"EVIDENCES OF INFORMATIONAL SIGNALLING OF OVERNIGHT NEWS ON PRE-MARKET PRICE BEHAVIOUR OF INDIAN STOCK MARKETS

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ABSTRACT:

The purpose of this research paper is to identify whether the premarket opening prices of stock markets efficient in absorbing the previous days overnight informational shocks and the causative factors of such influences. For this purpose the premarket opening price of Nifty Fifty is considered as the target variable followed by FTSE100 Index as a proxy to European Stock Markes,S&P500 Index as a representative of US Stock Markets, Previous day closing prices of Nifty50,Volatility Index of NSE as a representative of perception of Investors are chosen.Time series econometric tools such as ADF Test, Granger Causality, VAR Model,GARCH Models were applied and the study found that that there is no other significant impact of other chosen Stock Markets on Indian Stock Markets which strongly suggest that our Markets are marching towards Informational Efficiency which is a pre-requisite condition for Efficient Markets.

Key words : Information signalling, overnight news, volatility, time series, VAR Model, GARCH Models

JEL Classification: G1,G14,G17

1) INTRODUCTION

The NSE and BSE introduced the pre – open call auction sessions from October 18 2010, and these sessions are intended to reduce volatility and provide better liquidity in the markets. The pre-open session lasts for 15 minutes from 9 AM to 9:15 AM, and is divided into three parts. In the first 8 minutes orders are placed. They can be cancelled or modified during this time period also. In the next 4 minutes price discovery will be done, and orders will be executed. The next 3 minutes are used to facilitate the transition from pre – open to regular session. Right now, only the index stocks are included in this session, and you can place both market, and limit orders as part of the pre – open session. A price band of 20% is applicable on all securities in the pre – open session.

The pre-open session duration is 15 minutes i.e., from 9:00 am to 9:15 am. The pre-open session is comprised of order collection period and order matching period. After completion of order matching there is silent period to facilitate the transition from pre-open session to the normal market. Accordingly, Normal Market / Odd lot Market and Retail Debt Market will open for trading after closure of pre-open session i.e. 9:15 am. Pre-open session shall comprise of two sessions viz.

- Order Collection Period.
- Order Matching Period.

ORDER COLLECTION PERIOD:

The order collection period is defined as the timing of Pre Open Session. During this period orders can be entered, modified and cancelled. Both limit and market order will be allowed. The information like indicative equilibrium / opening price of scrip, total buy and sell quantity of the scrip, indicative NIFTY Index value & per centage change of indicative equilibrium Price to previous close price will be computed based on the orders in order book and will be disseminated during pre-open session

ORDER MATCHING PERIOD:

Order matching period will start immediately after completion of order collection period. Order will be matched at a single (equilibrium) price which will be open price. During order matching period order modification, order cancellation, trade modification and trade cancellation will not be allowed. The trade details will be disseminated to respective members before the start of normal market. The pre open session is introduced initially for the SENSEX and NIFTY components. In case of any change in composition of the index, the incoming stock(s) will be incorporated for computation of the market opening price in the pre open session. The outgoing stock(s) will continue to be part of the pre open session.

DETERMINATION OF EQUALIBRIUM OPENING PRICE:

The opening price shall be determined based on the principle of demand supply mechanism. The Equilibrium Price will be price at which the maximum value is executable. In case more than one price meets the said criteria the Equilibrium Price will be the price at which there is minimum order imbalance quantity (unmatched order quantity). The absolute value of the minimum order imbalance quantity, the Equilibrium Price will be the price closest to the previous day's closing price is the mid-value of pair of prices which are closest to it, and then the previous day's closing price will be the adjustable closing price or the base price. Both limit and market orders shall reckon for computation of Equilibrium Price.

The Equilibrium Price determined in Pre Open Session is considered as open price for the day. In case of only market orders exist both in the buy and sell side, then order shall be matched at previous day's closing price or adjusted closing price/ base price. Previous day's close or adjusted close price/ base price shall be the opening price. In case of no price is discovered in Pre Open Session, the price of first trade in the normal market shall be the open price. In case more than one price meets the said criteria, the Equilibrium Price shall be the price at which there is minimum unmatched order quantity.

