Do Investors Think Big of Themselves? Testing Overconfidence Bias in Nepalese Stock Market: A VAR and IRF Approach

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Abstract:

The purpose of this study is to investigate the empirical relationship of volume, returns and volatility to find overconfidence bias in Nepalese stock market. The study uses Vector Auto regression and Impulse Response Function to find the relationship of volume, return, and volatility for finding overconfidence bias. The study finds evidences of overconfidence bias in Nepalese Stock Market. It is found that past returns of markets affects present volume. The Findings is further confirmed by Impulse Response Function. The findings of the study have noteworthy recommendation for the investors and regulators. It is recommended that if investors are aware about the biases, they may be aware about their biased decisions and trade with logic keeping fundamentals of market in mind. The same goes for regulators to find effective ways to curb these biases from market. The study endorses the belief that like other underdeveloped and developing markets Nepali market is also having different behavioral anomalies. This article is one of the few to provide empirical evidence of market based overconfidence issues.

Key Words*: NEPSE, Overconfidence Bias, Returns, Volume, Volatility, Vector Auto regression, Impulse Response Function*

1. Introduction:

In the event of any economic transaction, it is experienced market participants are not rational enough. The explanation of different irregularities or anomalies from the purview of standard finance would not be available. According to the traditional finance theory (Fama, 1970) markets are efficient and investors have rational expectations and take decisions that maximize their expected utility. Nevertheless, some anomalies are found on the financial markets, which previously could not be studied using theory of standard finance. Among them overconfidence bias in a stock market is much studied by behavioral economist. De Bondt and Thaler (1995) state the bias as "single most embarrassing fact" to standard financial paradigm. The theory of rationality was always not a complete theory at all. This has given rise to the concept of Behavioral Finance. As From Tulip mania to housing bubble there have been participants who have showed imitation behavior and have traded erratically due to past success (Shiller, 2000).

Overconfident buyers or investors think they can earn superior returns from their own knowledge and skills. They tend to have unnecessary belief in their abilities, choice or stocks and reason for the choice Pompian; (2008). Most of economist who have been impressed with the definition of overconfidence is with respect to calibration. Skala (2008) finds the much of economist used this definition for better part till end of 1970s. Miscalibration considered as the giving undue stress on wrong answers of factual questions. These unwarranted faith on the beliefs is stated as mere evolution of perceptions and fallible memory (Fischh off et al., 1977) and (Oskamp, 1965). The psychological view of overconfidence comes

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from Miscalibration and along with selective perception and reconstructing nature of memory and the concept of confirmation bias comes as the cause of overconfidence. (Fischhoff et. al., 1980).

Economists credit the factors of heuristics for causing overconfidence bias. To find any solution to a difficult problem, people tend to go for some pre-determined plan to solve a problem which is not scientifically correct but have logical justifications. The work of Khaneman and Traversky (1982) discuss cognitive bias that comes from heuristics: representative heuristic, availability heuristic, adjustment and anchoring heuristics. Griffin and Taversky (1992) states that people become confident by looking at the "strength" of evidence and giving less importance to "weight" of evidence. After heuristics, economists and psychologists have defined overconfidence bias originating from other like Better than Average Effect, Unrealistic Optimism (comparative and absolute), and Illusion of Control. Studies of Sevenson (1981), Benoit and Dubra (2007) and Presson and Benassi (1996) are instrumental to study causes of overconfidence.

Studies find relation of overconfidence with increased trading activity and volatility (Yeh and Yang, 2011). Odean (1998, 1999) suggested that overconfident investors trade more aggressively. In present study's view, most preferably in a typical bullish trend of small market, average investor would feel superior / overconfident from his/ her holdings. This over optimism bid up the prices further inviting new investors. The end result is past prices increasing present prices which also obviously influences volume

The presence of overconfidence hypothesis in Nepali literature is tested mainly through questionnaire. The use of robust empirical testing have been done. In 2010, there was identification of overconfidence bias (Adhikari, 2010). But the study by Dangol and Manandharin (2020) finds there no effect in trading by overconfidence bias. Thus, there is need of econometric evidence of overconfidence. Sampling procedure and other decisions in survey would have a fallible tendency to generalize findings for the whole population under study.

In Nepal, the use of survey data have been analyzed in robust regression based models, like in Shrestha (2019). There have been descriptive researches also in Nepalese context like Adhikari (2010) and Awale and et. al. (2018). Other studies have also provided productive insights as samples were collected through varied parts of Nepalese stock market like retail investors, brokers and executives related financial markets like in (Thapa, 2014 and Adhikari 2010).

