situation exist increase of dollar price.

5.3 Future direction policy

Results significancy show that when an investor invests their money in Pakistan stock exchange, so there is lot of opportunity to earn more and more profit. Pakistan stock exchange limited consist of thirty-five sectors and total five hundred fifty-nine firms, the work has done, and seventeen sectors are remains to do work on that. The Pakistan stock exchange (PSE-100) data is easily available at business recorder and yahoo finance.

It is suggested that implication of the political instability is low so foreign investor

can be invested to invest their money in Pakistan stock exchange. Although, if the fluctuation occurs in the stock prices due to the political instability. Hence, investors will take all the invested money from the financial markets.

Researchers can further study on this topic, i.e. the relationship between trading volume and stock return on other sectors such as paper & board, cable & electrical goods, mutual funds, engineering, fertilizer, glass & ceramics, securities, jute, leather & tanneries, real estate investment trust, woolen, etc. Listed on PSX-100 index for future study.

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Appendix

List of 42 Firms

S.no	Code	Company name
1	AGTL	Al-Ghazi Tractors Limited
2	ATLH	Atlas Honda Ltd
3	DFML	Dewan Farooque Motors Limited
4	GHNL	Ghandhara Nissan Ltd
5	GAIL	Ghani Automobile Industries Limited
6	HINO	Hino Pak Motors Ltd
7	HCAR	Honda Atlas Cars Ltd
8	INDU	Indus Motor Company Limited
9	MTL	Millat Tractors Limited
10	PSMC	Pak Suzuki Motors Co Ltd
11	SAZEW	Sazgar Engineering Works Ltd
12	AKDCL	AKD Capital Limited
13	AKGL	Al-Khair Gadoon Limited
14	HADC	Hayderi Construction Co Ltd
15	MACFL	MACPAC Films
16	MWMP	Mandviwala Mauser Plastic Industries Limited
17	OML	Olympia Mills Limited
18	PACE	Pace (Pakistan)
19	PHDL	Pakistan Hotels Developers Ltd
20	PSEL	Pakistan Services Limited
21	SHFA	Shifa International Hospitals Limited
22	STPL	Siddiqsons Tin

			Cant'd
23	SPEL	Synthetic Products Enterprises Limited	
24	TPLP	TPL Properties Limited	
25	TRIPF	Tri-Pack Films Limited	
26	UBDL	United Brand Limited	
27	UDPL	United Distributors Pakistan Limited	
28	AGIL	Agriauto Industries Limited	
29	ATBA	Atlas Battery Ltd	
30	BWHL	Baluchistan Wheels Limited	
31	BELA	Bela Automotives Limited	
32	EXIDE	Exide Pakistan Limited	
33	GTYR	General Tyre & Rubber Co of Pakistan Ltd	
34	THALL	Thal Limited	
35	FEROZ	Ferozsons Laboratories Limited	
36	GLAXO	GlaxoSmithKline Pakistan Limited	
37	HINOON	Highnoon Laboratories Limited	
38	IBLHL	IBL HealthCare Limited	
39	OTSU	Otsuka Pakistan Ltd	
40	SAPL	Sanofi-Aventis Pakistan Limited	
41	SEARL	The Searle Company Limited	
42	WYETH	Wyeth Pakistan Limited	

Table 5.1

DIAGNOSTIC TEST

Note. There are 1st value 5 lag, and [.] values 5 lag probability value.

S.no	Company	Jarque-Bera [probi]	Q-Statist on Standardzd Residuals. [probi]	Q-Statist on Squared Standardzd Residuals. [probi]	ARCH 1-10 test: F (10,1253) [probi]
1	AGTL	0.000026 Q [0.00000]	4.95541 Q [0.5919029]	0.171920 Q [0.9819898]	0.026892 Q [.52000]
2	ATLH	6.3602 Q [0.041582]	0.656069 Q [0.9566339]	4.67846 Q [0.969139]	0.57473 Q [0.8307]
3	DFML	2.15 Q [0.34121]	1.90534 Q [0.7531646]	7.51074 [0.0572832]	0.80512 Q [0.6241]
4	GHNL	24.905 Q [.000039]	1.87423 Q [0.7588774]	4.16023 Q [0.446737]	1.3495 Q [0.5160]
5	GAIL	500.14 Q [0.0000001]	7.64458 Q [0.6055004]	1.67391 Q [0.6427504]	0.46918 [0.9104]
6	HINO	221.53 Q [0.000000]	7.17601 Q [0.1269621]	11.3828 Q [0.0098262]**	2.2998 Q [0.5113]
7	HCAR	15.40 Q [0.00045211]	4.40640 Q [0.6537902]	6.02630 Q [0.6103378]	0.80739 [0.6216]
8	INDU	453.17 Q [0.000000]	9.96480 Q [0.5410248]*	6.09715 Q [0.6069781]	1.6573 Q [0.858]
9	MTL	2459.5 Q [0.00000]	12.1326 Q [0.6163919]*	5.71869 Q [0.5261279]	1.0342 [0.54118]
10	PSMC	31.475 Q [.00000014]	2.52991 Q [0.6392877]	6.40449 Q [0.935062]	1.2060 Q [0.823]
11	SAZEW	2.1912 Q [0.33434]	6.31356 Q [0.769235]	3.90912 Q [0.2714458]	0.71891 Q [0.7073]
12	AKDCL	.000000019 Q [0.00000]	= 0.0274399 Q [0.9999067]	0.0168516 Q [0.9994211]	O.0033732 Q [1.6000]
13	AKGL	.00000008 Q [0.00000]	0.00929442 Q [0.9999892]	0.00424062 Q [0.9999266]	0.00084487 Q [1.0000]
14	HADC	0.00004 Q [0.00000]	1435.03 Q [0.0000000]**	518.857 Q [0.0000000]**	384.05 Q [0.0000]**
15	MACFL	352.48 Q [0.0000000]	1.19908 Q [0.8782498]	3.46433 Q [0.6254183]	0.49540 Q [0.8938]
16	MWMP	0.00000266 Q [0.00000]	1797.16 Q [0.0000000]**	1051.99 Q [0.0000000]**	99.438 Q [0.0000]**
17	OML	.00000002 Q [0.00000	0.162176 Q [0.9968848]	0.0130519 Q [0.9996050]	0.0026184 Q [1.54000]
18	PACE	627.20 Q [.00000006]	7.76089 Q [0.6007404]	1.70911 Q [0.6349099]	0.40490 Q [0.9448]
19	PHDL	0.00022 Q [0.00000]	0.0544648 Q [0.9996359]	0.0150852 Q [0.9995095]	0.0030104 Q [1.56000]
20	PSEL	0.0000012 Q [0.00000]	0.102673 Q [0.9987265]	0.0280207 Q [0.9987629]	0.0056499 Q [1.0000]
21	SHFA	.0000036 Q [0.00000]	2.95801 Q [0.5648769]	0.146565 Q [0.9857160]	0.048379 Q [1.0000]