The SEBI circular said "Further in case more than one price has some minimum order imbalance quantity, the Equilibrium Price shall be the price closest to the previous day's closing price." The circular said. At the time of order execution limit orders shall be given priority over market orders the circular said, if the price is not discovered in the Pre Open Session, then the orders entered in the Pre Open Session will be shifted to the order book of the normal market following time priority. The price of the first trade in the normal market shall be the opening price

2) REVIEW OF LITERATURE

Kumar and Reddy observed that pre-market equilibrium stock price helps the investors to trade without much volatility during the market opening time. The initiative called pre-open session by the stock exchanges in Indian much be extended to many other actively traded shares to increase the confidence of the investors.

Moshirian, Nguyen, & Pham, 2012 concluded that the efficiency of indicative opening prices gradually increases from 9:30 am up to the opening time. More importantly, this pattern becomes more significant when overnight announcements are released. Additionally, the intensity of overnight announcements influences order placement activities during the pre-opening period. When comparing returns following overnight and daytime earnings announcements, we find that price adjustments in response to overnight announcements occur primarily within the overnight period, with limited spillover effects after the market opens. By comparison, daytime earnings announcements can induce price fluctuations over a longer postevent trading period. Thus, the practice of providing investors with ample time to digest new information before trading commences appears to improve rather than hamper the price discovery process

Easley and O'Hara (1987) show that informed traders are likely to use large trades instead of small trades. By contrast, Barclay and Warner (1993) show that informed traders may camouflage their private information and split their large trades into medium trades. Because actual trading does not occur during the pre-opening period

There is a well-established literature documenting that stock return volatility is directly related to information arrivals (e.g., Clark, 1973). As such, volatility from the previous trading day may serve as a proxy for the intensity of aggregate information arrivals and the level of uncertainty about stock values that persist from the previous trading day. Therefore, we expect the volatility of the previous trading day to be a determinant of order aggressiveness during the preopening period.

There is some evidence that pre-opening orders contain useful information about fundamental asset values. For instance, Cao et al. (2000) document that NASDAQ dealers use crossed and locked inside quotes to signal to other market makers the direction in which prices should move during the pre-opening period. Davies (2003) observes that, in the Toronto Stock Exchange, the majority of orders submitted during the preopening period are placed with a serious intention of being executed. Biais et al. (1999) reconcile these contrasting findings by showing that pre-opening orders can reflect both noise and price discovery. Based on data from the Paris Bourse, they observe a considerable degree of noise in indicative opening prices during the early hours of the pre-opening period. However, as the market approaches opening, the efficiency of indicative opening prices tends to increase. Such evidence supports the hypothesis that there is an evolution in the environment for learning about asset values, which reflects the role of the pre-opening period in facilitating a convergence of prices toward equilibrium.

In this backdrop this study aims at studying the impact of overnight news and other influences on the pre-market opening prices of Indian Stock Markets.

3) Research Methodology

The purpose of this research paper is to identify whether the premarket opening prices of stock markets efficient in absorbing the previous days overnight informational shocks and the causative factors of such influences. For this purpose the premarket opening price of Nifty Fifty is considered as the target variable followed by FTSE100 Index as a proxy to European Stock Markes,S&P500 Index as a representative of US Stock Markets, Previous day closing prices of Nifty50,Volatility Index of NSE as a representative of perception of Investors are chosen as causative factors that may or may not influence the Pre-market opening price of Nifty shares.

The data for the above mentioned variables are collected for a period of five years starting from 01-01-2014 till 31-12-2018 and the everyday closing values are considered as the frequency for the study.

a) Statistical Tools used for the study

i. T –Test for the difference in Prices

In order to know whether there is any significant difference between previous day closing price and current pre-market opening price , a T test was applied on the difference in prices by applying the following formula

$Diff_t = NFPMOP_t - NFPCP_{t-1}$

and T-statistic was obtained by

$$T_{diff} = \frac{\overline{DIFF} - \mu}{SE}$$

ii. Test of Cointegration

Two variables are said to be Cointegrated when a linear combination of the two variables is stationary implying that there is a long term relationship existing between them. Lack of Cointegration suggests that no such relationship exists.

The co-integration test represents the gesticulation of long-run equilibrium relationship between two variables say y_t and x_t let both are integrated at one, that is $y_t \sim I(1)$ and $x_t \sim I(1)$. Then y_t and x_t are said to be Cointegrated if there exists a β such that $y_t - \beta x_t$ is I (0). This is denoted by saying y_t and x_t are CI (1,1).that is y_t and x_t are Cointegrated. Different types of co-integration techniques are available for the time series analysis. These tests include the Engle and Granger test (1987), Stock and Watson procedure (1988) and Johansen's method (1988).