In view of a researcher, at this point of time where the concept market is being globalized through online trading, a wider view of overconfidence bias should be judged. It is experienced that in studies testing other biases like Disposition effect, studies employ data on individual investor transactions in specific stocks. In contrast, overconfidence is related to stock market in general. Thus, to get the general overview of overconfidence all market participants' collective view about all stocks should be taken into consideration. The best measure should be using index level and corresponding volume. In international level, the researchers have been balanced with methodology of empirical investigation along with survey methodology leading to statistical analysis. With this background some research problems are put forth as questions

1. Apart from the mixed findings of previous researches, do NEPSE participants have overconfidence bias?

2. Can previous studies' findings done through survey be complemented by findings through direct econometric method (relating volume and returns)?

3. As a statement, under the econometric analysis, would relationship of Volume, Volatility and Returns bring effective results in finding overconfidence bias in developing market like of Nepal?

4. Can estimating the relationship of volume and return on daily time intervals have fruitful result?

2. Literature Review

Study of Overconfidence on the Side of Financial Markets

As stated, the prime focus of our study is Overconfidence Bias. We are primarily concerned about the overconfidence bias of the investors. Thus, we look at the collected research from overconfidence bias point of view. From a theoretical point of view, it was experienced that overconfidence bias is present in the market which could be experienced from trading volume and return.

Daniel K. et. al. (1998) found investor overconfidence is caused by biased self-attribution of outcomes. The idea implies that overconfident investors overreact to private information and underreact to public information signals. The study finds positive autocorrelations of returns are sign of increasing overconfidence in the market.

The study by Odean (1998), was done on traders, insiders and market makers. He discussed that overconfidence increases expected trading volume, increases market depth, and also decreases expected utility of overconfident traders. The finding also advocates price quality and volatility as conditional to level of confidence of each group of study. Similarly, Odean (1999) stated the excessive volume traded in the market would decrease in the returns of the market. He found overconfidence as the reason for investor excessive trading. Moreover, the study further showed that investors are so attracted to trade even when gains through trading are not enough break even the cost of portfolio.

Barber and Odean (1999) explained and carried out study to find overconfidence and disposition bias in stock market. The overconfidence was related to excessive trading and holding loosing stock and selling winning stocks was related to disposition effect. The paper found that being overconfident makes an investor to trade more and a general human tendency to avoid regret and mistake makes investor to sell winning stock sooner than selling loss making stocks. To test the overconfidence in markets, it is determined whether the stocks bought by the investors were been able to sell in break even or not? The study found that there was existence of overconfidence as investors were not able to take up profits from the trades. Similarly, Barber and Odean (2001) had given hint about gender issues in being overconfident. The study found overconfidence in various forms and made assumptions about the trading behavior of men and women. The study depicts that men trade 45 percent more than women. Trading reduces men's net returns by 2.65 percentage points a year when compared to 1.72 percentage points for women. The study finds aspects of overconfidence like illusion of control, illusion of knowledge, self-attribution to be present influencing trading activity of people.

Gervais and Odean (2001) found traders not having confident about the success at the early stage of career. When past successes affects the person, he or she becomes overconfident. The study predicts that overconfident traders increase volume and volatility which ultimately gives less profit, making higher

trading correlate to lower profits. The study finds self-attribution as a major cause of overconfidence. Self-attribution evolves from past success. As with age and being less energetic, traders are patient enough to trade with better logic.

Statman et. al. (2006) estimated relationship between volume and returns for modelling overconfidence. The study used autoregressive measures and associated impulse response functions to find present volume is positively related to lagged returns for months. The study found that share turnover is positively related to lagged returns for many months. The relationship holds for both market-wide and individual security volume. This confirms existence of overconfidence bias and disposition effect.

Pompian (2008) described overestimation of returns, self-attribution, underestimation of loss, excessive trading, having undiversified portfolio as the major traits of overconfident investor.

The following studies have been much influenced by methodology of Statman et. al (2006). Its applications have been used in finding effect on volume due to lag returns and testing overconfidence hypothesis in different market setups like developed and emergent market.

Chuang and Lee (2005) studied the overconfidence hypothesis by implying testable implications. The study made analysis of overconfidence about relating to private and public information, aggressive trading in subsequent period, excessive volatility. Also, relating overconfidence with trading risker securities. The study found overconfident investors overreact to private information, trade excessively, creates volatility, and underestimate risk leading to be in riskier securities.

Glaser and Weber (2007) explained various facets of overconfidence bias. They measure miscalibration, volatility estimates and better than average effect. Through the measurement of trading pattern of 215 traders. It was found that traders trade more because the notion that they have better skills and past information. They also found the miscalibration questions are not related to trading volume, meaning one of the dimension of overconfidence: miscalibration cannot be found by modelling trading volume. The study further suggests empirical method of testing behavioral phenomena is needed on time to time basis for validation of theory.

The study by Griffin and et.al. (2007) was done for 46 countries and found interesting results for developing and emerging countries. The relationship of market turnover (proxy for liquidity) and returns were stronger in developing countries rather than developing countries. The relationship of volume following returns was seen diminished for developed countries. The return volume was described strongest in developing nations having high volatility, short sale constraints and low correlation to world market.

