

IMPACT OF STOCK RETURNS ON TRADING VOLUME IN INDIAN STOCKS: A PANEL ARDL APPROACH

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Abstract *The purpose of this paper was to analyse the impact of stock returns on trading volume for the companies listed on BSE in India. This article attempted to analyse that whether there had been a significant impact of returns on the trading volume in the short-run and long-run. This study included a sample of 30 companies listed Sensex. To conduct this analysis, a two-stage methodology was employed. In the first stage, a panel autoregressive distributed lag (ARDL) approach was used to investigate the impact of stock returns on trading volume. In the second stage, the focus was on checking the cross-section short-run relationship in the sample by extending the ARDL estimation. The results showed that the short-run co-integration equation, all the variables have shown significant relationship. The returns have shown significant positive impact on trading volume in short-run whereas significant negative impact in the long-run. The lagged trading volume and stock returns have also shown significant positive impact on current trading volume. These findings have significant implications for investors, equity analysts and portfolio management firms for stock selection and trading patterns.*

Keywords: ARDL, Stock Returns, Trading Volume, Panel Data, Sensex

INTRODUCTION

Every type of economic equilibrium has two important components: price and volume, both of which are governed by the equal portion of market forces. As a result, it is often assumed that these variables should have an adjacent relation between them. Stock returns and volume are the indicators that are recurrently reported in order to show on the state of the markets and are actively monitored by participants. As a result, traders and investors feel that having a deep grasp of price fluctuations and trading volume will improve their comprehension of markets and, as a result, the financial performance. Most research focused on stock returns rather than prices due to several unfavourable stochastic features of stock prices, particularly non-stationarity.

The whole stock market rests around two major pillars: stock returns and trade volume. While stock returns can be understood as an assessment of new evidence, volume is a measure of how much participants disagree about it. It will be possible if certain participants consider some information as favourable whereas other considers the same information as negative. As a result, price swings reflect the average investor reaction to news. Trading volume and variations,

like stock returns, are primarily a reflection of the set of information professed by the indices.

Stock prices are confusing as they do not represent all the available information in the market. The relationship between stock returns and trading volume is significant for various reasons as these variables provide understanding of financial markets' structures, this relationship can be used to induce implications through event studies and they are crucial for the research regarding futures markets (Karpoff, 1987).

Gallant et al. (1992) suggested that the analysis of concurrent relationship between trading volume and stock returns give better inferences than studying the relationship from only one side. This study emphasises on studying the impact of stock returns on trading volume in the context of Indian companies. The study gives significant implications for various participants in decision making related to stock trading and investment. There is a research gap in this area as a very few studies have been conducted in the Indian context. This study is fulfilling the gap as none of the previous studied were conducted using the panel data and adopting panel-ARDL approach. This study attempts to establish the short-run as well as long-run relationship

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between trading volume and stock returns with various integration orders using pooled mean group, autoregressive distributed lag approach based on the studies conducted by Pesaran and Shin (1999) and Pesaran et al. (2001). The ARDL technique demonstrates the short-run as well as long-run relationship among variables. This study shows the panel ARDL approach to investigate the short-run as well as long-run relationship between trading volume and stock returns for the Indian market.

LITERATURE REVIEW

The relationship between stock returns and trading volume is explained empirically by two theories namely 'Mixture of Distribution Model (MDH)' and 'Sequential Arrival of Information Model (SAIH)'. Clark (1973) proposed the MDH model, which was later expanded by other studies by Epps in 1976. The MDH theory explained the relationship as a function of the speed at which the information arrives in the market. Copelan (1976) proposed the 'Sequential Arrival of Information Model' which explained that the information is disseminated to investors in a sequential manner, resulting in a succession of intermediate equilibrium prices before reaching a final informational equilibrium price once all investors have been informed.

Trading volume can be used to gauge the degree of divergence among participants as a result of differences in how they react to new information as it enters the market. Trading volume rises as the spread extends, showing a constructive link between trading volume and stock returns. Stock returns and trading volume are linked, according to the MDH, because they are both dependent on underlying latent information flow characteristics. Stock prices are likely to vary further when additional evidence enters the market (information clustering). This hypothesis argues that volume, return and volatility have a co-existent connection. This means that when new information enters the market, trade volume, return and volatility all change at the same time. As a result, information is disseminated simultaneously at the level of investors, allowing for a quick shift to market equilibrium. Individuals get new information in a random order and respond to it at that moment, according to the SIAH, "whereas trading volume is a positive logarithm function of the number of traders and the strength of new information, which is the size of change in traders' demand curve." It means that information is disseminated gradually at the investor level, implying that successions of intermediate balances are completed first before the ultimate balance is completed.