The most popular system method is the Johansen (or Johansen and Juselius, JJ)method, based on canonical correlations (Johansen 1988; Johansen and Juselius 1990), that provides two likelihood ratio (LR) tests. The first, trace test, tests the null hypothesis that there are at most r ($0 \leq r \leq n$) Cointegrating vectors, or equivalently, n–r unit roots. The second, maximum eigenvalue test, tests the null hypothesis that there are r Cointegrating vectors against the alternative of r+1 Cointegrating Vectors. Johansen and Juselius recommend the second test as better. Reimers (1992) argues through a Monte Carlo study of the Johansen LR test that the test statistic is corrected for the number of estimated parameters to obtain satisfactory size properties in small samples. The correction is by replacing T by T–np in the test statistic, where T is the number of observations, n is the number of variables and p is the lag length of the VAR .(Pillai-2001)

iii. Granger Causality Test

According to the concept of Granger's causality test (1969, 1988), a time series X_t Granger-causes another time series Yt if series Yt can be predicted with better accuracy by using past values of X_t rather than by not doing so, other information is being identical. If it can be shown, usually through a series of F-tests and considering AIC on lagged values of X_t (and with lagged values of Y_t also), that those X_t values provide statistically significant information about future values of Yt time series then X_t is said to Granger-cause Yt i.e. X_t can be used to forecast Yt. The pre-condition for applying Granger Causality test is to ascertain the stationarity of the variables in the pair. Engle and Granger (1987) show that if two non-stationary variables are co-integrated, a vector auto-regression in the first differences is unspecified. If the variables are co-integrated, an error-correcting model(VECM) must be constructed. In the present case, the Granger causality test is applied at the first difference of the variables. The second requirement for the Granger Causality test is to find out the appropriate lag length for each pair of variables. For this purpose, we used the programme specified lag order given by Eviews.

Since the time series of Nifty 50 and Nifty Small Cap is non-stationary, they are converted into a stationary form or I(0) from the ADF test, and then Granger Causality test is performed as follows:

$$\Delta LnNFPMOP_t = \sum_{i=1}^{n} \alpha \Delta Lnindex_{t-1} + \sum_{j=1}^{n} \beta_j \Delta Ln\ NFPMOP_{t-j} + u_t \quad \text{..... (3.2.1)}$$

$$\Delta Ln\ INDEX_t = \sum_{i=1}^{n} \lambda \Delta Ln\ INDEX_{t-j} + \sum_{i=1}^{n} \delta \Delta LnNFPMOP_{t-1} + \quad \text{.....(3.2.2)}$$

Where n is a suitably chosen positive integer; j = 0, 1… k are parameters and α β λ δ's are constant; and Ut's are disturbance terms with zero means and finite variances.
($\Delta Ln\ NFPMOP$is the first difference at time t of NIFTY50 pre market opening price and $\Delta Ln\ INDEX_t$ is the first difference of Respective causative Index Series.)

iv. VAR Model

The vector auto regression (VAR) is commonly used for forecasting systems of interrelated time series and for analysing the dynamic impact of random disturbances on the system of variables. The reduced form VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of *p*-lagged values of all of the endogenous variables in the system.(Sermpinis, Stasinakis, & Hassanniakalager, 2017),(Christie-David, 2002)

A stationary, K-dimensional, VAR(*p*) process as can be expressed as
$Y_t = A_1 Y_{t-1} + \ldots\ldots\ldots\ldots\ldots A_p Y_{t-p} + Cx_t + E_t$ where,

Y_t is a (k x1) vector of endogenous variables
X_t is a (d x 1) vector of exogenous variables
A_1 and A_p are k x k matrices to be estimated
C_t is a k x k matrix of exogenous variables to be estimated
E_t is the white noise error term of the VAR
By applying the least square estimation we get

$B=((ZZ^{1)-1}Z*I_k$) y.

v. Impulse Response Function

Impulse response functions represent the mechanisms through which shock spread over time. Let us consider the Wold representation of a covariance stationary VAR(p),

$$\begin{aligned} Y_t &= C(L)\epsilon_t \\ &= \sum_{i=0}^{\infty} C_i \epsilon_{t-i} \end{aligned}$$

