IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668
PP 20-31
www.iosrjournals.org

Do macroeconomic variables influence Bombay Stock Exchange (BSE 30) stock prices in India?

P R Venugopal[1], K Sudha Sahithi[2]
[1](*Assistant Professor, Department of Commerce, Bhavan's Vivekananda College of Science, Humanities and Commerce, India)*
[2](*B. Com (Hons), Bhavan's Vivekananda College of Science, Humanities and Commerce, India)*

Abstract: *Nowadays, financial well-being of a country is being measured by stock market indices. Broadly, the stock markets are a coalescence of exchanges and markets dealing with issuance and trading of securities. Such markets allow firms to procure long-term financesin exchange for a part of their profits to investors. Similarly, there are varied macroeconomic factors which connote a country's financial status and these two vital segments of India's economy might as well be related or impacted by each other's movements through time. This study's fundamental objective is to appraise the relationship linking select macroeconomic variables viz., call money rate, money supply (M3), exchange rate, gold &silver prices, forex reserves, and consumer price index as a proxy for inflation, and the stock prices of 30firms which form the basis for the principal barometer of India's economy, Bombay Stock Exchange's Sensex (BSE30). It tries to understand the degree of impact of select macroeconomic variables on prices of stocks and vice-versa. In this study, time series data is used. The required data is collected from reliable secondary sources such as RBI, BSE and other international sites. This study is conducted for the period Jan 2000- Aug 2017 month-wise and results were anticipated using OLS method and Granger causality test. And found Call Money rate, Exchange rate and Forex reserves showing significant impact on theIndian BSE 30 Index.*
Keywords: *BSE Sensex, macroeconomic variables, stock prices, OLS method, Granger Causality test*

I. Introduction

A place where purchasers and vendors exchange securities at a price in a secondary market is referred to as Stock Exchange. Stock Exchanges played a vital function in the pooling of capital in emerging countries, leading to the increase of business of the country, because of liberalized and globalized policies adopted by Indian government after 1991, New Economic Policy.There are many aspects which can indicate volatility in the stock exchanges while expectingreturns and such factors are aggregate (macroeconomic) variables. Similarly, BSE 30 Index also changes due to the impact of some macroeconomic variables. This study will be helpful for investors as a guiding factor in knowing which economic variables to be considered whileinvesting to get some advantage to make better investment decisions.

The current research looks at seven macroeconomic variables as the independent variables: Consumer Price Index (CPI), Exchange Rate (ER), Money Supply (M3), Foreign Reserves (FR), Gold Prices(GP), Silver Prices(SP), Call Money Rate (CMR) and Bombay Stock Exchange's flagship index, BSE30 as the dependent variable. In thestudy, Sensex (BSE 30) and macroeconomic variablesimpact is tested using the Granger Causality Test using monthly data from January 2000 to August 2017. The ADF test is used to examine the stationarity of the data and diagnose the residuals for white noise. The objective is to investigate the effect of macroeconomic variables on the Bombay stock exchange (BSE 30) during the period 2000-2017. The present study adds literature to the existing literature.

II. Theoretical Framework

Many theories have been put forward by researchers to estimate the fluctuations in stock markets through the changes in macroeconomic variables. The Market Hypothesis Theorydeveloped by Fama (1970) and the Arbitrage Pricing Theory (APT) developed by Ross (1976) are famous ones. These theories are discussed as they relate the macroeconomic variables to stock market return.The Efficient Market Hypothesis widely known as random walk theory assumes that market prices should assimilate all available information at any juncture. The term "efficient market" was initiated by Eugene Fama (1970) who said that, "in an efficient market, on the average, competition will cause asymmetrical flow of informationwhich bring changes in intrinsic values to be reflected on actual prices".

Fama defined an efficient market as "a market where prices always reflect all available information". Indeed, profiting from predicted price activity is improbable and very tough as this theory proposes that the main factor behind price changes is the influx of new information. However, there are distinct forms of information that affect security values. Consequently, Fama's theory is explained in three variations namely: the weak form hypothesis, semi-strong form hypothesis and the strong form hypothesis depending on what "available information" means. This paper emphasizes on the semi-strong hypothesis as this is the most relevant for the study. The semi-strong hypothesis expounds that all publicly available information is hitherto incorporated into current prices, i.e., the asset prices reflect the accessible public information.

Indeed, the semi-strong hypothesis is utilized to inspect the positive or negative relationship between stock return and macroeconomic variables since it hypothesizes that economic factors are fully mirrored in the price of stocks. Public information can also include data stated in companies' financial statements,financial state of their competitors, for the analysis of pharmaceutical companies. Hence, information is public and is impossible to make profit using information that everybody else knows. So, the existence of market analysts is required to be able to understand the implication of vast financial information as well as to comprehend processes in product and input market.