Salma and Ezzeddine (2008) tested Tunisian market in terms of relationship of Volume, Returns and Volatility. The test used monthly volume (traded Shares), returns, month wise cross sectional Dispersion of securities, monthly temporal volatility from 2000 to 2006. VAR results showed only 5th month lagged value being significantly related to present volume. Authors describe the findings having little evidence of overconfidence. The study proposes test of daily data intervals which is one of the focus of present study. Salma in 2013 found strong presence of overconfidence bias in Chinese market. Also, study finds no disposition hypothesis in individual stocks of the market.

Glaser and Weber (2009) studied 3,000 individual investors over a 51 month period to test the link between past returns and volume through linear panel regressions, negative binomial panel regressions, Tobit panel regressions. They found that both past market returns as well as past portfolio returns affect trading activity of individual investors namely measured by stock portfolio turnover, the number of stock transactions, and the propensity to trade stocks.

Siwar (2011) found presence of overconfidence bias in French stock market during the period of 1988 to 2004. The study found evidence of overconfidence bias in the market by using VAR methodology and impulse response. The study used T-GARCH model to identify the effect of asymmetry in the process of volatility, decisively stating that past losses increase the volatility which is more in terms of magnitude than decrease in volatility due to positive past returns. The study further found that bullish market reduces volatility but increase of volume.

The following studies have been dedicated to find evidence of overconfidence bias and also the determinant of overconfidence bias on different market.

Mishra and Metilda (2015) strived to find relationship between experience, gender, and level of education on confidence level. The paper showed that overconfidence is higher among Male than Female. It is a general convention that with experience and previous mistake, at present overconfident investor would lose overconfidence and become more diligent about trading but same was not confirmed by the study.

Jaiyeoba and Haron (2016) looked upon the Malaysian market. The main purpose was to examine the investment decision behavior of retail investors in Malaysia. The study was based on structured questionnaire. The paper findings found that people are relying on their heuristics rather than fundamental analysis. With more experience they tend to be more reliant on fundamental data and churn out investment decisions from them.

Prosad et al. (2017) found presence of overconfidence and disposition effect in Indian stock market. The study was done on NSE Nifty 50 from year 2006 to 2013 using VAR Methodology and Impulse Response Function (IRF) to find empirical evidence of relationship between Volume and lagged Returns. This article is one of the few to expose the use of empirical evidence on issues of behavioral sciences.

Mushinda and Veluri (2018) tested evidence of Overconfidence Bias. The study was done at Bombay Stock Exchange. The results conveyed that overconfident investors overreact to private information and underreact to the public information. The study used EGARCH Specifications stating self-attribution bias could increase investors over confidence. Moreover the study finds positive relationship between return volatility and trading volume.

The study by Baker and et.al. (2018) was done in India to find link between financial literacy and demographic variables along with behavioral biases. The results showed the presence of different behavioral biases including overconfidence, self-attribution, disposition effect, anchoring bias, representativeness, mental accounting, emotional biases and herding among Indian investors. The results also show no significant relation between financial literacy and overconfidence biases.

Kansal and Singh (2018) conducted an exploratory analysis on finding the determinants of overconfidence bias among Indian investors. The study identified four constituents of over confidence considered for the study. The study identified "better than average", "planning fallacy", "self attribution"

and "positive illusion "as aspects of overconfidence. The study found that high income earning, less experienced, investors like to trade in bulk, investors trading in sophisticated/ large cap stocks show aspects of overconfident behavior.

Metawa, Hassan and Metawa (2018) found relationship between investors' demographic characteristics and their investment decisions. The study was based on structured questionnaire survey variedly responded by locals, internationals, institutional and individuals. The paper used partial multiple regression method to analyses the effect of demographic parameters to investment behavior. The study conveyed age, gender, level of education, have significant impact on investment decisions. The study also coveys more experienced the investor more the investor overlooks the biases. Similarly Boutseka and Regaieg (2018) investigated the effect of two behavioral biases: loss aversion and overconfidence on US equities. The study found overconfidence has positive impact on market performance of industrial firms. The same relationship is opposite in terms of service oriented firms.

Rasool and Ullah (2019) studied the relationship between financial literacy and behavioral biases in Pakistan. The study finds there is negative relationship between financial literacy and behavioral biases of individual investors. The study obtained 300 observations through questionnaires from individual investors. The testing was done through Pearson Chi-square and ordinal regression.

Jaiyeoba, Abdullah and Ibrahim (2020) studied the difference in investing behavior between the investor divides. There are retail and institutional investors. The study devised reveals that both of these investors are similar with respect to showing representative heuristic, overconfidence bias and anchoring bias, but different in terms of religious bias and herding bias. The study conveys that even institutional investors are not free form the different biases. The paper used second order measurement invariance analysis to find both retail and institutional investors behave more or less in the same way.