The matrix Cj has the interpretation

$$\frac{\partial Y_{t+j}}{\partial \epsilon_t'} = C_j$$

That is, the row i, column k element of Cj identifies the consequences of a unit increase in the kth variable's innovation at date t for the value of the ith variable at time t + j holding all other innovation at all dates constant.

vi. GARCH MODELLING

In order to analyze the transmission of volatility and volatility spillover effects between the Nifty 50 premarket opening price and above mentioned causative Indices, Generalised Autoregressive Conditionally Heteroscedastic model (GARCH), Generalised Autoregressive Conditionally Heteroscedastic model with external regressors,. Through GARCH model, it is possible to interpret the current fitted variance as a weighted function of long-term average value information about volatility during the previous period as well as the fitted variance from the model during the previous period.

The first step in GARCH modeling is to fit a mean equation. This should be done by fitting AR or MA models and the residuals must be checked for autocorrelation and ARCH effect.

The following AR model was used to fit an ARIMA model (Narwal, Sheera, & Mittal, 2016)

Mean Equation

AR model: $\mathbf{Y_t = \alpha + \beta\, Y_{t-p} + \varepsilon_t}$, $\mathbf{\varepsilon_t \sim N\,(0,\sigma_t^2)}$ and.....(6)

p=1,2,3.....n

MA model: $\mathbf{Y_t = \alpha_t - \upsilon_t - \theta_{at-1}}$ .....(7)

The next step was to fit a variance equation by taking the residuals from the fitted ARIMA model. For this purpose the model used was

Variance Equation

$$\mathbf{\sigma^2_t = \alpha_0 + \beta\, \varepsilon^2_{t-1} + \alpha_1\, \sigma^2_{t-1}} \quad \text{.....(8)}$$

where $\alpha_0 > 0$, $\beta_1 \geq 0$, $\alpha_1 \geq 0$. In the above equation, σ_t is the conditional variance of exchange rates , which is a function of mean α_0. News about volatility from the previous period is measured as the lag of the squared residuals from the mean equation (ε_{t-1}^2), last period's forecast variance (σ^2_{t-1})

GARCH REGRESSOR Equation

$$\mathbf{\sigma_t} = \omega_0 + \beta\, \varepsilon^2_{t-1} + \alpha_1\, h_{t-1} + \omega_{\mathbf{(square\ resid\ INDEX)}} \quad \text{.....(9)}$$

In the GARCH REGRESSOR Equation, we use the squared residual of chosen Indices (ω) instead of residual on their level, which is used as a proxy for the shock of a particular Index on Nifty 50 pre-market opening price.

4) **Presentation and Discussion of Results:**

FIG:1

Graphical representation of Difference in prices of Nifty50 pre-market opening price and its previous day's closing price