'Sequential Information Arrival Hypothesis' suggests that price volatilities and trading activity have positive

contemporaneous, lag and causal relationships. As a result, conversant participants make trades and revise their investments, whereas unacquainted participants adjust their assets to balance them. A balance is achieved once all investors have responded to the new information. This pattern of traders' reactions to fresh information suggests that lagged trading volume values might assist anticipate current volatility and returns. Several scholars looked into the real-time relation between volume and stock returns. Many researchers discovered a positive contemporaneous link between such variables, whereas others discovered a negative contemporaneous relationship. The following are some instances of such studies.

Bhattacharya et al. (2000) studied Mexican stocks for a period from 1994 to 1997 using the event study method and found no relation between trading volume and stock returns. On the same line, Guner and Onder (2002) studied Turkish stock index using the volatility of daily stock returns, as well as the volatility of returns during trading and non-trading hours, was investigated for equities traded on the Istanbul Stock Exchange found positive relationship between trading volume and stock returns. Llorente et al. (2002) studied the relationship between trading volume and returns autocorrelation of stocks using the daily data from 1993 to 1998 and found that mean-reversion pattern was followed in the trades made by investors which involved risk sharing and trades based on speculations shown continuation pattern of returns.

Mestal et al. (2003) studied the Australian market for a period of 2000–2003 using the daily data of 31 companies listed on Australian stock index and found that there was a positive relationship between trading volume and stock returns. They found a strong contemporaneous between volume and returns.

Karmakar (2007) studied the volatility and risk-return relationship of Nifty for a period of one and a half decade emphasising on investigating whether volatility is changing over time or not, existence of asymmetric volatility and existence of relationship between market risk and stock returns using GARCH, E-GARCH and E-GARCH (M) models respectively and found that volatility revealed clustering, high persistence and predictability. She also concluded that volatility was representing historical innovation, increasing consistently during sluggish market.

DeMedeiros and VanDoornik (2008) examined the relationship between volume and returns of 57 companies included in theoretical portfolio of Brazilian stock exchange for a period of five years using various econometric models like bivariate simultaneous regression models, GARCH models, VAR model, etc. and found a co-existent as well as

an active relationship between returns and trading volume, inferring those predictions of one variable can be only somewhat enhanced by information of another variable.

Puri and Philippatos (2008) concluded that intra-day volumes and returns of the interest rate futures and currency futures contracts revealed an irregular relationship between trading volume and returns where trading volume associated with negative returns were quite huge as compared to positive returns. These findings contradict with the findings of equity markets where trading volume was found to be high with increase in price as compared to price decrease.

Al-Saad and Moosa (2008) studied 36 listed companies on Kuwait stock exchange using asymmetric ARDL model to check the impact of increase or decrease in prices on trading volume of the stocks and found a vigorous lopsided relation between trading volume and price where the trading volume was found to be quite high in bull market as compared to a bear market.

Pathirawasam (2008) studied the similar relationship using monthly data on stocks of Sri Lanka exchange and concluded a positive relation between volume and returns. Mubarik and Javid (2009) and Ning and Wirjanto (2009) conducted their studies on the same line for companies listed on Pakistan Stock Market and East Asian stock markets, respectively and found a robust relationship.

Ugwu et al. (2011) studied the relationship between trading volume and stock returns of ten banking sector stocks of Nigeria and found a significant relationship where trading volume found to lead the stock returns for all the firms in the sample.

El-Ansary and Atuea (2012) studied the relationship between trading volume and stock return in order to gain a better understanding of the Egyptian stock exchange's structure and information delivery pattern, with the goal of formulating recommendations that will benefit the stock exchange, investors and other stakeholders. The study discovered that there is a real-time association between trading volume and return, and that previous data on trading volume, particularly over the last five days, aids in future return prediction. Even though trading volume should not be used only to predict return because it only explains a small portion of the change in stock return. Furthermore, the Egyptian stock exchange is inefficient in terms of information because information is delivered to the market in stages rather than all at once.