Mushinda (2020) found change in confidence level of investor's pre and post market crash. The study concludes that market over-reacts to private information and under-react to public information during pre-crisis times. When crisis hits market the same behavior is changed. Investors actually under act to both type of information. The study states that over confidence bias can be a dynamic phenomenon.

Nepalese Context

There have been better amount of research on overconfidence biases in Nepal.

Adhikari (2010) tested the existence of behavioral biases: herding, heuristics and overconfidence bias. The paper found all the biases were influencing the investor behavior. The study was simple in terms of measuring the overconfidence. The investors found to have "above than average knowledge". Also the overconfidence was a version of "illusion of Knowledge". The study further deep dived to find gender based confidence level. The study found male are more confident than men. Unrealistic optimism was experienced when male and female showed Index would rise and each shares would appreciate in value. The positivity of people's attitude make investors to have confirmation bias and tend not to analyze the unfavorable impact.

Thapa (2014) found that increase in personal size of portfolio of investors makes them to lose much of their confidence. Professional experience makes the individual to take more risk. The type of questions asked related to overconfidence were related to "better than others attitude", Illusion of control, "Illusion

of knowledge and data". The regression model which modelled Overconfidence bias is a fit giving fruitful result. The study found that overconfidence has positive impact on trading frequency. The study further deep dives into behavior of different professions. Executives and brokers are found to have different attitude on confidence of investors.

Shrestha (2019) made contribution by the use of descriptive statistics and found that mostly investors who are having a good capital cushion (net worth) are confident on their trading decision. They have problem of miscalibration and 'better than others" fallacy. The research has given gender room for being overconfident. The study woman who are highly educated have fallacy of being overconfident. Further showed that Awale and et.al. (2018) randomly studied 60 investors and found Disposition Effect, overconfidence Bias and herding behavior circulated. The study found large proportion of investors, majority having disposition effect and herding behavior. The study showed only 34 percent showing overconfidence bias.

Dangol and Manandhar (2020) assesed the heuristics or short cut investors take. The result indicated significant relationship between irrationality in decision making and all heuristic biases: representativeness, availability, anchoring and adjustment, and overconfidence. The study further finds that locus of control does not play a moderating role for relating investment decision with overconfidence bias. This implies that though investors are overconfident, investors are not so confident enough to trade in market with their gut belief as they would feel external environment is not stable enough.

Karki and Kafle (2020) performed ordinal regression on dependent variable risk tolerance with independent variables like education, gender, financial literacy, experience, loss and leverage taken for trade. Nepalese traders have been much affected by financial literacy, prior experience of loss or profit, and scenario of financial leverage (margin trading). The study in any sense does not address the overconfidence in Nepalese market.

3. Methodology

This section describes the methodology followed to test the overconfidence bias in Nepalese Stock Market. The following subtopics are discussed in this section.

3.1 Type of Data

The Study have used Time series data. NEPSE Closing Index, trading volume (Turnover) and volatility measure is taken into consideration. The interval of data is daily. We estimate daily volatility using Garman-Klass-Yang-Zhang (GKYZ) Historical Volatility. This estimation is used widely as three dimension of volatility is taken into consideration and it is improvement of Garman-klass volatility. The GKYZ volatility has volatility dimension of days open and close price, intraday high and low price, previous day's close price and present day's open price. The whole data is taken from NEPSE Daily prices form 1st January, 2017 to 1stOctober, 2020 which comprises 840 data points.

3.2 Variable Specification
The variables in the study have been specified in the following form:

Index Returns: The study considered changes in index. Index change is calculated using the natural log of the ratio of NEPSE index (I) from the current data point (t) to the previous data point (t-1) as:

Rt = Index returns = ln(I_t) – ln(I_{t-1}),

Where, I_t represents the closing price index for the period t; t is the time in months. $I_{t-1}$is the closing price index for the period of **t-1**.

Market Trading Volume: This study uses Turnover as an effective measure of both number of shares traded and price paid for it. "**Vt**" is used as volume for particular day. Natural Logarithm of the Vt is taken further for the study.

Ln (V_t) = Natural Logarithm of daily turnover

Historical Market Volatility: In the VAR setup, relationship of volatility with Return and Volume is depicted in contemporaneous form. Historical Volatility is taken as exogenous variable. The present study uses **Garman-Klass-Yhang-Zhang** measure of historical volatility in daily terms. The **GKYZ Volatility** measure is stated as:

Volt(σ) =√ S [(ln oi/ct-1)2 + ½ (ln Hi/Li) 2– (2ln2-1) (ln ci/oi) 2]…………………………. (1)

Oi = Opening index level of the day

C_{t-1} = Previous day closing index level

Hi = Highest point of the index level on the day

L_i = lowest point of the index level on the day

C_i = Closing of the index level on the day

After calculation of each day's volatility, natural logarithm of volatility is taken for VAR Estimation as *Ln (Vol$_t$)*