2.1 The Arbitrage Pricing Theory

Developed by Ross (1976), the Arbitrage Pricing Theory (ATP) is another manner of relating macroeconomic variables to stock market return. It is an extension of the Capital Asset Pricing Model (CAPM) which is based on the mean variance framework by the assumption of the process generating security. In other words, CAPM is based on one factor, meaning that there is only one independent variable, which is the risk premium of the market. There are similar assumptions between CAPM and APT namely: the assumption of homogeneous expectations, perfectly competitive markets and frictionless capital markets. However, Ross (1976) proposes a multifactor approach to explaining asset pricing through the arbitrage pricing theory (APT). According to him, the primary influences on stock returns are some economic forces such as (1) unanticipated shifts in risk premiums; (2) changes in the expected level of industrial production; (3) unanticipated inflation and (4) unanticipated movements in the shape of the term structure of interest rate. These factors are denoted with factor specific coefficients that measure the sensitivity of the assets to each factor. APT is a different approach to determining asset prices and it derives its basis from the law of one price. As a matter of fact, in an efficient market, two items that are the same cannot sell at different prices; otherwise an arbitrage opportunity would exit.

APT requires that the returns on any stock should be linearly related to a set of indexes as shown in the following equation:

(1) $R_i = a_i + b_{i1}I_1 + b_{i2}I_2 + \ldots\ldots + b_{ij}I_j + e_i$

Where, a_j= the expected level of return for stock i if all indices have a value of zero

I_j = the return on stock I will be impacted by the value of the j_{th} index

b_{ij} = the sensitivity of stock i´s return to the j_{th} index

e_i = a random error term with mean equal to zero and variance equal to

According to Chen and Ross (1986), individual stock depends on anticipated and unanticipated factors. They believe that most of the return realized by investors is the result of unanticipated events and these factors are related to the overall economic conditions. In fact, although asset returns can also be affected by influences that are not systematic to the economy, returns on portfolios are influenced by systematic risk because distinctive returns on individual assets are cancelled out through the process of diversification.

III. Review of Literature

S. No	Title	Author's Name	Variables	Methodology& Period	Results
1.	Impact Of macroeconomic variables on stock market performance in India: An empirical analysis (2014)	Venkatraja B	Independent Variables: IIP[1], WPI[2], GP[3], FII[4] and REER[5] Dependent Variables: Sensex	Multiple regression model, ANOVA[6] on monthly data for Apr 2010- Jun 2014	Combined influence of WPI, IIP, FII, GP and REER on Sensex is strong and coefficients of all variables except IIP are statistically significant
2.	The impact of macroeconomic fundamentals on stock prices revised: A study of Indian stock market (2016)	Gurmeet Singh	Independent Variables: IIP, WPI, MS[7], T-bill Rates, ER[8] Dependent Variables: Sensex	ADF[9]unit root test to check stationarity, Johansen's Co-integration test, VECM[10] and Granger Causality	Stock prices are positively related to WPI, MS, IR. IIP and ER negatively related to stock prices. Bidirectional causality between ER and stock price index & IR