Chen (2012) studied the relationship between trading volume and stock returns using monthly data of S&P 500 index for a period of 1973–2008 and found asymmetric correlation between them. They also concluded that the stock returns can forecast the trading volume when markets

are either increasing markets or decreasing markets though the forecasting ability is relatively very weak.

Abdeldayem and Mahmoud (2013) studied 167 stocks listed on Egypt stock exchange using the daily data to investigate the relationship between stock returns and volume using LMSW model and found the positive impact of trading motives on the dynamic relationship between returns and volume.

Abdullahi et al. (2014) studied the relationship between returns and trading volume in the crude oil futures markets of West Texas intermediate and Brent using GMM estimates and found that there was no relationship between trading volume and returns and neither variable had the ability to forecast the other variable. Pathak et al. (2014) investigated the role of trading volume in price discovery in equity derivatives markets and concluded that the literature did not show strong relationship price movement and trading volume as the direction and the speed of information flow was not found to be same.

Dadhich et al. (2015) studied the impact of FII on volatility in India by emphasising on volatility patterns in Indian markets with volatility clustering and leverage effect and found the existence of persistent volatility and leverage effect in Indian markets. They also concluded that FIIs had led to increase the trading volume and volatility.

Gupta et al. (2015) examined the relationship between volatility, volume and open interest in 18 commodity futures contracts of Indian market using GARCH (1, 1) model and found the existence of GARCH effects in volume and open interest in all the contracts except energy commodities. They also concluded that trading volume shown persistent volatility with asymmetric effect as a proxy to information.

Nandan et al. (2016) studied the relationship between stock returns, volatility and trading volume for ten companies of NSE and found a bi-directional relationship between trading volume and returns for two companies in the sample and uni-directional relationship between trading volume and stock returns in rest of the sample companies.

Bajwa (2016) studied various factors affecting the growth of capital markets in India and found that the variables like trading volume, capital flow through IPOs, market indices, FIIs and market capitalisations played a significant role in the growth of capital markets in India.

Ryaly et al. (2017) studied the random walk hypothesis using the daily data and weekly data of Sensex for a period of 1998–2015 and found that the trading volume had grown immensely during these years and Indian market had a weak-form of market efficiency.

Sushmita et al. (2018) studied the disposition effect in Indian markets by studying the trading volume, stock returns and market returns using OLS regression and found the existence of disposition effect and investor overconfidence in Sensex and had influenced the decision making regarding the investments.

Faniband (2020) studied the effect of macroeconomic and non-macroeconomic variables on the trading volume of money market instruments in India using the quantile regression approach. He concluded that the variables like GDP, consumer price index (CPI), economic policy uncertainty index, VIX and Nifty had a small impact on trading volume of money market instruments.

Veeravel et al. (2021) studied the impact of COVID-19 on stock returns in India by the number of confirmed cases or deaths using OLS regression and found that the stock returns were affected positively by number of confirmed cases and negatively by number of deaths and which affected the trading volume in turn.

Desai and Joshi (2021) studied the volatility comparison and the volatility spillover effects in India and major global indices. The major results regarding volatility spillover posit that the Indian stock market strongly impacted selected global indices. Volatility spillover was found to be in existence from the Indian stock market to the international indices, and vice-versa.

Joshi (2021) studied the impact of trading volume and open interest on the volatility of 33 futures contracts from Indian futures markets using the E-GARCH model and OLS regression and found that trading volume and open interest affected the volatility but the factors were different and the trading volume had a positive impact on volatility for most of the futures contracts in the sample.

Joshi et al. (2022) examined the consequence of open interest on the volatility of futures markets. They found that the depth of the market affected the futures market's volatility, but the direction of this effect depends on the type of contract.

Joshi and Mehta (2023) studied if the commodities market in India follows the random walk process and whether they deviate from the random walk theory. They observed that futures prices were showing volatility clustering and non-

stationarity behaviour, which was in line with the research objective of finding the random walk in commodity index.