3.3 Methodology of Analysis

The study uses Vector Auto Regression Methodology and Impulse Response Function. Following methodology of Statman and et. al. (2006) for overconfidence bias, a Market Wide VAR is introduced is introduced in the study. The model is as follows:

Ln (Vt) =α + $\sum_{j=1}^{K} \beta j$ Ln (Vt − j) + $\sum_{j=1}^{K} \gamma j$ Rt − j + $\vartheta Ln(Volt) + \varepsilon t$…………..... (2)

Rt = α0 + $\sum_{j=1}^{K} \beta' j$ Ln (Vt − j) + $\sum_{j=1}^{K} \gamma' j$ Rt − j + $\vartheta' Ln(Volt) + \varepsilon t'$…......… (3)

Where the two endogenous variables are Ln (Vt):log value of the turnover of the market index and Rt: daily return on the market index. Following Karpoff (1987), contemporaneous daily volatility, Ln (Vol), is included as exogenous variable. Karpoff in 1987 detected volume is positively related to the volatility and volatility per se.

Overconfidence theories do not specify an exact time frame for the relationship between trading volume and returns (Statman et al., 2006). Hence, Akaike Information Criterion (AIC) is chosen for determining the lag. The number of lags is determined to be 18.

4. Results and Discussion

Unit Root Test: At first, Augmented Dickey Fuller Test and Philips Perron Test is done for confirming of stationarity in the variables of study. The present study uses Augmented Dickey fuller Test and Phillips Perron Test.

The results are given below:

Table 1: Unit Root Test of Ln (Vt)

Particulars	Augmented Dickey Fuller Test		Philips Perron Test	
	T-statistic	Probability	T-Statistic	Probability
Constant at levels	-4.427405	0.0000***	-8.569497	0.0000***
Linear Trend at Levels	-4.590126	0.0011***	-8.872074	0.0000***

Source: author's calculation through Eveiws.

Table 2: Unit Root Test of Ln (Volt)

Particulars	Augmented Dickey Fuller Test		Philips Perron Test	
	T-statistic	Probability	T-Statistic	Probability
Constant at levels	-8.456428	0.0000***	-17.04406	0.0000***
Linear Trend at Levels	-8.457084	0.0000***	-17.04488	0.0000***

Source: author's calculation through Eveiws.

Table 3: Unit Root Test of Ln (Rt)

Particulars	Augmented Dickey Fuller Test		Philips Perron Test	
	T-statistic	Probability	T-Statistic	Probability
Constant at levels	-25.27193	0.0000***	-25.51191	0.0000***
Linear Trend at Levels	-25.30249	0.0000***	-25.46655	0.0000***

Source: author's calculation through Eveiws.

The tables are the results of unit root test of 3 time series data. The p-value of all three time series are below 1% threshold for both test to reject null hypothesis of presence of unit root. So, all the data set are stationary. This allows the time series data to be modelled in auto regressive form.

VAR Methodology: Volume with lagged relationship of Returns

The following tables, Table 4(a) and Table 4(b) represents the VAR of Volume & Returns and relationship of Volume with Volatility respectively.

Table 4(A): Relationship between Volume and Market Return Lags Using VAR

Table 4(a). VAR Model									
Dependent Variable : LnVt									
LnReturn	**Co-efficient**	**S. Error**	**T-Statistics**	**Prob. Value**	**LnVt**	**Co-efficient**	**S. Error**	**T-Statistics**	**Prob. Value**
LnReturn(-1)	7.7301	1.0058	7.6857	0.0000***	LnVt(-1)	0.4579	0.0354	12.9252	0.0000***
LnReturn(-2)	0.6241	1.0449	0.5973	0.5504	LnVt(-2)	0.1082	0.0389	2.7804	0.0055***
LnReturn(-3)	-0.3669	1.0455	-0.3509	0.7256	LnVt(-3)	-0.0234	0.0388	-0.6038	0.5460
LnReturn(-4)	4.3404	1.0428	4.1623	0.0000***	LnVt(-4)	0.1016	0.0385	2.6399	0.0084***
LnReturn(-5)	1.2640	1.0563	1.1965	0.2317	LnVt(-5)	-0.0403	0.0382	-1.0546	0.2914
LnReturn(-6)	1.4652	1.0486	1.3972	0.1625	LnVt(-6)	0.0492	0.0381	1.2901	0.1972
LnReturn(-7)	3.1595	1.0469	3.0179	0.0026***	LnVt(-7)	-0.0261	0.0381	-0.6858	0.4929
LnReturn(-8)	2.2997	1.0495	2.1911	0.0286**	LnVt(-8)	0.0528	0.0383	1.3806	0.1676
LnReturn(-9)	-1.6136	1.0489	-1.5384	0.1242	LnVt(-9)	0.0219	0.0377	0.5821	0.5606
LnReturn(-10)	7.3279	1.0506	6.9743	0.0000***	LnVt(-10)	-0.0124	0.0374	-0.3329	0.7392
LnReturn(-11)	1.3794	1.0800	1.2768	0.2018	LnVt(-11)	0.0131	0.0375	0.3493	0.7269
LnReturn(-12)	1.3631	1.0749	1.2681	0.2049	LnVt(-12)	0.0679	0.0374	1.8145	0.0698*
LnReturn(-13)	-0.2210	1.0696	-0.2066	0.8363	LnVt(-13)	-0.0376	0.0375	-1.0029	0.3160
LnReturn(-14)	4.9085	1.0656	4.606	0.0000***	LnVt(-14)	-0.0100	0.0375	-0.2683	0.7885
LnReturn(-15)	-1.1046	1.0777	-1.0249	0.3056	LnVt(-15)	0.1759	0.0374	4.6979	0.0000***
LnReturn(-16)	-3.4214	1.068	-3.2035	0.0014***	LnVt(-16)	-0.1086	0.0378	-2.8551	0.0044***
LnReturn(-17)	0.1756	1.0566	0.1661	0.868	LnVt(-17)	0.0791	0.0377	2.0776	0.0379**
LnReturn(-18)	-1.9785	1.0345	-1.9125	0.056**	LnVt(-18)	-0.0333	0.0332	-1.0048	0.3151
R-Squared									0.815807
Adjusted R-Squared									0.807103