				framework on monthly data for Jan 2007- Mar 2014	and stock price index
3.	The effect of macroeconomic determinants on the performance of the Indian stock market (2012)	Samveg Patel	Independent Variables:IR[11], CPI[12], ER, IIP, MS, GP, SP[13], OP[14] Dependent Variables: Sensex and S&P CNX Nifty[15]	ADF Unit root test, Johansen Co-integration test, Granger Causality test and VECM on monthly data from Jan 1991- Dec 2011	IR is I(0); Sensex, Nifty, ER, IIP, GP, SP and OP, are I (1); and CPI and MS are I (2)
4.	An impact of macroeconomic variables on the functioning of Indian stock market: A study of manufacturing firms of BSE 500 (2015)	Gurloveleen K and Bhatia BS	Independent Variables: MS, CMR[16], OP, ER, FR[17], FII, GFD[18], IIP, WPI, T-bill rates Dependent Variables: BSE 500[19]	ADF Unit root test, Granger Causality test, Multiple regression on monthly data from Apr 2006- Mar 2015	FII and ER found significant under multiple regression. No relationship between variables and BSE 500
5.	Impact of macroeconomic variables on the stock market prices of the Stockholm stock exchange (OMXS30) (2013)	Joseph Tagne Talla	Independent Variables: IR, ER, MS Dependent Variables: OMXS30[20]	ADF Unit root test, Multivariate Regression Model, OLS method and Granger causality test on monthly data from Jan 1993- Dec 2012	CPI and ERhave significant negative influence on stock prices. IR has insignificant negative influence on stock price. MS is insignificant but positively associated to stock prices. Unidirectional causal relation from stock prices to CPI
6.	The impact of macroeconomic fundamentals on stock prices revisited: An evidence from Indian data (2012)	Naik Pramod Kumar and Padhi Puja	Independent Variables: IIP, WPI, MS, T-bill rates, ER Dependent Variables: Sensex	Johansen's co-integration and VECM, Granger causality test on monthly data from Apr 1994–Jul 2011	Stock prices positively relate to MS and IIP but negatively relate to WPI. Bidirectional causality exists between IIP and stock prices whereas, unidirectional causality from MS to stock price, stock price to WPI and interest rates to stock prices
7.	Macroeconomic indicators and Saudi equity market: A time series analysis (2016)	Ammar Yasser Almansour, Bashar Yaser Almansour	Independent Variables:IF, MS, OP, IR Dependent Variables:Saudi stock returns	ADF unit root test, Granger Causality Test, OLS on monthly data from Jan 2010- Dec 2014	Significant positive relationship between OP and stock returns. Unidirectional relationship between stock return and OP. Stock return Granger causes OP
8.	Macroeconomic link to Indian capital market: A post-liberalization evidence (2014)	Hirak Ray, Joy Sarkar	Independent Variables:IIP, WPI, T-bill rates, GB[21], ER, MS Dependent Variables: Sensex	ADF unit root test, DF-GLS[22]test; VAR; Johansen Co-integration test, VECM, Granger causality test on monthly data from Jan 1991- Apr 2008	Indian stock market leads the economic activities and the core determinants of the asset market are IIP, MS and ER. Weak influence of other macroeconomic variables on stock market

IV. Research Gap

The previous studies have been conducted by taking a period of 10 years or lesser to analyze the effect on the stock returns over such period. This study is considering a large period of 17 years ranging from January 2000 – August 2017 month wise 212 observations which allows a more elaborate and comprehensive understanding of the impact of macroeconomic variables on stock returns. The Methodology corresponds to this study and selection of the variables have been chosen after due consideration to literature reviewed. BSE Sensex impacts varied financial strategies and it is the leading indicator of financial health of the Indian economy.

V. Methodology

In this study the data wasobtained from RBI website and this is a time series data. The data is run in EViews software and the result found for each variable data is of non-stationarity. To make the data stationary the Augmented Dickey Fuller (ADF) test was conducted but the data failed to attain stationarity at Level, first difference and even at second difference. This can be seen in the output sheets put in annexure.Then the data was converted to log values for each of the eight variables. Again, the data was tested for stationarity, however the data could not attain stationarity. Then the data was put to Dlog (variable) for both the dependent variable and the independent variables i.e. First Difference and Second Difference.

After the data is obtained as stationary,the other tests like Unit Root Test, Normality Test, Heteroskedasticity Test, Serial Correlation LM Test and Granger Causality Test were conducted to know which variables were influencing the stock returns.

5.1 Unit Root Test

H_o: P = 1 Unit Root (Variable is not Stationary)

H_1: P < 1 No Unit Root (Variable is Stationary)

If the P value is lesser than 0.05, then we can reject the H_0.

5.2 Serial Correlation LM Test

The presence of serial correlation is examined by Breusch – Godfrey serial correlation LM test.

H_o: No Auto Correlation

H_1: Auto Correlation

If the Probability value > 0.05 then we can accept H_o. Hence, no auto correlation was found.

5.3 Heteroskedasticity test

This test is important to confirm the robustness of the OLS output since the results cannot be reliable in the presence of Heteroskedasticity.

H_o: No Heteroskedasticity

H_1: Heteroskedasticity

If the Probability Value is > 0.05 then we can accept the H_0. Hence, no heteroskedasticity was found.

5.4 Normality Test

This test is again very important test to find out whether the error term follows Normal Distribution and the hypotheses are stated as follows:

H_o: Residuals are normally distributed

H_1: Residuals are not normally distributed.

Again, if the Probability value > 0.05 then we can accept H_0.

5.5 Ordinary Least Square Method (OLS Method)

When the original data was run in the software, the conditions of heteroscedacity and auto correlation were not satisfied. Therefore, the variables were converted into log variables. The same were tested. But this data could not satisfy the conditions. The log variables were then converted into stationarity and then the OLS method and Granger Causality test were used.

(2) Sensex = f (CMR, GP, ER, FR, SP, CPI, M3)

The OLS equation is obtained.

(3) LBSE30 = f (c, LCMR, LCPI, DLM3, LER, LFR, LGP, LSP)

Then the OLS equation is obtained.