22	STPL	313.21 Q [.000000009]	5.02994 Q [0.842391]	2.22324 Q [0.5273853]	0.48359 Q [0.9015]
23	SPEL	0.024553 Q [1.0000]	0.163778 Q [0.9832134]	4.00051 Q [0.6059371]	0.000065 Q 0.00000
24	TPLP	0.000014 Q [0.00000]	1.61697 Q [0.8057381]	1.37218 Q [0.7120679]	0.26186 Q [0.9889]
25	TRIPF	342.45 Q [0.0000043]	8.65236 Q [0.5704012]	3.48279 Q [0.3230012]	0.55239 Q [0.8531]
26	UBDL	0.000014 Q [0.00000]	0.0959288 Q [0.9988858]	0.0229503 Q [0.9990816]	0.0046626 Q [1.0000]
27	UDPL	0.000053 Q [0.00000]	6.67563 Q [0.540551]	0.217011 Q [0.9747975]	0.035088 Q [1.0000]
28	AGIL	45.563 Q [.00000012]	5.94696 Q [0.6031449]	6.81325 Q [0.780945]	0.97091 Q [0.6470]
29	ATBA	.000013 Q [0.00000]	7.98690 Q [0.6920593]	0.239299 Q [0.9710088]	0.046547 Q [1.0000]
30	BWHL	32901. Q [0.00000]	16.8564 Q [0.5020611]**	0.867361 Q [0.8332964]	0.22440 Q [0.9940]
31	BELA	0.000043 Q [0.00000]	1.37820 Q [0.8479757]	0.0341708 Q [0.9983371]	0.0066377 Q [1.5000]
32	EXIDE	20.608 Q [.00003]	5.29018 Q [0.587979]	9.20452 Q [0.6266918]*	1.4393 Q [0.573]
33	GTYR	15464. Q [0.00000]	3.42585 Q [0.5892429]	0.210549 Q [0.9758685]	0.21608 Q [0.9949]
34	THALL	24.561 Q [.0000046]	1.67868 Q [0.7945870]	4.49773 Q [0.5124932]	0.73969 Q [0.6873]
35	FEROZ	8.6115 Q [0.013491]	1.16261 Q [0.8842148]	7.70589 Q [0.524977]	1.1621 Q [0.5124]
36	GLAXO	0.000002 Q [0.00000]	490.730 Q [0.0000000]**	462.948 Q [0.0000000]**	46.099 Q [0.0000]**
37	HINOON	33529. Q [0.00000]	3.30440 Q [0.5082352]	1.06662 Q [0.7851368]	0.19400 Q [0.9967]
38	IBLHL	7219.5 Q [0.00000]	4.30607 Q [0.661650]	1.16840 Q [0.7605934]	0.24704 Q [0.9912]
39	OTSU	10.573 Q [0.0050601]	6.44777 Q [0.1681115]	5.36994 Q [0.5466278]	1.1949 Q [0.897]
40	SAPL	3.1369 Q [0.20837]	5.10258 Q [0.769329]	9.60576 Q [0.0222324]*	1.3240 Q [0.5120]
41	SEARL	16635. Q [0.00000]	5.11865 Q [0.753390]	0.737292 Q [0.8643994]	0.10123 Q [0.9998]
42	WYETH	0.00029 Q [0.00000]	4.37580 Q [0.0575297]	0.660507 Q [0.8824514]	0.13037 Q [0.9994]

Table:1

The diagnostic test done for the GARCH model fit or not for the following data. The p.valve greater than 0.05 for the squared standardized residuals. First value of every column that are the 5 lag value and [.] value of every column that is probability value of any column. The jerque bera significance value 0.05. when the prob value

less 0.05 the data normal but now see the [.] value of AGTL,GAIL and ATLH etc but 39 companies p value are normal but the jarque bera are normally. Results on standardized residual and squares standardized residual series p.values are display as[.] and the test are conduct under null hypothesis no serial correlation and at 5 percent significance level. The std residual and square std residual and decision on probability value the series are most normally distributed. ARCH effect in the data null hypothesis no arch effect and one of lag value and the [.] value ten percent. But decision on probability value there are ARCH effect.But in last against the data take decision the GARCH Modeling fit for that. Ljung and Box (1978) West and Cho (1995), wusu (2011).