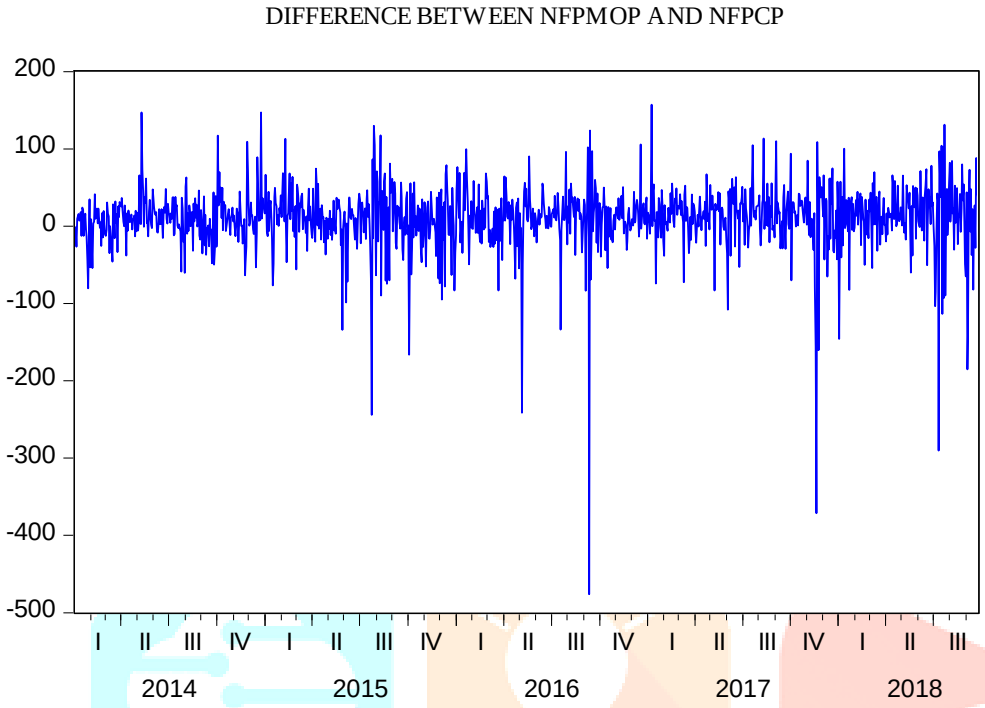


Table:1

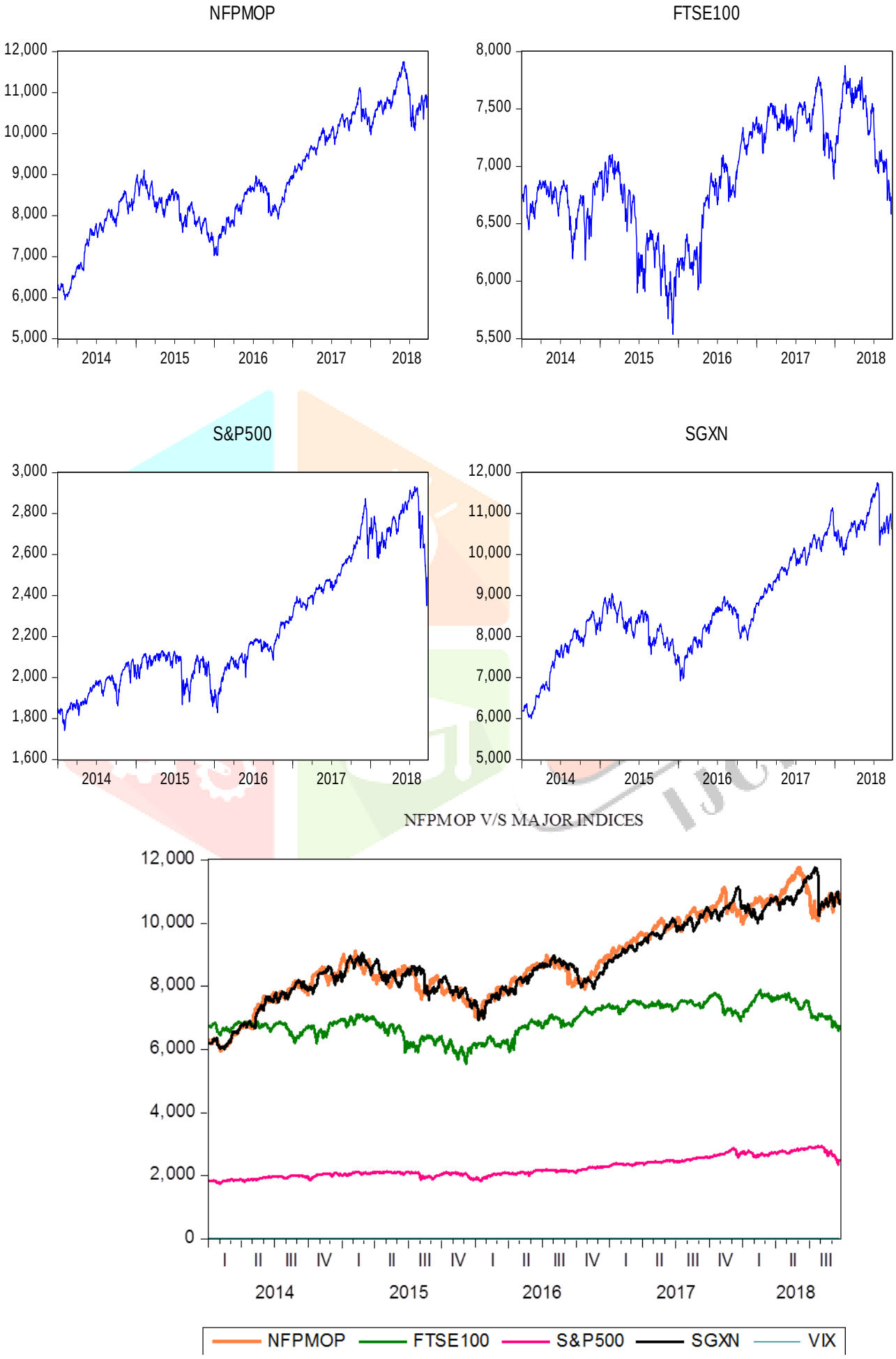
T-Test for the Diff of prices

	diff in prices	*Hypothesised Mean*
Mean	10.53942	0
Variance	1781.742	0
Observations	1233	1232
Hypothesized Mean Difference	0	
df	1232	
t Stat	8.767497	
P(T<=t) one-tail	2.98E-18	
t Critical one-tail	1.646091	
P(T<=t) two-tail	5.95E-18	
t Critical two-tail	1.961891	

A T-Test was conducted to check whether the difference between the premarket opening price and its previous day's closing price to account for the presence of the overnight news and impact of other markets. As per the table :1 the T-Test result ids hifhly significant as the p-value is insignificant compared to the critical alpha value of 0.05.In other words there is a significant difference between the current nifty 50 preopening pricew and its previous closing price.This also suggest that the shocks and overnight news may be incoeporated in the preopening price

FIG:2

GRAPHICAL REPRESENTATION OF THE CHOSEN VARIABLES OVER REFERENCE PERIOD



Result of test of Cointegration:

Table:2

Result of test of Cointegration

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.065556	121.5249	47.85613	0.0000
At most 1 *	0.017869	38.12599	29.79707	0.0044
At most 2 *	0.011375	15.94786	15.49471	0.0427
At most 3	0.001525	1.876648	3.841466	0.1707

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.065556	83.39890	27.58434	0.0000
At most 1 *	0.017869	22.17813	21.13162	0.0355
At most 2	0.011375	14.07121	14.26460	0.0536
At most 3	0.001525	1.876648	3.841466	0.1707

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Johansen (or Johansen and Juselius, JJ)method, based on canonical correlations (Johansen 1988; Johansen and Juselius 1990), that provides two likelihood ratio (LR) tests. The first, trace test, tests the null hypothesis that there are at most r ($0 \leq r \leq n$) Cointegrating vectors, or equivalently, n–r unit roots. The second, maximum eigenvalue test, tests the null hypothesis that there are r Cointegrating vectors against the alternative of r+1 Cointegrating Vectors. Johansen and Juselius recommend the second test as better.