(4) D (LBSE30) = f (c, LCMR, DDLCPI, DDLM3, DLER, DLFR, DLGP, DLSP)

The data in this study hassatisfied all the conditions described in the methodology such as the residual normality test, Auto Correlation and Heteroskedasticitytest, hence the same are shown in the output sheets.

5.6 Granger Causality Test

The Granger Causality test is a statistical test which determines significance of a time series in forecasting another. This test aims at determining whether past values of a variable help to predict changes in another variable (Granger, 1988). Also, it says variableY is Granger caused by variable X if variable X helps in predicting the value of variable Y(Sarbapriya, 2012). Granger Causality test is applied to know whether there is unidirectional causal relation or there is bi-directional causal relation between the macroeconomic variables and the BSE 30 Index.

VI. Results

The original variables have failed to satisfy the Heteroskedacity test as the p values were less than 0.05 (as enclosed in the annexure). Therefore, we reject the null hypothesis meaning, there is a Heteroskedacity problem with the original data. Hence, Log has been introduced for the same variables. The results are shown below.

6.1 Unit Root Test

Table 1: Unit Root Test

S. No.	Variable	Level	First Difference	Second Difference
1.	LBSE30 Index	0.3712	0.0000	-
2.	LCMR	0.0000	-	-
3.	LCPI	0.8943	0.1642	0.0000
4.	LER	0.8267	0.0000	-
5.	LFR	0.0154	0.0001	-
`6.	LM3	0.4399	0.6160	0.0000
7.	LGP	0.6678	0.0003	-
8.	LSP	0.6442	0.0000	-

Log variables denoted by "L".

From the above results we can say that the LBSE 30, LCPI, LER, LFR, LGP, LSP have attained stationarity after first difference and two variables LCPI and LM3 have attained Stationarity after Second difference and one variable LCMR attained Stationarity at level. After the log variables satisfied the unit root test we continue to conduct heteroskedacity test but the same problem of heteroskedacity persists.

To solve the problem of heteroskedacity, D, DD for the log variables were introduced. Now, unit root test is checked using ADF and the results are as below.

6.1.1 ADF test

Table2: ADF test results are shown below for all the eight variables

S. No	Variable	Null Hypothesis	P Value	Accept / Reject	Result
1.	*D (LBSE 30)	Non-Stationary	0.0000	Reject	Stationary
2.	LCMR	Non-Stationary	0.0000	Reject	Stationary
3.	**DD(LCPI)	Non-Stationary	0.0000	Reject	Stationary
4.	*D(LER)	Non-Stationary	0.0000	Reject	Stationary
5.	*D(LFR)	Non-Stationary	0.0000	Reject	Stationary
6.	**DD(LM3)	Non-Stationary	0.0000	Reject	Stationary
7.	*D(LGP)	Non-Stationary	0.0000	Reject	Stationary
8.	*D(LSP)	Non-Stationary	0.0000	Reject	Stationary

**DD = Second difference *D = First difference L = log values

After the variables attained stationarity, OLS Method is applied to find the impact of the variables on the BSE 30 Index. The OLS model applied is as follows:

(5) DLBSE 30 = f (C, DDLCPI, DDLM3, DLER, DLFR, LCMR, DLGP, DLSP)

After the OLS output is obtained, the Heteroskedasticity test, Serial Correlation LM test and the Normality test were conducted, and the results were positive, satisfying all the conditions specified in the methodology.

6.2Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.563409	Prob. F(8,192)	0.8070
Obs*R-squared	4.770882	Prob. Chi-Square(8)	0.7818

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 11/01/17 Time: 22:00
Sample: 2000M03 2017M06
Included observations: 208
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000361	0.026109	0.013832	0.9890
DDLCPI	-0.050785	0.490021	-0.103638	0.9176
DDLM3	-0.059380	0.307297	-0.193232	0.8470
LCMR	-5.37E-05	0.013721	-0.003916	0.9969
DLER	-0.049827	0.291848	-0.170730	0.8646
DLFR	-0.019929	0.214869	-0.092750	0.9262
DLGP	0.013897	0.057095	0.243394	0.8080
DLSP	-0.007402	0.043313	-0.170888	0.8645
RESID(-1)	-0.053248	0.073084	-0.728589	0.4671
RESID(-2)	0.048283	0.072447	0.666454	0.5059
RESID(-3)	0.070269	0.073279	0.958922	0.3388
RESID(-4)	0.026725	0.074551	0.358478	0.7204
RESID(-5)	-0.078652	0.072761	-1.080957	0.2811
RESID(-6)	-0.006575	0.072966	-0.090105	0.9283
RESID(-7)	-0.022354	0.072831	-0.306937	0.7592
RESID(-8)	-0.078761	0.073368	-1.073506	0.2844

