

# A Comparative Study on Relationship between Delivery Quantity to Total Quantity traded Ratio and Stock returns in Bajaj Auto Ltd. and Bharat Petroleum Corporation Ltd.

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**ABSTRACT:** : This study is done to examine whether the delivery quantity to total quantity traded ratio of a stock affects its stock return. The paper investigates the relationship between stock return and delivery quantity traded to total quantity traded ratio for 2 companies in the NSE NIFTY. The data is collected for a period of 2008-2018. Unit root test was conducted to check stationary of volume and return data. Granger causality tests were conducted to analyze the causal relationship. We found that, stock return is caused by delivery quantity traded to total quantity traded in Bajaj auto and not in BPCL Ltd. It is also found that delivery quantity to total quantity traded ratio of a stock varies across days. It implies market efficient market hypothesis holds true for one and not for another.

**Key Words:** Stock return; Delivery Quantity traded; granger causality test

## I. INTRODUCTION

Many studies have examined the relationship between daily stock returns and percentage of change in trading volume. But, apart from the volume of shares, the percentage of delivery quantity traded to total quantity traded (percentage delivery quantity traded) is an important data that needs to be analyzed along with the share price. When the share price of the stock goes up alongside with the higher percent of deliverable quantity to traded quantity, it specifies that maximum buyers are expecting the share price to rise. Similarly, when the share price of the stock declines with higher percent of deliverable quantity to traded quantity, it indicates that most of the sellers are expecting the share price to decline. Some stocks tend to rise with a significantly lower per cent of total deliverable quantity to traded quantity per cent which signifies that there is more traders are interested in the stock. This is because there is more squaring-off on the same day in the stock implying there is more trader interest in the stock rather than long term investors interest. In this paper we try to examine the relationship between stock returns and percentage delivery quantity traded for two companies that are included in the NIFTY 50.

## II. LITERATURE REVIEW

The study on relationship between stock return and trading volume is widespread. We have summarized the previous researches related to these issues.

**Fama.E.F, (1970)**<sup>1</sup> The Efficient Market Hypothesis (EMH) suggests that there is no possibility of predicting the future prices by analyzing the past data or publicly available new information or through a combination of public and private data. Fama also splits the efficiency into three forms such as weak form (where current stock prices depend on historical data), semi-strong form (where current stock prices depend on the information that is publicly available) and strong form (where current stock price depends on both the company's insider information and information that is publicly available)

**Al-Jafari, M. K., & Tliti, A. (2013)**<sup>2</sup> focused on investigating the dynamic relationship between stock return and trading volume of the Banking sector. Finally they came to a conclusion that there was a significant relationship between trade volume and stock return.

**Gold. S. (2004)**<sup>3</sup> examined and tested the validity of using trading volumes to forecast stock return. And concluded with high stock price returns, when coupled with normal volume that implies greater agreement and less uncertainty in the market.

**Easley, D., O'hara, M., &Srinivas, P. S. (1998)**<sup>4</sup> analyzed that the trading volume signifies the quality or precision of information in movement of past price. They also gave a main implication that only the investors who concentrate on the past trading volume could incur profits and could perform better.

**Llorente, G., Michaely, R., Saar, G., & Wang, J. (2002)**<sup>5</sup> investigated the dynamic relation between stock return and volumes. The study found that variation in the relation between return autocorrelation and volume is related to the extent of informed trading.

**Mubarik, Fauzia; Javi, Attiya (2009)**<sup>6</sup> examined 50 Indian stocks and took three measures of trading volume namely number of shares traded, number of transaction and value of shares traded are used. By focusing on the contemporaneous relation between trading volume and returns they analyzed the asymmetric behavior of trading volume in response to change in price.

**Tapa, A., & Hussin, M. (2016)**<sup>7</sup> explores the relationship between trading volumes and stock return and the relationship on Malaysian market is considered as the weak form of the efficient of hypothesis were the two objectives. Finally they came to a conclusion that there is a strong significant positive relationship that exists and in the meanwhile there also exists a contemporaneous negative relationship between the past period trading volume and stock return.