As per table 2 the Trace test reports that the null hypothesis of no cointegrating vectors, atmost one cointegrating vector, and atmost two cointegrating vectors fails to be accepted as the p-values of the trace statistics for all the three hypothesis are less than the 0.05% level of significance and are highly significant. However the null of atmost three cointegrating vectors cannot be rejected as the p-value of trace statistic is above the 0.05% level of significance.Therefore thos test observes that there are three cointegrating vectors.In other words,there is long term relationship amomg three variables.

On the other hand, maximum eigenvalue test reports that the null hypothesis of no cointegrating vectors, atmost one cointegrating vector,fails to be accepted as the p-values of the max eigenvalue statistics for all the first two hypothesis are less than the 0.05% level of significance and are highly significant. However the null of atmost two and atmost three cointegrating vectors cannot be rejected as the p-value of trace statistic is above the 0.05% level of significance. Therefore there are two cointegrating vectors. In other words, there is long term relationship amomg two variables.As per the standard practice,when these two tests report contradicting results,then max eigen value test result should be considered.

Hence we conclude that there is a long term cointegrating relationship among two sets of variables.

TABLE:3
Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
DFTSE does not Granger Cause DNFPMOP	1230	2.41246	0.1206
DNFPMOP does not Granger Cause DFTSE		0.39210	0.5313
DSGXN does not Granger Cause DNFPMOP	1230	2.54031	0.1112
DNFPMOP does not Granger Cause DSGXN		0.03336	0.8551
DSP500 does not Granger Cause DNFPMOP	1230	4.24991	0.0395
DNFPMOP does not Granger Cause DSP500		0.02760	0.8681

Granger Causality Test verifies whether there is any lead-lag relationship among the variables which may be providing linear feedback and may thus influence other variables.("John Y. Campbell, Andrew W. Lo, A. Craig MacKinlay, Andrew Y. Lo-The Econometrics of Financial Markets-Princeton University Press (1996).pdf," n.d.) This test is conducted on the differenced Index series of Nifty50 premarket opening price,S&P500,FTSE100 and Nifty VIX and are henceforth termed as DNFPMOP,DFTSE500, DFTSE100,and DSGXN respectively .