R-squared	0.022937	Mean dependent var	-7.94E-18
Adjusted R-squared	-0.053396	S.D. dependent var	0.060482
S.E. of regression	0.062076	Akaike info criterion	-2.647119
Sum squared resid	0.739853	Schwarz criterion	-2.390386
Log likelihood	291.3004	Hannan-Quinn criter.	-2.543309
F-statistic	0.300485	Durbin-Watson stat	1.983543
Prob(F-statistic)	0.994978		

Figure 1: Breuch-Godfrey Serial Correlation LM Test

From the table we can see that the Probability value is 0.8070, which is more than 0.05 and hencethe null hypothesis can be accepted. Thus, there is no auto correlation.

6.3 Heteroskedasticity test

From fig 2., we can see that the probability value is 0.3911 which is more than 0.05, enabling us to accept the null hypothesis.This means that the data has no problem of heteroskedasticity.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.059494	Prob. F(7,200)	0.3911
Obs*R-squared	7.437321	Prob. Chi-Square(7)	0.3848
Scaled explained SS	7.657549	Prob. Chi-Square(7)	0.3638

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/01/17 Time: 21:32
Sample: 2000M03 2017M06
Included observations: 208

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005722	0.002269	2.521795	0.0125
DDLCPI	0.081866	0.042448	1.928635	0.0552
DDLM3	-0.008965	0.026576	-0.337327	0.7362
LCMR	-0.001279	0.001194	-1.071280	0.2853
DLER	0.037774	0.024930	1.515217	0.1313
DLFR	0.017443	0.018413	0.947306	0.3446
DLGP	-0.002775	0.004901	-0.566190	0.5719
DLSP	0.003128	0.003762	0.831355	0.4068

R-squared	0.035756	Mean dependent var	0.003640
Adjusted R-squared	0.002008	S.D. dependent var	0.005446
S.E. of regression	0.005441	Akaike info criterion	-7.552118
Sum squared resid	0.005920	Schwarz criterion	-7.423751
Log likelihood	793.4203	Hannan-Quinn criter.	-7.500213
F-statistic	1.059494	Durbin-Watson stat	1.999017
Prob(F-statistic)	0.391135		

Figure 2: Heteroskedacity Test: Breuch-Pagan-Godfrey

6.4 Normality Test

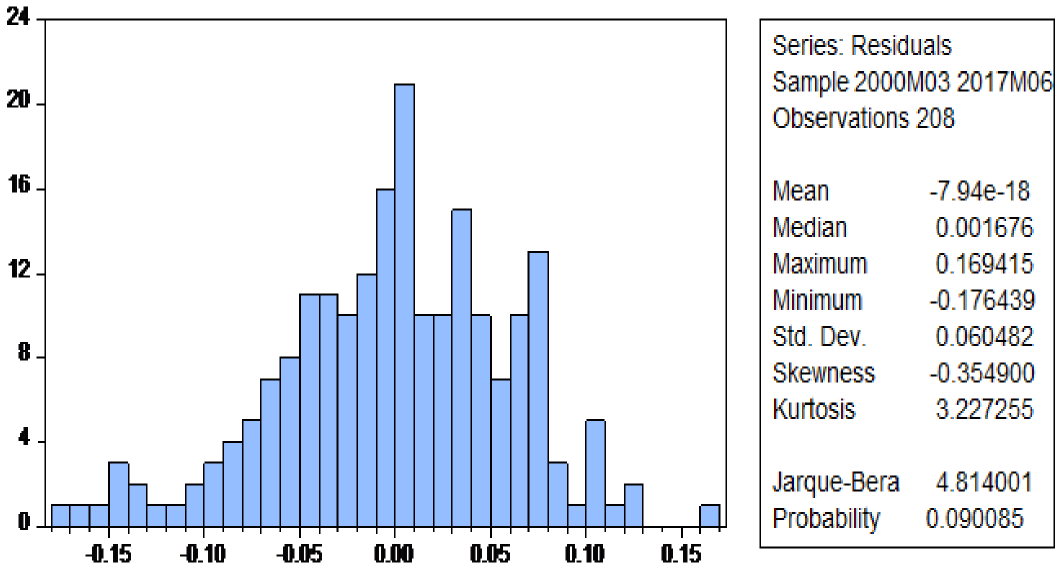

Figure 3: Normality Test

From the above table, it is clear that the probability value is 0.09 which is more than 0.05, thus we can accept the null hypothesis. The data has passed the normality test. Therefore, we can proceed for further analysis.