**Abinaya.P., Kumar.V.S., Balasubramanian.P, & Menon.V.K. (2016)**<sup>8</sup> in their research on stock price and trading volume relationship through Granger causality by using minute data concluded that out of 50 companies, 29 companies showed causality relationship that is bi-directional between stock price and trading volume, 15 companies were found to have uni-directional relationship between the two variables and 6 companies had no causality relationship at all.

**Singh, D., & Balasubramanian, P. (2000)**<sup>9</sup> in their study on price-volume relationship through Granger Causality test stated that price forecasts are improved by past volume knowledge behavior.

**Tripathy, N. (2011)**<sup>10</sup> The test of Granger causality is conducted to find out whether one time series data can be used to predict another time series data. The Unit root test is a mathematical test that is used to find out the stationarity of a particular dataset. Stationarity time series implies that the properties of statistics, such as mean, variance and autocorrelation, are all constant over a period of time

**Abdeldayem, M. M., & Mahmoud, M. R. (2013)**<sup>11</sup> studied about the dynamic relationship between trading volume and returns from the stock in Egypt and concluded that there is positive auto correlation in Egyptian exchange

### III OBJECTIVE OF THE STUDY

1. To test Delivery quantity traded to total quantity traded ratio causes return in Bajaj-auto Ltd
2. To examine Delivery quantity traded to total quantity traded ratio causes return in BPCL Ltd

### IV. METHODOLOGY

In this study daily stock return and percentage of delivery quantity to traded quantity ratio of Bajaj auto Ltd., and BPCL Ltd., companies are taken for the past 10 years (1-4-2008 to 31-03-2008) The Data is Collected from Prowess IQ Database.

First the data are tested for stationary using unit root test. Unit root test is used to test whether a time-series variable is non-stationary and possess a unit root. Also it is a feature of a random process that can cause some problems in statistical inference that are involved in time series model. We performed Augmented Dickey Fuller (ADF) test for the stock returns. The null hypothesis is that a unit root is present (data is non-stationary).

Secondly Non-Stationarity data was converted to stationary in returns. The volume data was stationary and hence it is directly used in further analysis.

The stationary data was then used for Granger Causality test to find whether one time series data will be useful in forecasting another time series data (i.e. one time series data will cause another time series data). Granger Causality has an assumption that future cannot cause past but the past cause the past or future.

Granger Causality test: It is conducted in order to find out whether one time series data set can predict another time series dataset. Hypotheses for some of the variables are as follows:

$$SR_t = \sum_{i=0}^2 a_i QT_{t-i} + \sum_{j=0}^2 \beta_j SR_{t-j} + \varepsilon_{1t}$$

$$QT_t = \sum_{i=0}^2 y_i SR_{t-i} + \sum_{j=0}^2 \delta_j QT_{t-j} + \varepsilon_{2t}$$

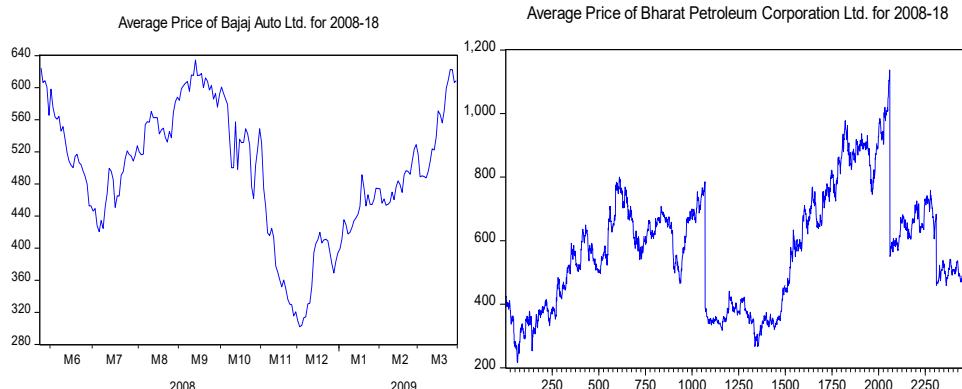
Variable description:

$\delta_j, a_i, \beta_j, y_i$  = coefficients of the model (i.e., the contributions of each lagged observation)

$\varepsilon_{1t}, \varepsilon_{2t}$  = residuals (prediction errors) for each time series

## V DATA ANALYSIS AND INTERPRETATION

Stock prices of Bajaj auto ltd and BPCL Ltd., for the period of 10 years when plotted on a graph showed the following results.



