

The Effect of Stock Return Sequences on Trading Volumes: The Case of Nifty 50 index

Avani Malani
Dr. Manu K S

ABSTRACT

The study focuses on how the stock trading volume can be effected using gamblers fallacy. In the following study it is assumed that if price of a stock keeps on rising for numerous successive trading days then, according to the gamblers fallacy the investors will expect the stock prices to subsequently fall and vice versa. Therefore, the investor's wish to sell the stock increases, which results in a conflict between the investors and a greater trading volume on day one when the stock prices falls. The data sample consists of nifty 50 daily closing prices and the corresponding trading volume for 5 years starting from 2nd September 2013 to 31st August 2018. The study shows that after a long sequence of the stock returns with the same sign, the day on which the sign is changed, the selling and buying activity in that particular stocks is exceptionally high. Furthermore, the average abnormal trading volumes constantly increases along the length of the preceding return sequence.

Keywords: stock return sequences, trading volume, stock prices, gambler fallacy.

1. INTRODUCTION

In a series of financial literature, ample amount of attention has been given to analyse the relationship between volatility, return and trading volume. One of the major factors that has been identified in the earlier research is that there is an irrevocable relationship between the stock prices and the trading volume. The following study shreds a light on the effect of the gambler's fallacy as a behavioural factor on the trading volume. The gambler's fallacy is one of the oldest recognized psychological prejudices and believes that there is a negative autocorrelation of variables that are actually non auto correlated. According to the gambler's fallacy a person would be certain that after four black numbers comping up on the roulette wheel, the fourth number would most likely be a red one. In reference to this, if a stock's price keeps on falling for a number of uninterrupted trading days, then some investors may believe that the price of the stock has to consequently grow, and therefore, rise their eagerness to purchase the stocks. Therefore, the stocks with the larger sequence of similar sign stock returns will have a higher trading activity on the day on which the stock return's sign is inverted. Further, like in a casino the individuals would bet on a black number on the wheel after consecutively showing of numbers which are red, in the same way in the financial market the trading volume of the stock is likely to be increased when the sign of the stock return is changed following a series of the days when the returns of the stock are positive. The sequence of returns analyses the series in which the returns on investment occur.

The research hypothesis is proved using the daily prices, stock returns and the trading volume for the Nifty 50 index for 5 years starting from 2013 to 2015. While a considerable amount of pragmatic evidence on volatility and volume relationship, daily returns and price and volume relationship hypothesis exist for many developed countries but very few studies have been published from the Indian Stock markets.

Gambler's Fallacy

The gambler's Fallacy occurs when an individual ineffectively believe that a certain event is less or more likely to occur, provided a series of event has already occurred. This concept can be applied towards investing as some investors would sell their shares off after the price has is increasing continuously for a long period of days and the investors feel that the prices would come down now.

In whole, the gambler's fallacy is recognised in theory as well as the practical world. Though, there is slight proof of this behavioral pattern in financial sector.

2. LITERATURE REVIEW

The research on stock markets has mostly focused on prediction of asset prices, while there is very less attention emphasized on the trading activities. As the trading activity in stock markets acts as an significant feature of the financial market and is continuously increasing and therefore requires a separate examination.

The previous studies provide a number of factors that influence the trading activity. Volume is a useful tool in detecting how the new information would be affecting the stock markets, noted by Beaver (1968). He concluded that information is described as anything that motivates investors to act, irrespective of the information having an influence on the underlying valuation of the company. The investors may also trade to balance their portfolios which enhances liquidity trading, therefore not based on information. As anticipated by a various hypothetical theories ((De Long, 1990) 1990; Hong and Stein 1999; Hirshleifer et al. 1994, 2006) the past returns would be a function of the liquidity trading. Chordia et al. (2007) analyses that the fungibility of trading is related to stock visibility which can be determined through the firm size, age, and the price, the need for rebalancing the portfolio, the difference in the opinion and the ambiguity about the fundamental values.

The stock trading volume are linked to certain stock return designs, such as positive, constant and negative. In the study by, Jegadeesh and Titman (1993) they provide a proof that the price force exists, by suggesting that the tactics of trading would involve buying stocks that have a historical good performance and selling the stocks that have not done well previously. These create positive returns over three to twelve months periods. These continuous patterns of the price of stock are still criticized as unusual and present a difficult encounter for the research scolars. Lee and Swaminathan (2000) dispute that the previous trading volumes provide a relationship between the momentum and value plans. They conclude that the companies with high previous turnover ratios show many importance features, get lesser future returns consecutively and do not have positive profits over the coming years. The increase in prices leads

to a converse over the coming years and greater volume traders face faster setbacks. This concludes that the previous trading volume will act as a forecaster for the scale and the perseverance of price motion.