*, ** and *** signifies stationarity at 10%, 5% and 1% respectively. Source: author's calculation through Eveiws.*

The VAR expression of lagged returns and volume results that out of 18 coefficients, 6 coefficients are significant at 1% threshold and 1 coefficient is significant at 5% threshold. Among significant coefficient, all the coefficient are positive except the last coefficient which is at 16th lag. The presence of positive significant coefficient states that increase in previous return in past increases the volume at present. Moreover, significant coefficients are very strong. These significant coefficients also present along the lags from lags 1 to 16. Significant Coefficients are not concentrated and are present among all lags evenly. Positive relationship between volume and lag of market return is taken as evidence of overconfidence bias in the market (Geravis and Odean, 2001; Statman et. al. 2006).

The VAR expression of lagged Volume has significant positive relationship to Volume. Among significant coefficients, relationship is positive for 1st, 2nd, 4th, 12th, 15th and 17th lag. There is only one negative coefficient at 16th lag which is significant at 1% threshold. This provides evidence that past trading activity positively influences the present trading activity which states that investors are buying stocks based on previous increase of volume.

VAR methodology hints about presence of overconfidence as in past increase in returns motivates the old investors to buy further at increasing price. And new investors come to market to exploit past price increases though having no surety of profit booking in coming days.

Table 4 (B): Contemporaneous relationship of LN (V_t) and LN (Vol_t)

Table 4 (b). Relationship of LN(Vt) and Ln (Volt)			
Dependent Variable: Ln (Vt)			
	Coefficient	S. Error	T-Statistics	Prob. Value
Ln (Volt)	0.204829	0.0227	9.013854	0.0000

The table signifies that there is positive relationship between turnover and volatility on daily basis. Investors trade more when there is volatility. A general, belief in the market is that there is volatility in the market, people tend to be in a wait and watch position but if overconfidence has bigger role then people enjoy volatility which does not guarantee profits. This relationship supports the overconfidence biasedness.

VAR Methodology: Returns with lagged relationship of Volume

Table 5: Relationship between Return and Volume Lags Using VAR

Table 5(a). VAR Model									
Dependent Variable: LnReturn									
LnVt	Co-efficient	S. Error	T-Statistics	Prob. Value	LnReturn	Co-efficient	S. Error	T-Statistics	Prob. Value
LnVt(-1)	0.0025	0.0013	1.9858	0.0472**	LnReturn(-1)	0.1359	0.0364	3.7333	0.0002
LnVt (-2)	-0.0027	0.0014	-1.926	0.0543**	LnReturn(-2)	-0.061	0.0378	-1.6148	0.1065
LnVt (-3)	-0.0028	0.0014	-2.0427	0.0412**	LnReturn(-3)	0.0564	0.0378	1.4907	0.1362
LnVt (-4)	0.0033	0.0014	2.3694	0.0179**	LnReturn(-4)	0.0961	0.0377	2.5478	0.0109
LnVt (-5)	-0.001	0.0014	-0.7497	0.4535	LnReturn(-5)	0.0176	0.0382	0.4601	0.6454
LnVt (-6)	0.0019	0.0014	1.39	0.1647	LnReturn(-6)	-0.0125	0.0379	-0.3302	0.7412
LnVt (-7)	-0.0024	0.0014	-1.7529	0.0798*	LnReturn(-7)	-0.0042	0.0379	-0.111	0.9116
LnVt (-8)	0.0011	0.0014	0.8351	0.4038	LnReturn(-8)	0.041	0.0379	1.0801	0.2803
LnVt (-9)	-0.0022	0.0014	-1.6628	0.0965*	LnReturn(-9)	0.0604	0.0379	1.592387	0.1115
LnVt (-10)	0.0026	0.0014	1.9256	0.0543*	LnReturn(-10)	-0.0385	0.038	-1.01471	0.3105
LnVt (-11)	-0.0005	0.0014	-0.3876	0.6983	LnReturn(-11)	0.0595	0.0391	1.52222	0.1281
LnVt (-12)	-0.0013	0.0014	1.0176	0.309	LnReturn(-12)	0.0043	0.0389	0.1116	0.9111
LnVt (-13)	-0.0013	0.0014	-1.0254	0.3053	LnReturn(-13)	-0.0596	0.0387	-1.5416	0.1234
LnVt (-14)	-0.0007	0.0014	0.5165	0.6055	LnReturn(-14)	-0.0016	0.0385	-0.0439	0.9649
LnVt (-15)	-0.0036	0.0014	-2.7201	0.0066***	LnReturn(-15)	-0.0367	0.039	-0.941	0.3468
LnVt (-16)	0.0006	0.0014	0.483	0.6291	LnReturn(-16)	0.0078	0.0386	0.2018	0.8401
LnVt (-17)	0.0007	0.0014	0.517	0.6052	LnReturn(-17)	-0.0523	0.0382	-1.3687	0.1713
LnVt (-18)	0.0018	0.0012	1.5329	0.1255	LnReturn(-18)	0.0143	0.0374	0.3834	0.7014
R-Squared									0.10518
Adjusted R-Squared									0.0629