From the above graph you can analyse that mean and variance are changing over time and hence the data are non-stationary. This is further validated by ADF Unit root test.

Augmented ducker-fuller Unit root test was conducted for statistical validation to check whether the data are stationary or non-stationary.

NAME OF THE COMPANY	t-statistics	p-value	DECISION critical value:-3.431
Bajaj Auto Ltd.	-1.6077	0.4768	$H_0$ : returns are stationary is rejected
Bharat Petroleum Corporation Ltd.	-2.5195	0.1109	$H_0$ : returns are stationary is rejected

Therefore the null hypotheses of stationarity have been rejected. Once the non stationarity has been confirmed for both the stocks, integration is used to make them stationary. Since the series under consideration are time series having some regular annual growth rate and therefore mean is continuously changing, log differences have to be calculated to make them stationary by the use of following formula:

$$R = [\ln(Y_t) - \ln(Y_{t-1})] * 100$$

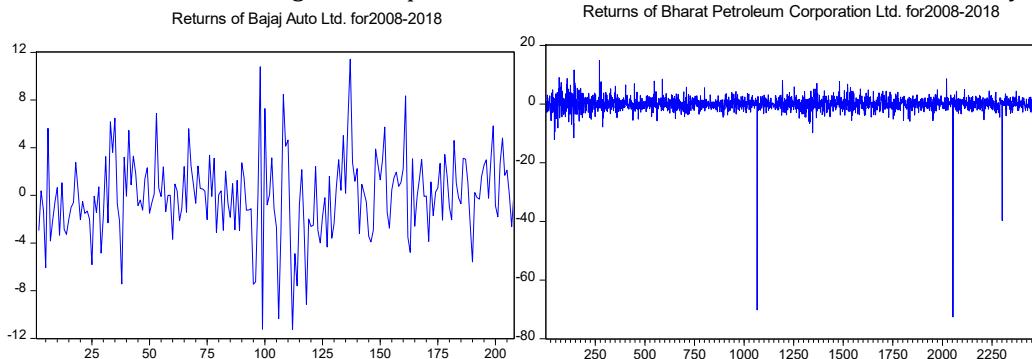
where, r = return

ln = natural log

Yt = absolute value of Y at time period t

Yt-1 = absolute value of Y at time period t-1

After calculating returns for the stocks using the above formula, the original series get converted into return series. Then both the tests have again been performed on return series to confirm the stationarity.



NAME OF THE COMPANY	t-statistics	p-value	DECISION critical value:-3.431
Bajaj Auto Ltd.	-12.804	0.0000	$H_0$ : returns are stationary is accepted
Bharat Petroleum Corporation Ltd.	-46.6204	0.0001	$H_0$ : returns are stationary is accepted

From the above table and graph, it can be analysed that the data has been converted to stationary. Now this data is used for futher analysis.

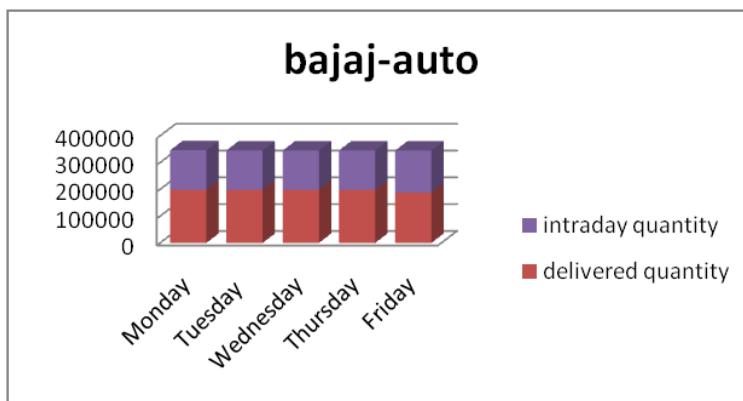
Name of the company	f-statistic	Prob	@5% level of significance
Bajaj Auto Ltd.	4.3153	0.0135	$H_0$ :Delivery quantity traded to total quantity traded doesnot cause return is rejected
Bharat Petroleum Corporation Ltd.	1.27168	0.2805	$H_0$ :Delivery quantity traded to total quantity traded doesnot cause return is accepted