The trading volume of the stock is linked to the stock prices and its returns. (Westerfield 1977; Schwert 1989; Rutledge 1984; Karpoff 1987; Gallant et al. 1992; Ying 1966) studied on the price volume relationship and said that there exists a positive relationship the daily price changes value and the daily volume values for the individual stocks and the market indices. Further, Epps (1975, 1977) concludes that in the stock as well as the markets of the bond, the proportion of the volume to change in price is greater for dealings when the price of the security rises rather than when it is falling. (Crouch 1970; Epps and Epps 1976; Harris 1983), also suggest optimistic association between the changes in the price and the simultaneous variations in the volume.

The recent studies have been focusing on the relationship of the returns of the stock and volumes of trade of the stock for different kinds of time period. (Chen et al. 2001; Khan and Rizwan 2008; Lee and Rui 2002) and have introduced certain surplus variables to their study. Saatcccioglu and Starks (1998), found out that capacity effects the stock prices to change. Gervais et al. (2001) uses the transaction action in reference to the data it comprises of the forthcoming values and discover that the stocks whose trading size is generally high over a time interval varying from one day to seven days, subsequently have high returns over the following months.

In recent years the financial literature is taking into account the behavioural factors that potentially affect the trading volume. Barber and Odean (2008) advise that the stocks which receive higher attention in terms of their presence in the news, extreme returns and higher trading volumes; the investors of these stocks are buyers and the specialized investors are sellers.

In this study, an effort is made to test the impact of the gamblers fallacy on stock trading volumes.

3. OBJECTIVES OF THE STUDY

As stated in the above sections, there is an important relationship between the prices of stocks and return on one side and, stock prices and stock trading volume on the other side. This study analyses an additional angle to this relationship with these mutually dependent variables. In addition to the stock returns and the stock trading volume, there is a third variable added to the study which is the stock return sequence. It can be seen how the stock return sequence would affect the trading volume in the stock market in India. This theory is tested using the gambler's fallacy.

In this study we can observe that if a price of the stock keeps on increasing for numerous continuous days, then the theory would lead some of the psychologically inclined investors to think that the stock's price will successively decline, leading them to sell their stocks creating selling pressure.

Therefore, the objectives of the study are:

- To analyse the relationship between the 4 days and the 6 days of consecutive sequence of positive and negative stock returns of Nifty 50 followed by a negative or a positive stock return.

- To analyse the relationship between the 4 days and the 6 days of consecutive positive and negative stock returns of Nifty 50 followed by the corresponding abnormal trading volume.

Therefore, the aim of the study is to find out the impact of the stock return sequence on the trading volumes using the Gambler's fallacy theory.

Hypothesis:

H₀₁: There is no significant difference in mean 4 days and 6 days of consecutive positive stock returns followed by a negative stock return series of Nifty 50.

H₀₂: There is no significant difference in mean 4 days and 6 days of consecutive negative stock returns followed by a positive stock return series of Nifty 50.

H₀₃ : There is no significant difference in mean 4 days and 6 days consecutive positive abnormal returns followed by corresponding abnormal trading volume.

H₀₄: There is no significant difference in mean 4 days and 6 days consecutive negative abnormal returns followed by corresponding abnormal trading volume.

4. METHODOLOGY

A. Data:

The collected data consists of the daily closing prices and the trading volume for the Nifty 50 index as of 31.08.2018.

B. Source of Data:

The data that is selected is the Nifty 50 prices and the source from which the data is collected is the official National Stock Exchange website.

C. Period of Study:

The period of the study is for 5 years starting from 02nd September 2013 31st August 2018, where the closing prices and the trading volume has been collected for all the 5 years.

D. Statistical Tools for analysis of data:

The models used for analysis is the independent T statistics test and the regression analysis.

a. Independent t statistics

The independent t statistics test is used to analyse the data. The two unrelated groups would consist of the 4 days and the 6 days sequence of positive and negative stock returns for the first two hypothesis and for

the third and the fourth hypothesis the unrelated groups would consist of the trading volumes corresponding to the stock returns.

To do this, a significance level (also called alpha) needs to be set that permits us to reject or accept the other hypothesis. The value provided is 0.05.

E. Analytical tools, data analysis and interpretation:

The daily returns of the market index is calculated for each trading day. Further, for the stock the abnormal trading volume is normalised in the time series using the below formula:

$$ABVOL_{it} = \frac{Vol_{it} - Avol_i}{STDVol_{it}}$$

Where: $ABVOL_{it}$ is the Nifty 50's abnormal trading volume and Vol_{it} is the stock's exchanging volume on the t^{th} day, $Avol_i$ is the underlying assets average exchanging volume on the preceding 250 days from the day t and $STDVol_i$ is the standard deviation of the index's average volume over 250 trading days preceding day t .