As per this test there is no granger causality among DNFPMOP, DFTSE100 and DSGX as the p-value of the F statistic for these equations are more than0.05% level of significance and the null hypothesis of no causality cannot be rejected.

However the p-value of F statistic of the equation between DSP500 and NFPMOP is 0.0395 which is less than 0.05% level of significance and the null hypothesis of no causality cannot be accepted. In other words there is a unidirectional causality running from S&P500 to NFPMOP

TABLE:4

Mean	8828.41545
Actual Runs	20
Number of positive Runs	483
Number of negative Runs	750
Number of observations	1233
E(R)	588.5912409
Variance	278.5424778
Standard Deviation	16.6895919
Z-statistic value	-15.2669642
P-VAL	6.34734E-53

Result of Runs test on Nifty Pre-opening price

As per Table 4 Runs test of randomness on Nifty50 pre-opening price was applied to verify whether the price changes of the pre-opening series is random or non-random and the as per the test results, the null hypothesis of randomness cannot be accepted as the p-value of Z test ststistic is lesser than 0.05% and is highly significant. Therefore we can conclude that the pre market price series is not random.

Result of Garch External Regressor Model

TABLE-5

Result of Garch External Regressor Model

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	4.744658	1.529792	3.101505	0.0019
AR(5)	0.954727	0.022603	42.23984	0.0000
MA(5)	-0.973331	0.018179	-53.54162	0.0000
	Variance Equation			
C	459.8867	190.3342	2.416207	0.0157
RESID(-1)^2	0.112127	0.019844	5.650399	0.0000
GARCH(-1)	0.721238	0.047795	15.09013	0.0000
GARCH01	0.074874	0.026332	2.843471	0.0045

GARCH model reports that the mean equation was fitted with ARMA(5,5) model which suggest thar there is significant informational signalling at 5^{th} lag order of the series.The mean model was subjected to residual diagnostics and was found to be well fitted exept the presence of ARCH effect which is prerequisite to the application of GARCH model.

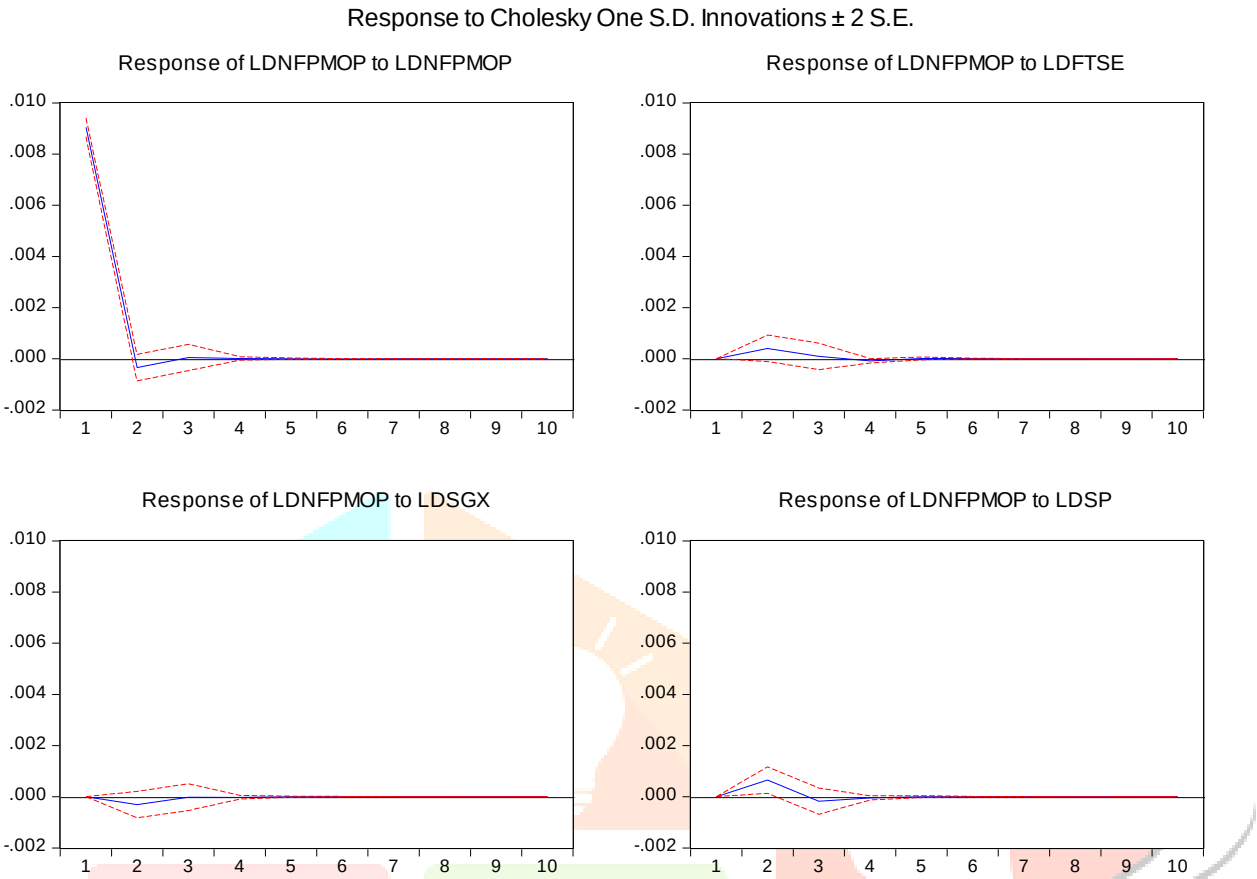
The GARCH variance equation was fitted with the order of GARCH(1,1) on the NFPMOP series and the model reported that error variance (μ^2_{t-1}) and conditional variance(σ^2_{t-j})were both positive, less than one and statistically highly significant.Further the result suggest that the previous day's variance was .11 and past period conditional variance was .72 and we can infer that there is significant persistence of past period volatility in the series and this result supports the result of runs test for the same series which observed that the series is not random .