6.5OLS test

The data set has passed all the required tests we need to consider the OLS method to understand the impact of thevariables on te BSE30 Index.The OLS Method is applied to get the required output.

Dependent Variable: DLBSE30
Method: Least Squares
Date: 11/01/17 Time: 21:31
Sample (adjusted): 2000M03 2017M06
Included observations: 208 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047607	0.025660	1.855305	0.0650
DDLCPI	-0.391002	0.480063	-0.814481	0.4163
DDLM3	0.020254	0.300555	0.067388	0.9463
LCMR	-0.022615	0.013505	-1.674570	0.0956
DLER	-1.222109	0.281940	-4.334643	0.0000
DLFR	0.427571	0.208239	2.053275	0.0413
DLGP	0.014844	0.055433	0.267779	0.7891
DLSP	-0.047335	0.042549	-1.112487	0.2673

R-squared	0.199153	Mean dependent var	0.008348
Adjusted R-squared	0.171123	S.D. dependent var	0.067585
S.E. of regression	0.061531	Akaike info criterion	-2.700838
Sum squared resid	0.757221	Schwarz criterion	-2.572471
Log likelihood	288.8872	Hannan-Quinn criter.	-2.648933
F-statistic	7.105081	Durbin-Watson stat	2.088122
Prob(F-statistic)	0.000000		

Figure 4: Least Square Method

It is evident that the exchange rate is highly significant on BSE30 Index. The next variable having significant impact on BSE 30 Index is found to be the forex reserves and third variable showing impact on the BSE 30 index is the call money rate but not as high as influencing as the first two variables. These results are taken at 10% level of significance.

6.6 Granger CausalityTest

VAR Lag Order Selection Criteria
Endogenous variables: DLBSE30
Exogenous variables: C DDLCPI DDLM3 LCMR DLER DLFR DLGP DLSP
Date: 11/01/17 Time: 20:12
Sample: 2000M01 2017M08
Included observations: 201

Lag	LogL	LR	FPE	AIC	SC	HQ
0	282.3584	NA*	0.003819*	-2.729934*	-2.598459*	-2.676734*
1	282.8259	0.893094	0.003839	-2.724636	-2.576726	-2.664785
2	282.8795	0.101946	0.003876	-2.715219	-2.550876	-2.648719
3	283.2157	0.635517	0.003902	-2.708614	-2.527836	-2.635463
4	283.4210	0.386209	0.003933	-2.700707	-2.503495	-2.620906
5	283.7677	0.648489	0.003958	-2.694206	-2.480559	-2.607755
6	284.4045	1.184799	0.003973	-2.690592	-2.460511	-2.597491
7	284.7283	0.599430	0.004000	-2.683864	-2.437349	-2.584113
8	286.0947	2.515115	0.003986	-2.687509	-2.424559	-2.581108

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Figure 5: VAR Lag Order Selection Criteria

In the present study the Granger Causality test is applied to study the causal relationship between the macroeconomic variables and the BSE30 index.Before the Granger Causality test was applied the ADF test conducted to convert the non-stationary data to a stationary data. After the data attained Stationarity Lag of 8 was chosen by conducting Lag selection. Granger Causality test concluded that there is a Unidirectional relationship between LCMR and DLBSE 30 and the Bi-directional relationship between DLER, DLFR and DLBSE 30. The variables DLER, DLFR & LCMR show there is a significant influence of these variables on the BSE 30 Index at 0.10 level of significance.

Pairwise Granger Causality Tests
Date: 11/01/17 Time: 20:01
Sample: 2000M01 2017M08
Lags: 8

Null Hypothesis:	Obs	F-Statistic	Prob.
DDLCPI does not Granger Cause DLBSE30	202	0.99576	0.4409
DLBSE30 does not Granger Cause DDLCPI		0.49650	0.8577
DDLM3 does not Granger Cause DLBSE30	202	0.24887	0.9806
DLBSE30 does not Granger Cause DDLM3		0.82552	0.5811
LCMR does not Granger Cause DLBSE30	203	2.81070	0.0058
DLBSE30 does not Granger Cause LCMR		0.37578	0.9325
DLER does not Granger Cause DLBSE30	203	1.96629	0.0528
DLBSE30 does not Granger Cause DLER		3.12066	0.0025
DLFR does not Granger Cause DLBSE30	201	1.77307	0.0848
DLBSE30 does not Granger Cause DLFR		2.27703	0.0240
DLGP does not Granger Cause DLBSE30	203	0.98350	0.4503
DLBSE30 does not Granger Cause DLGP		1.35749	0.2179
DLSP does not Granger Cause DLBSE30	203	1.14988	0.3321
DLBSE30 does not Granger Cause DLSP		0.51033	0.8477