Gabriel and Devkota (2023) analysed the drivers of stock prices in the USA. The empirical results shown that there existed a long-run co-integrating relationship between the variables under consideration. In the long run, the exchange rate, Index of Industrial Production (IIP), money supply and the treasury bill rate were positively related to stock prices, while CPI was negatively related to stock prices.

Data Sources

For the purpose of this study, the data considered was the closing price and trading volume for respective stocks. A sample of 30 companies which are constituents of the benchmark index (SENSEX) of Bombay Stock Exchange was selected. Monthly data of closing prices and trading volume of all the companies were collected from the official website of the stock exchange. The study covered the data for a period from June 2008 to May 2022.

METHODOLOGY

This study is focuses on investigating the long-run as well as short-run relationship between trading volume and stock returns of the companies of Indian market. For this purpose, pooled mean group (PMG) estimator of Pearson et al. (1999) for ARDL models with individual effects was adopted. This model was adopted as it is more flexible in terms of variables control for various degrees of co-integration. This model was found more suitable for the study as it permits the intercepts, error variances and the coefficients of the short-run to vary athwart the cross sections while defining the long-run coefficients and the pace of equilibrium modification. Another advantage of this model shown that ARDL estimation provided consistent estimators for I(0) and I(1) variables of there was an existence of a sole co-integration vector among the parameters for long-run relationship. In order to check the mixed order of co-integration, Pedroni co-integration test (1999) was used. The following ARDL model was adopted to measure the relationship between trading volume and returns.

$$Vol_{.t} = \beta_0 + \beta_1 Vol_{.t-1} + \beta_2 R_{t-1} + \sum_{i=1}^n \Delta Vol_{.t-i} + \sum_{i=1}^n \Delta R_{t-i} + \varepsilon_t \quad (1)$$

Where R_t = Natural Log of Monthly Stock Returns and $Vol_{.t}$ = Natural Log of Monthly Trading Volume calculated as follows:

$$R_t = \text{Monthly Stock Returns} = \ln \left(\frac{P_t}{P_{t-1}} \right)$$

$$Vol_t = \text{Monthly Trading Volume} = \ln\left(\frac{Vol_t}{Vol_{t-1}}\right)$$

RESULTS AND FINDINGS

The descriptive statistics of the variables, as shown in Table 1, depict that mean of the turnover for the panel was found to be negative and the mean returns were found positive for the period of the study. The values of skewness show a lop-sided distribution. The kurtosis values of the variables are quite high which indicate that the trading volume and returns of the stock have extreme values. These values of Kurtosis complement the values of Jarque-Berra statistic, which show that the stock returns are not normally distributed. The ADF test was performed for the sample and the p-value is less than 5% for all the variables at the first difference level. It was found that all the stock returns and trading volume were stationary at the original level.

Table 1: Descriptive Statistics

	LN_TURNOVER	LN_RETURN
Mean	-0.004005	0.004407
Median	-0.022433	0.010984

	LN_TURNOVER	LN_RETURN
Maximum	4.642887	0.567642
Minimum	-4.852391	-3.016891
Std. Dev.	0.643729	0.140051
Skewness	0.245242	-6.934875
Kurtosis	7.516862	107.7678
Jarque-Bera	4334.949	2345420.
Probability	0.000000	0.000000
Sum	-20.18771	22.21065
Sum Sq. Dev.	2088.098	98.83588
Observations	5040	5040

Results of Panel Co-Integration Test

The results of panel co-integration test are shown in Table 2. The Pedroni (1999) panel co-integration test was conducted by using the automatic lag length selection on AIC criteria. The results inferred that there is a co-integration between trading volume and returns as all the tests for panel co-integration rejected the null hypothesis of no co-integration between the variables. These results also show the existence of long-run homogenous relationship between trading volume and returns.

Table 2: Results of Pedroni Residual Co-Integration Test

	T-Statistic	P-Value	Weighted T-Statistic	P-Value
Panel v-Statistic	5.044443	0.0000***	2.107851	0.0175**
Panel rho-Statistic	-174.3676	0.0000***	-174.6798	0.0000***
Panel PP-Statistic	-202.5066	0.0000***	-200.8521	0.0000***
Panel ADF-Statistic	-38.88240	0.0000***	-40.71749	0.0000***
Group rho-Statistic	-158.8984	0.0000***		
Group PP-Statistic	-282.6469	0.0000***		
Group ADF-Statistic	-45.21193	0.0000***		

Source: Author's Calculation, *** Significant at 1% level, * Significant at 5% level.