Further when GARCH Regressors Model was fitted by extracting the GARCH variance series of S&P500 INDEX,it was found that the co-efficent ω was 0.07 and was statistically significant which implies that there is volatility spillover effect of S&P 500 series on NFPMOP series.In other words the premarket price is significantly impacted by the volatility of S&P500 INDEX.

a) VAR Impulse Response Test

Fig-04

Result of VAR Impulse Response Test of the variables



Impulse Response Test is done by fitting a VAR Model of the series to check the responses of a given series to the shock of one standard deviation and by carefully observing the diffusion of it over a period.. Accordingly, a stationary VAR Model was developed and was subjected to stability test and residual diagnostics.After successful clearing of these tests, the model was tested for impulse response. Our analysis is limited to the response of NFPMOP towards one SD shock of LDSP,LDSGX and LDFTSE100

The Impulse Response Test reports that NFPMOP reacts only to its previous period and corrects rapidly to its equilibrium value and is not affected by SGX and FTSE100.There is notable impact of S&P 500 Index on the NFPMOP where the sock is transmitted to two periods and reverts in the 3rd period. This observation is supported by the previous GARCH test results that there persistence of shocks of S&P 500 on NFPMOP series

5) FINDINGS AND CONCLUSIONS

The purpose of this research paper is to identify whether the premarket opening prices of stock markets efficient in absorbing the previous days overnight informational shocks and the causative factors of such influences. For this purpose the premarket opening price of Nifty Fifty is considered as the target variable followed by FTSE100 Index as a proxy to European Stock Markes,S&P500 Index as a representative of US Stock Markets, Previous day closing prices of Nifty50,Volatility Index of NSE as a representative of perception of Investors are chosen as causative factors that may or may not influence the Pre-market opening price of Nifty shares and based on the results presented in the previous section we conclude that

1. The preopening price significantly captures the overnight news and volatility spillovers of other world markets and this phenomenon contribute to a large extent on the equilibrium price discovery of Stock Markets in India.
2. There is noticeable dependence of Indian Stock Markets on the fluctuations of US Stock Markets as there are long term as well as short term feedback causing from the US Markets to Indian Markets.
3. Indian Stock Markets suffer from persistence effect as the shocks caused to the markets in the form of news arrivals do not die down rapidly. This reveals the general market inefficiency of Indian Stock Markets that pave the way for excess market returns and supports the 'beat the market' practices.
4. The study found that there is no other significant impact of other chosen Stock Markets on Indian Stock Markets which strongly suggest that our Markets are marching towards Informational Efficiency which is a pre-requisite condition Efficient Markets.

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