Figure 6: Pairwise Granger Causality Tests

VII. Conclusion

In this Study, both the tests i.e. OLS test and Pair-wise Granger Causality Test have shown the same results i.e. the LCMR, DLER, and DLFR have significant influence on the Stock Prices. Meaning the Macro Economic Variables, namely Call Money Rate, Exchange Rate and Foreign Exchange Reserves have shown the significant impact on the Indian Stock Prices of BSE 30 Index.Further research can be done to understand the impact of other macroeconomic variables like WPI, fiscal deficit, real effective exchange rate, T-bill rates, FDI's, FII's, IIP's etc., on sector specific indices of both NSE and BSE. Such will be a comparative study of the indices of NSE and BSE.

References

[1]. Fama, E., Efficient capital markets: A review of theory and empirical work,*The Journal of Finance, Vol. 25, No. 2,*1970, 383-417.

[2]. Ross, Stephen A., The arbitrage theory of capital asset pricing,*Journal of Economic Theory 13*, 1976, 341-60

[3]. Chen, N. F., Richard Roll and Stephen A. Ross (1986) "Economic Forces and the Stock Market", *Journal of Business*, 59, pp. 383-403.

[4]. VenkatrajaB, Impact of macroeconomic variables on stock market performance in India: An empirical analysis, *International Journal of Business Quantitative Economics and Applied Management Research, Volume 1, Issue 6*, 2014, 71-85.

[5]. Singh G,The impact of macroeconomic fundamentals on stock prices revised: A study of Indian stock market,*Journal of International Economics*, *7(1)*, 2016, 76-91.

[6]. Patel S, The effect of macroeconomic determinants on the performance of the Indian stock market, *NMIMS Management Review* 22, 2012, 117-127.

[7]. Gurloveleen K, Bhatia BS, An impact of macroeconomic variables on the functioning of Indian stock market: A study of manufacturing firms of BSE 500,*J Stock Forex Trad,* 5*: 160, doi:10.4172/2168-9458.1000160*, 2015, 1-7.

[8]. Talla, J. T., *Impact of macroeconomic variables on the stock market prices of the Stockholm stock exchange (OMXS30),*Jönköping International Business School, Jönköping University, Sweden, 2013.

[9]. data. *Eurasian Journal of Business and Economics,Vol. 5 (10),* 2012, 25-44.

[10]. Almansour, A.Y., &Almansour, B.Y., Macroeconomic indicators and Saudi equity market: A time series analysis, *British Journal of Economics, Finance and Management Sciences, Vol. 12(2),* 2016, 59-72.

[11]. Ray, H., & Sarkar, J., Macroeconomic link to Indian capital market: A post liberalization evidence. *Modern Economy, Vol. 5, No. 04*, 2014, 272-288.

[12]. Granger, C. W. J., Some properties of time series data and their use in econometric model specification, *Journal of Econometrics, Annals of Applied Econometrics, 16*,1981, 121-30.

[13]. Sarbapriya, Ray, Foreign exchange reserve and its impact on stock market capitalization: Evidence from India, *Research on Humanities and Social Sciences, Vol.2, No.2*,2012.

Websites

[14]. https://dbie.rbi.org.in

[15]. http://databank.worldbank.org/data/home.aspx

[16]. http://www.bseindia.com/sensexview/IndexArchiveData.aspx?expandable=3

[17]. http://www.ajournal.co.uk

[18]. http://www.scirp.org

[19]. https://www.ejbe.org

[20]. http://citeseerx.ist.psu.edu

[21]. https://ideas.repec.org/a/eee/econom/v16y1981i1p121-130.html

[22]. www.diva-portal.org

[23]. https://www.omicsonline.org

[24]. http://www.nmims.edu/NMIMSmanagementreview/pdf/august-2012/06-effect-macroeco-performance-indian-stock-market.pdf
[25]. https://papers.ssrn.com
[26]. http://rady.ucsd.edu
[27]. http://efinance.org.cn

VIII. Annexure

Dependent Variable: BSE30
Method: Least Squares
Date: 10/31/17 Time: 21:50
Sample (adjusted): 2000M01 2017M06
Included observations: 210 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17035.62	3490.719	4.880261	0.0000
CMR	180.0458	67.94192	2.649996	0.0087
CPI	162.8462	53.78222	3.027882	0.0028
FR	0.007749	0.004917	1.575920	0.1166
ER	-556.0925	66.56534	-8.354084	0.0000
GP	-0.229471	0.073296	-3.130736	0.0020
M3	0.224597	0.054272	4.138372	0.0001
SP	-0.046544	0.027671	-1.682024	0.0941