Results of Panel ARDL Estimates are shown in Table 3. The analysis was conducted to check the impact of stock returns on the change in trading volume. These results were obtained using the automatic lag selection method with maximum number of lags as 4 by adopting Akaike Information Criterion (AIC) for model selection. The model had used natural log of stock returns as the dynamic regression with maximum lag length of 4 and constant as a fixed regressor. The model selected by AIC was ARDL (4, 2)

after evaluating 16 models.

The results show that in the short-run co-integration equation, all the variables have shown significant relationship. The returns have shown significant positive impact on trading volume in short-run whereas significant negative impact in the long-run. The lagged trading volume and stock returns have also shown significant positive impact on current trading volume.

Table 3: Panel ARDL Results

Short-Run Equation				
Variables	Co-Efficient	S. E.	T-Statistic	P-Value
C (β_0)	-0.000225	0.003213	-0.070021	0.9442
COINTEQ01 (β_1)	-2.242494	0.055882	-40.12920	0.0000***
D (LN_TURNOVER (-1)) (β_2)	0.665644	0.040318	16.50989	0.0000***
D (LN_TURNOVER (-2)) (β_3)	0.306327	0.024692	12.40573	0.0000***
D (LN_TURNOVER (-3)) (β_4)	0.119186	0.011398	10.45647	0.0000***
D (LN_RETURN) (β_5)	1.029653	0.053369	19.29313	0.0000***
D (LN_RETURN (-1)) (β_6)	0.414494	0.051000	8.127385	0.0000***

Long-Run Equation				
Variables	Co-Efficient	S. E.	T-Statistic	P-Value
LN_RETURN	-0.596721	0.039279	-15.19177	0.0000

Source: Author's Calculation, *** Significant at 1% level, * Significant at 5% level.

In order to check the cross-section short-run relationship in the sample, the extended ARDL estimation was done and the cross-section short-run coefficients were obtained for each company in the sample using the equation based on the primary estimation.

These results indicate that the trading volume is affected by the stock returns as well as lagged trading volume (3 lags) and lagged returns (1 lag) for most of the companies in the sample. The results show the significant impact of returns,

lagged returns and lagged trading volume on current trading volume except seven companies in the sample namely Dr. Reddy's Laboratories, Kotak Mahindra Bank, Nestle, ITC, Wipro, HCL and PowerGrid where the results have shown insignificant impact of lagged return on trading volume. All the regressors have shown the significant positive impact on the trading volume. IndusInd Bank and PowerGrid have shown insignificant impact of lagged volume on current volume.

Table 4: Results of Cross-Section Short-Run Relationship

	β_0	β_2	β_3	β_4	β_5	β_6
HDFC	-0.0052 (0.0868) *	0.7572 (0.0002) ***	0.3930 (0.0002) ***	0.1619 (0.0001) ***	0.8676 (0.0019) ***	0.2091 (0.0634) *
Bajaj Finance	0.0494 (0.0005) ***	0.6551 (0.0004) ***	0.4107 (0.0002) ***	0.1375 (0.0002) ***	0.7384 (0.0008) ***	0.4354 (0.0022) ***
SBI	-0.0117 (0.0004) ***	0.5963 (0.0002) ***	0.2122 (0.0006) ***	0.1664 (0.0000) ***	0.7988 (0.0001) ***	0.2849 (0.0004) ***
TITAN	0.0158 (0.0031) ***	0.8906 (0.0001) ***	0.4462 (0.0001) ***	0.1549 (0.0001) ***	0.8260 (0.0002) ***	0.1720 (0.0069) ***
Dr. Reddy	-0.0085 (0.0135) **	0.5529 (0.0008) ***	0.2357 (0.0014) ***	0.0819 (0.0008) ***	0.7573 (0.0283) **	0.1181 (0.5532)
HDFCBANK	-0.0004 (0.7194)	0.5964 (0.0003) ***	0.3690 (0.0002) ***	0.1390 (0.0001) ***	0.8648 (0.0005) ***	0.2654 (0.0073) ***
INFOSYS	4.5E-05 (0.9650)	1.3196 (0.0001) ***	0.5171 (0.0002) ***	0.2213 (0.0000) ***	0.8163 (0.0012) ***	0.2628 (0.0117) ***
KOTAK	-0.0099 (0.0828) *	0.8148 (0.0005) ***	0.3826 (0.0006) ***	0.1392 (0.0002) ***	1.0341 (0.0128) **	0.3583 (0.1474)
RELIANCE	-0.0209 (0.0022) ***	0.8829 (0.0002) ***	0.3638 (0.0004) ***	0.1062 (0.0004) ***	0.9887 (0.0043) ***	0.6551 (0.0098) ***
TATASTEEL	-0.0113 (0.0001) ***	0.2431 (0.0016) ***	-0.0817 (0.0064) ***	0.0500 (0.0025) ***	0.8116 (0.0001) ***	0.2115 (0.0014) ***