From the granger causality result given in table it is found that the null hypothesis is rejected for Bajaj Auto Ltd and accepted for Bharat Petroleum Corporation Ltd. It shows that delivery quantity traded to total quantity traded ratio causes returns only in Bajaj Auto Ltd and not in Bharat Petroleum Corporation Ltd. From this we can conclude that market is efficient in weak form for Bajaj Auto Ltd stocks. Only when percentage delivery quantity traded to total quantity traded is causing stock returns its possible to make abnormal profit and it implies market is not efficient. We can make abnormal profit in Bajaj Auto Ltd but not in BPCL Ltd.

**TABLE SHOWING DAY-WISE VOLUME OF DELIVERED AND TRADED STOCKS FOR BAJAJ-AUTO LTD FOR 2008-2018**

bajaj-auto	Delivered		intraday		total traded	
	Quantity	percentage	quantity	percentage	Quantity	percentage
Monday	204020	59	141776	41	345797	100
Tuesday	198017	57	147370	43	345387	100
Wednesday	197525	57	147168	43	344693	100
Thursday	197758	57	147318	43	345076	100
Friday	187935	54	156940	46	344875	100

**GRAPH SHOWING DAY-WISE VOLUME OF DELIVERED AND TRADED STOCKS FOR BAJAJ-AUTO LTD FOR 2008-2018**



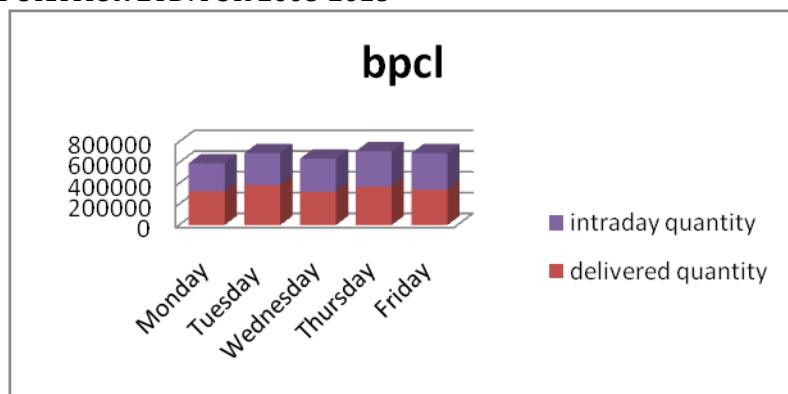
From the above table and graph we can understand that, for almost all days of the week delivery quantity to total trade quantity is more than 50%. Hence more investors are interested to hold the stock and abnormal profits can be made over a span of time.

On the other hand, on Fridays investors sentiments are negative over the market and tend to sell the stocks.

**TABLE SHOWING DAY-WISE VOLUME OF DELIVERED AND TRADED STOCKS FOR BHARAT PETROLEUM CORPORATION LTD. FOR 2008-2018**

Bpcl	delivered		Intraday		total traded	
	quantity	percentage	quantity	Percentage	Quantity	percentage
Monday	326166	55	269756	45	595923	100
Tuesday	384436	55	310107	45	694543	100
Wednesday	323141	50	316930	50	640071	100
Thursday	341659	48	369774	52	711432	100
Friday	340044	49	353878	51	693922	100

**GRAPH SHOWING DAY-WISE VOLUME OF DELIVERED AND TRADED STOCKS FOR BHARAT PETROLEUM CORPORATION LTD. FOR 2008-2018**



From the above table and graph we can understand that, for though for 2 days of the week delivery quantity to total trade quantity is more than 50% the test shows that on an average delivered quantity does not cause returns. Hence more investors are interested to trade the stock and square it off at the end of the day.

On the other hand, on Thursday investors sentiments are negative over the market and tend to sell the stocks.

## VI CONCLUSION

From the above analysis we can conclude that, abnormal profits can be made by some stocks and not by all. Hence Investor cannot claim markets are perfect(strong and semi-strong) or imperfect(weak). It may be weak for some at some point of time and may vary over span of years. On the other hand the influence of day of the week may also vary for stocks which to be well analysed before taking or changing positions.

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