Table 1: Descriptive Statistics

	Stock returns				Abnormal Trading volume			
	positive		Negative		positive		negative	
	4 day positive	6 day	4 day	6 day	4 day	6 day	4 day	6 day
Mean	2.904	3.687	2.883	5.069	0.092	0.115	0.168	0.082
Median	0.892	-0.54	0.69	1.003	0.154	0.126	0.022	0.204
Maximum	41.61	38.78	17.669	55.942	2.169	1.577	3.737	1.731
Minimum	-6.111	-9.798	-7.327	-19.047	-2.11	-1.718	-3.843	-2.127
Std. Deviation	9.446	11.04	6.931	15.418	0.872	0.596	1.393	0.813
Skewness	2.552	1.514	0.728	1.247	0.02	-0.085	0.295	-0.371
Kurtosis	10.423	4.659	2.572	5.727	0.124	2.887	4.173	2.8
Jarque-Bera	135.271	22.37	2.977	14.801	0.062	0.192	3.452	1.926
Probability	0.000	0.000	0.225	0.000	0.969	0.908	0.178	0.381

Table 1 shows the descriptive statistics which consists of the abnormal trading volume and the stock returns for the length of consecutive 6 days and 4 days for both positive and negative sequence.

In order to carry out the analyses and prove the hypothesis to be true, a simple calculation is performed to find out the abnormal trading volume for the sequence of days having the same stock returns of the similar sign, whether positive or negative. In order to test the research hypothesis, the length of the same sequence are specified: namely 4 days and 6 days (which refers to 4 days of continuous positive returns or negative returns and 6 days of either continuous positive returns or negative returns). Since the return sequence effect would occur on the days when the sign of the return is inverted, the days with zero stock returns are appended.

Therefore, in order to derive at the t values for the corresponding days, an independent t statistics test is carried out. The following table would show the results for the same.

Table 2: Independent Samples Test

Variable	Mean	t value	Probability value
4 days and 6 days of positive returns	0.086	0.39	0.698
4 days and 6 days of negative returns	-0.023	-0.207	0.837
4 days and 6 days of positive average abnormal trading	-0.804	-0.352	0.725
4 days and 6 days of negative average abnormal trading	-2.165	-0.642	0.525

The table 2 consists of the probability, t values and the mean values for both the positive and negative stock returns and the average abnormal trading volumes for consecutive 4 days and 6 days of sequence. From Table 2 we can interpret that the value of Sig. (2 tailed) for the 4 days and 6 days of positive returns is 0.698, which is greater than 0.05. Therefore, the null hypothesis will be accepted for the first hypothesis which is stated and say that the mean score between the groups is not significantly different.

For the second hypothesis we can interpret that the probability value for the 4 days and 6 days of negative returns is 0.837, which is greater 0.05, therefore we would accept the null hypothesis, which states that there is no significant difference in mean 4 days and 6 days of consecutive negative stock returns followed by a positive stock return series of Nifty 50.

Further, for the third hypothesis we can see that the probability value for 4 days and 6 days of positive average abnormal trading is 0.725, which is greater than 0.05, therefore, we would accept the null hypothesis.

For the fourth hypothesis we can see that the probability value for 4 days and 6 days of negative average abnormal trading is 0.525, which is greater than 0.05, therefore, we would accept the null hypothesis.

Table 3: Average abnormal trading volumes for series of the stock returns with same sign

A: Average Abnormal Trading Volumes for the Days with the Sequences of Positive Stock Returns		
4 days	6 days	
3.4682	3.619	
Differences on average abnormal volumes:		(3.619-3.4682)
ABVOL (6 days) - ABVOL (4 days)		0.1508
B: Average Abnormal Trading Volumes for the Days with the Sequences of Negative Stock Returns		
4 days	6 days	
4.4910	4.7952	
Differences on average abnormal volumes		(4.7952-4.4910)
ABVOL (6 days) - ABVOL (4 days)		0.3042

The Table (3) shows the volume of average abnormal trading for the days with the sequence lengths of four days and six days of positive and negative stock returns. Further, the table also represents the difference between the 4 days and the 6 days of average abnormal volumes of the, and their statistical significance.

In reference to the first hypothesis succeeding the orders of all intervals of positive and negative returns of stocks, for the days when the sign of the stock is reversed, the volumes are positive, leading to an enormous stock trading transaction.

As we can see from the table that the average abnormal trading volume for positive 4 days is 3.4682 and it has subsequently increased to 3.6190 which represents the average abnormal trading volume for 6 days of continuous positive returns. A further investigation states that the average abnormal volumes are to some extent are higher subsequent to the sequence of negative returns, compared to stock returns which are positive, perhaps advising that the concluding signify more prominent actions from investors perspective, therefore growing their preference to depend on simple managerial techniques.