	β_0	β_2	β_3	β_4	β_5	β_6
L&T	-0.0290 (0.0001) ***	0.5332 (0.0010) ***	0.1711 (0.0034) ***	-0.0014 (0.8234)	0.4998 (0.0014) ***	0.2968 (0.0036) ***
M&M	0.0123 (0.0020) ***	0.4573 (0.0013) ***	0.1744 (0.0031) ***	0.0427 (0.0046) ***	1.0171 (0.0009) ***	0.3722 (0.0110) ***
HUL	-0.0051 (0.0287) **	0.7278 (0.0005) ***	0.3161 (0.0007) ***	0.0861 (0.0008) ***	1.3947 (0.0075) ***	0.5483 (0.0833) *
NESTLE	-0.0179 (0.0031) ***	0.8403 (0.0002) ***	0.4476 (0.0002) ***	0.1587 (0.0001) ***	1.5370 (0.0403) **	0.4928 (0.3380)
ASIANPAIN	0.0344 (0.0002) ***	0.8299 (0.0001) ***	0.4507 (0.0001) ***	0.1412 (0.0001) ***	1.1897 (0.0001) ***	0.3875 (0.0022) ***
ITC	0.0019 (0.1022)	0.8205 (0.0002) ***	0.4309 (0.0002) ***	0.2161 (0.0000) ***	0.8855 (0.0026) ***	0.1604 (0.1416)
WIPRO	0.0098 (0.0097) ***	0.5545 (0.0005) ***	0.2142 (0.0012) ***	0.1461 (0.0001) ***	0.8742 (0.0046) ***	-0.0053 (0.9577)
SUNPHARMA	0.0105 (0.0034) ***	0.8169 (0.0002) ***	0.3438 (0.0003) ***	0.1103 (0.0002) ***	0.9981 (0.0003) ***	0.2018 (0.0164) **
ICICI	-0.0192 (0.0002) ***	0.5677 (0.0003) ***	0.3142 (0.0002) ***	0.1666 (0.0000) ***	0.8584 (0.0002) ***	0.1532 (0.0088) ***
INDUSIND	0.0034 (0.1617)	0.1541 (0.0131) **	0.0386 (0.1018)	0.0728 (0.0010) ***	1.0671 (0.0007) ***	0.4312 (0.0077) ***
AXIS	-0.0174 (0.0011) ***	0.5251 (0.0005) ***	0.2450 (0.0007) ***	0.0953 (0.0006) ***	1.1134 (0.0002) ***	0.6254 (0.0005) ***
HCL	0.0199 (0.0034) ***	0.8585 (0.0003) ***	0.4601 (0.0002) ***	0.1985 (0.0001) ***	0.8201 (0.0099) ***	0.1517 (0.2863)
AIRTEL	-0.0237 (0.0038) ***	0.7369 (0.0004) ***	0.4325 (0.0003) ***	0.1455 (0.0002) ***	0.8600 (0.0174) **	0.7293 (0.0241) **
MARUTISUZU	-0.0104 (0.0010) ***	0.6066 (0.0003) ***	0.3137 (0.0004) ***	0.0965 (0.0004) ***	1.0894 (0.0005) ***	0.6910 (0.0013) ***
Ultratech	0.0141 (0.0086) ***	0.7912 (0.0004) ***	0.2940 (0.0009) ***	0.0501 (0.0034) ***	1.8683 (0.0020) ***	0.8187 (0.0197) **
TCS	0.0006 (0.5824)	0.7229 (0.0005) ***	0.2161 (0.0021) ***	0.0445 (0.0047) **	1.2692 (0.0005) ***	0.3265 (0.0185) **
NTPC	-0.0141 (0.0049) ***	0.6792 (0.0004) ***	0.4404 (0.0002) ***	0.2520 (0.0000) ***	1.0113 (0.0171) **	1.1343 (0.0113) **
Techmahindra	0.0166 (0.0073) ***	0.4107 (0.0009) ***	0.2051 (0.0012) ***	0.1259 (0.0002) ***	1.0183 (0.0013) ***	0.3477 (0.0218) **
Powergrid	-0.0040 (0.2055)	0.5752 (0.0005) ***	0.2321 (0.0010) ***	0.0108 (0.1733)	1.4662 (0.0310) **	0.4550 (0.3137)
Bajaj Finserve	0.0134 (0.0385) **	0.45034 (0.0005) ***	0.1993 (0.0009) ***	0.0574 (0.0015) ***	1.5465 (0.0007) ***	1.1423 (0.0017) ***