*, ** and *** signifies stationarity at 10%, 5% and 1% respectively. Source: author's calculation through Eveiws.

Table 5 (B): Contemporaneous relationship of Rt and LN (Vol$_t$)

Table 5 (b). Relationship of Rt and Ln (Volt)			
Dependent Variable: Rt			
Ln (Volt)	Coefficient	S. Error	T-Statistics	Prob. Value
	7.7300	1.0057	7.6856	0.3093

Table 5(A) states weak relationship between return and lagged values of volume. The R squared is 10% (approx.). Out of 18 lagged coefficients,10 coefficients have negative sign but among them only 5 are significant at 1% or 5%. The other remaining 8 coefficients are positive but among them 3 are significant.

Table 5 (B) states insignificant relationship between Return and Volatility. The coefficient is positive and strong but probability value is above threshold of 10%. This states that volatility provides positive return but not in significant fashion.

Market Impulse Response Functions

Impulse Response Function uses all the VAR coefficient estimates to trace the impact of residual shock that is one standard deviation from zero. Through shock of the market return residual by one sample standard deviation and by tracking how the trading volume responds over time, there could be deeper study of overconfidence bias in Nepalese Equity Market.

Figure A: Response of Volume Traded to Return Due to One Standard Deviation of Change in Volume
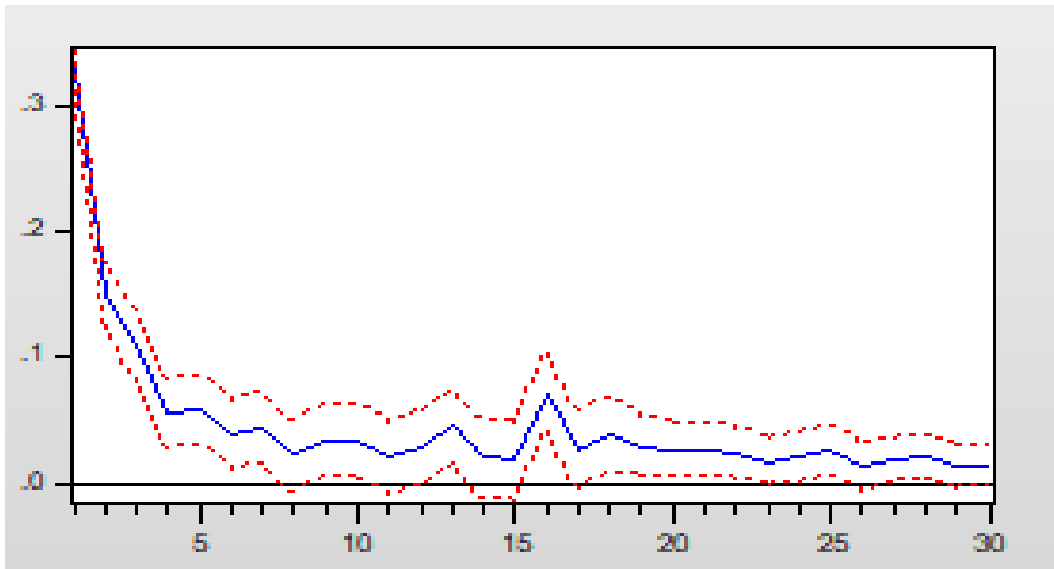
Figure B: Response of Volume Traded, Ln (V$_t$) to Return Due to one Standard Deviation of Change in Return, R$_t$
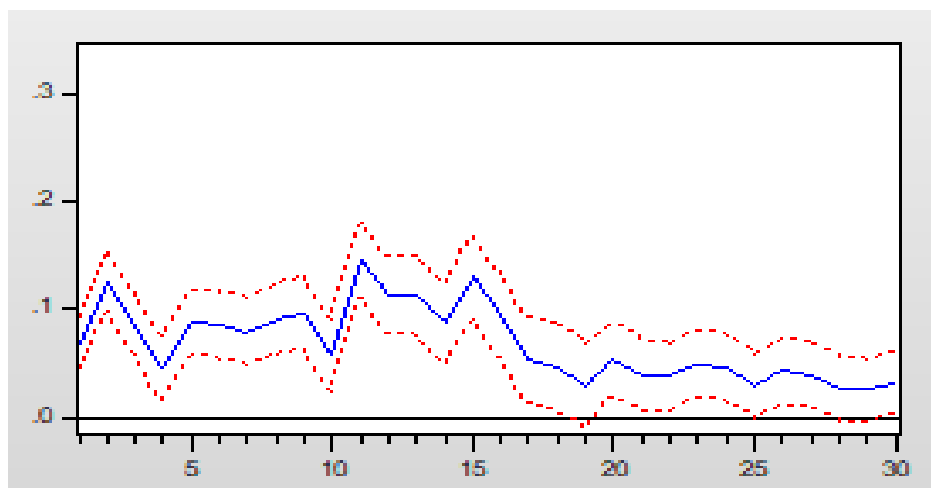