5. CONCLUSION

This study is emphasized on contributing rapidly to the financial study that deals with behavioural features influencing stock trading volumes. The study theorize that the decision of the investors of buying and selling the stocks would be impacted by the Gambler's fallacy, and therefore the trading volume of the stock will be greater when the sign of the return of the stock is changed preceding the following number of days which have the opposite sign for underlying asset returns.

After analysing the huge sample of the day to day prices and the trading volume data the conclusion is found out for the study's hypotheses. It is found that, when the sign of the stock return is changed, the volumes of stocks incline to be higher than normal. Further, the scale of the return series have an impact on stock trading volumes and slowly rise with the length of the return sequence.

The research's findings has important practical implications. The study would infer that the complex structure of the investors' trading activities would be impacted by the gambler's fallacy theory. This would call for additional study that would examine if this result continues for different time periods, diverse segments and groups of stocks and different continents Further, if investors seem to increase their trading transaction, then along with the impact of the return series on the trading volumes, there may also be an impact on the prices of the stocks too, that is not supported by other appropriate features. Thus, in this respect, it would be motivating to analyse the returns of the stocks and the trading volumes on days when the sign of the stock return is reversed.

REFERENCE

- Barber, B. M. (2008). All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors. *Review of Financial Studies* 21, 785–818.
- Beaver, W. H. (1968). The Information Content of Annual Earnings Announcements. Empirical Research in Accounting, Selected studies. *Supplement to Journal of Accounting Research*, 67-92.

- Brajesh Kumar, P. S. (n.d.). *The Dynamic Relationship between Stock Returns, Trading Volume and Volatility: Evidence from Indian Stock Market*. Retrieved from www.nseindia.com:
https://www.nseindia.com/content/research/res_paper_final226.pdf
- Chen, G.-M. M. (2001). The Dynamic Relation between Stock Returns, Trading. *The Financial Review* 36, 153–74.
- Chordia, T. S.-W. (2007). The Cross-Section of Expected Trading Activity. *Review of Financial Studies* 30, 709-40.
- Clara Constantine, K. S. (2017). Stock Return and Trading Volume in LQ45 Index. *Journal of Business & Applied Management* Vol.10 No. 2, 124-137.
- De Long, B. A. (1990). Investment Strategies and Destabilizing Rational Speculation. *Journal of Finance*, 379–86.
- Epps, T. (1975). Security Price Changes and Transaction Volumes: Theory and Evidence. *American Economic Review*, 586–97.
- Epps, T. (1977). Security Price Changes and Transaction Volumes: Some Additional Evidence. *Journal of Financial and Quantitative Analysis* , 141–46.
- Gervais, S. R. (2001). The High Volume Return Premium. *Journal of Finance* 56, 877–919.
- Hirshleifer, D. A. (2006). Feedback and the Success of Irrational Investors. *Journal of Financial Economics* 81, 311-38.
- Hong, H. a. (1999). A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets. *Journal of Finance* 54, 2143–84.
- Jegadeesh, N. a. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance* 48, 65-91.
- Khan, S. U. (2008). Trading Volume and Stock Returns: Evidence from Pakistan's Stock Market. *International Review of Business Research Papers* 4, 151–62.
- Kudryavtsev, A. (2017). The Effect of Stock Return Sequences on Trading volume. *International Journal of Financial Studies*.
- Laplace, P.-S. (1976). *A Philosophical Essay on Probabilities*. New York: Dover.
- Lee, C. a. (2000). Price Momentum and Trading Volume. *Journal of Finance* 55, 2017–69.
- Pisedtasalasai, A. a. (2007). Causal and Dynamic Relationships among Stock Returns, Return Volatility and Trading Volume: Evidence from Emerging Markets in South-East Asia. *Asia-Pacific Financial Markets* 14, 277–97.
- Queirós, S. M. (2016). Trading volume in financial markets: An introductory review.

- Rutledge, D. J. (1984). Trading Volume and Price Variability: New Evidence on the Price Effects of Speculation. *In Selected Writings on Futures Markets: Research Directions in Commodity Markets*, 237–51.
- Saatcciglu, K. a. (1998). The Stock Price–Volume Relationship in Emerging Stock Markets. *International Journal of Forecasting* 14, 215-25.
- Sarika Mahajan, B. S. (2013). Return, Volume and Volatility Relationship in Indian Stock Market: Pre and Post Rolling Settlement Analysis. *Global Business Review, Volume: 14 issue: 3*, 413-428.
- Westerfield, R. (1977). The Distribution of Common Stock Price Changes: An Application of Transactions Time and Subordinated Stochastic Models. *Journal of Financial and Quantitative Analysis* 12, 743-65.
- Ying, C. (1966). Stock Market Prices and Volumes of Sales. *Econometrica* 34, 676–86.