Source: Author's Calculation, *** Significant at 1% level, * Significant at 5% level.

Managerial and Theoretical Applications

This study contributes in the various ways. These results show significant positive long-run relationship between trading volume and returns of the companies along with significant impact across sections. These results have significant implications and consequences for investors,

equity analysts and portfolio management firms for stock selection and trading patterns. Higher returns will lead to higher volumes which will in turn lead to higher flow of money in the markets. The investors will be pushed to take higher risks in expectations of achieving better returns in future. These results will also have relevant effects on researchers, policymakers and regulators regarding money

illusion effect, future cash flows and risk. FIIs, HNIs, individual, institutional and public investors can make decisions regarding their trades in futures markets based on these results.

LIMITATIONS OF THE STUDY

This study is constructed on the secondary data of the companies which included monthly closing prices and trading volumes. This study does not involve the weekly or daily prices and volumes which can be used for further analysis. Further, this study has used only large-cap companies in the sample and these results may not be applied on the mid-cap or small-cap companies.

Another limitation of the study is that it includes the panel data approach where the cross-section effect has been identified but analysis on individual companies may give contradictory results. This study is consisting of 30 companies from composite index of Indian market only.

CONCLUSION

The study has analysed the relationship between trading volume and returns for 30 stocks listed on BSE through a panel ARDL approach. The study concludes that there is significant positive impact of stock returns on the trading volume in the long-run. In the short-run, stock return along with lagged stock return and lagged trading volume have significant impact on current trading volume. We can conclude that the most of the variables are significant and the model is able to attain the behaviour of volume for a long-time frame in a proper manner. The results also show the co-integration between trading volume and stock returns.

Another part of the study was focusing on the cross-section short-run relationship between trading volume and returns in the sample. The results show that trading volume has positive and significant relationship with the stock returns as well as lagged trading volume (3 lags) and lagged returns (1 lag) for most of the companies in the sample. The results show the significant impact of returns, lagged returns and lagged trading volume on current trading volume except seven companies in the sample namely Dr. Reddy's Laboratories, Kotak Mahindra Bank, Nestle, ITC, Wipro, HCL and PowerGrid where the results have shown insignificant impact of lagged return on trading volume. All the regressors have shown the significant positive impact on the trading volume. IndusInd Bank and PowerGrid have shown insignificant impact of lagged volume on current volume.

SCOPE FOR FURTHER STUDIES

This study has shown significant relationship of returns and trading volume. Further research can be done analysing the impact of macroeconomic variables like inflation, WPI, IIP, exchange rates, etc. on trading volume of the stocks.

This study has used panel ARDL regression analysis to study the relationship between trading volume and returns. The similar kind of study can be done using other models or methodologies like Impulse Response Function for causal analysis which may disclose the contribution of returns on trading volume. Also, the same methodology can be applied on individual stocks to check the impact of stock returns on trading volume.

This study is consisting of 30 stocks which are constituents of SENSEX only. The similar kind of study can be done using mid-cap and small-cap companies or other indices from Indian markets or from various international markets.

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