Figure (A) and (B) represents response of volume to a one standard deviation shock in volume and Return respectively along with +-2 S.E band.

Figure (A), shows that there is positive response of volume traded to change in volume. The change in volume through change in volume itself ranged from 1 percent on 30th day to 31 % on 1st day. There is gradual decrease in the effect as the days passes by. The effect of its own lag same on 1stday is 31 percent. After the first day, steep decrease is experienced. In this course, at 15th day, the change in volume with effect of 1 unit change in S.D of Volume is 2%. Again a spurt is experienced at 16th day of 7%. At 30th day, the change in volume with effect of 1 unit change in S.D of volume is 1%. The figure shows that increased trading volume is also positively related to the previous days increase in trade, consistent with the overconfident investor behavior.

Figure (B), shows that there is a positive response of volume traded to change in return. The change in volume through change in return ranged from 3 % on 30th day to 7 % on 1st day and reached a peak value of more than 14 % for one standard deviation shock to market return during the 11th day. After the 11th day, the effect of response of volume to one unit change in S.D of Return declined over the days. The figure shows increased trading consequent to increase in return. These figures support the belief that, change in volume and return would enhance trading activity.

5. Conclusion

The overall findings indicates that there is presence of overconfidence in Nepalese stocks market. The statistically significant positive coefficients of VAR process between volume and lagged return coefficients indicate the presence of overconfidence bias in Nepalese equity market. VAR relationship of Volume with lagged volume show increased volume due to previous increase in volume. These are sign of over confidence. There is contemporaneous positive relationship between Volume and volatility. This coveys Volatility makes people to trade more. Impulse Response of Volume to change in Return is stable

providing notable positive change in volume due to change in one unit standard deviation shock in market return.

Thus study find effect of overconfidence in Nepalese Equity Market. Using VAR and IRF, overconfidence bias is found in daily trading activity. We find the positive effect of volume by past returns for 30 days (at least) through IRF. The results are similar to findings of Awaleet. al (2018) and Adhikari (2010). The study also compliments findings of Dangol and Manadhar (2020).

A certain gain in market by investors create positive feedback which makes them to buy the stocks or asset more. The gain is due to sentiments of people for future market scenario. If these sentiments are based on good market fundamentals and there is surety of improvement, investors tend to bid up the prices. But as per Robert Shiller, there can be creation of loop, called positive feedback loop. It occurs as investor confidence grows, successful investors bid up stock prices further which attracts new investors in market which increases trading volume. The end result is a loop in which past returns generate expectations of future returns and investors are drawn in to the market with high volume because of the success of current investors rather than by market fundamentals.

So, the logic of confidence is to be judged at first place. According to Robert Shiller, if the confidence is not material and rests upon investors' over optimism and thinking stock market as safe and lucrative investment avenue, then further price increases is attributed to the loop: past prices are increasing current prices (Shiller, 2000). This is a dangerous facet of overconfidence. This study showed overconfidence by using the methodology of relating volume and Returns. Thus, now regulators should need to be concerned about overheating of market with respect to increasing returns. As Glaser and Weber (2010) suggested that this counter attack on behavioral biases or 'debiasing' can be made with the help of behavioral training and increasing financial literacy, educating and informing traders about overconfidence is necessary. This study further proves that usefulness of relating volume and returns of nascent market like of Nepal so that further study and researches could be done. Such knowledge can help the investors in developing strategies and taking appropriate measures.

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