R-squared	0.960197	Mean dependent var	14338.20
Adjusted R-squared	0.958818	S.D. dependent var	8439.402
S.E. of regression	1712.647	Akaike info criterion	17.76682
Sum squared resid	5.92E+08	Schwarz criterion	17.89433
Log likelihood	-1857.516	Hannan-Quinn criter.	17.81837
F-statistic	696.1389	Durbin-Watson stat	0.337068
Prob(F-statistic)	0.000000		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	10.51042	Prob. F(7,202)	0.0000
Obs*R-squared	56.06617	Prob. Chi-Square(7)	0.0000
Scaled explained SS	72.81676	Prob. Chi-Square(7)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/31/17 Time: 21:53
Sample: 2000M01 2017M06
Included observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-18162786	8411132.	-2.159375	0.0320
CMR	547504.7	163710.8	3.344340	0.0010
CPI	239913.1	129592.0	1.851295	0.0656
FR	50.38346	11.84886	4.252179	0.0000
ER	101611.8	160393.9	0.633514	0.5271
GP	-842.0605	176.6126	-4.767839	0.0000
M3	-229.8892	130.7716	-1.757944	0.0803
SP	154.0310	66.67572	2.310151	0.0219

R-squared	0.266982	Mean dependent var	2821422.
Adjusted R-squared	0.241580	S.D. dependent var	4738628.
S.E. of regression	4126744.	Akaike info criterion	33.34123
Sum squared resid	3.44E+15	Schwarz criterion	33.46874
Log likelihood	-3492.829	Hannan-Quinn criter.	33.39277
F-statistic	10.51042	Durbin-Watson stat	0.645316
Prob(F-statistic)	0.000000		

Dependent Variable: LBSE30
Method: Least Squares
Date: 10/31/17 Time: 22:02
Sample (adjusted): 2000M01 2017M06
Included observations: 210 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCMR	0.113491	0.044952	2.524706	0.0123
LCPI	1.513189	0.626063	2.416992	0.0165
LER	-2.044562	0.294927	-6.932444	0.0000
LFR	0.129391	0.154687	0.836469	0.4039
LGP	-0.443130	0.147830	-2.997571	0.0031
LM3	0.692927	0.443948	1.560828	0.1201
LSP	0.103673	0.105714	0.980694	0.3279
C	4.566225	0.992571	4.600400	0.0000

R-squared	0.938046	Mean dependent var	9.337975
Adjusted R-squared	0.935899	S.D. dependent var	0.744760
S.E. of regression	0.188560	Akaike info criterion	-0.461449
Sum squared resid	7.182095	Schwarz criterion	-0.333940
Log likelihood	56.45213	Hannan-Quinn criter.	-0.409902
F-statistic	436.9232	Durbin-Watson stat	0.177847
Prob(F-statistic)	0.000000		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	7.084278	Prob. F(7,202)	0.0000
Obs*R-squared	41.39231	Prob. Chi-Square(7)	0.0000
Scaled explained SS	32.95052	Prob. Chi-Square(7)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/31/17 Time: 22:03
Sample: 2000M01 2017M06
Included observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.309780	0.215755	1.435793	0.1526
LCMR	0.001466	0.009771	0.150039	0.8809
LCPI	-0.179039	0.136087	-1.315618	0.1898
LER	-0.038427	0.064108	-0.599406	0.5496
LFR	-0.057775	0.033624	-1.718242	0.0873
LGP	-0.125455	0.032134	-3.904169	0.0001
LM3	0.163428	0.096501	1.693542	0.0919
LSP	0.082410	0.022979	3.586301	0.0004

R-squared	0.197106	Mean dependent var	0.034200
Adjusted R-squared	0.169283	S.D. dependent var	0.044970
S.E. of regression	0.040987	Akaike info criterion	-3.513759
Sum squared resid	0.339351	Schwarz criterion	-3.386251
Log likelihood	376.9447	Hannan-Quinn criter.	-3.462212
F-statistic	7.084278	Durbin-Watson stat	0.541141
Prob(F-statistic)	0.000000		

Dependent Variable: DLBSE30
Method: Least Squares
Date: 10/31/17 Time: 22:11
Sample (adjusted): 2000M02 2017M06
Included observations: 209 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLCMR	0.021809	0.019909	1.095444	0.274
DLCPI	-0.036921	0.582643	-0.063368	0.949
DLER	-1.289401	0.280031	-4.604492	0.000
DLFR	0.521318	0.210179	2.480353	0.013
DLGP	0.019436	0.055764	0.348539	0.727
DLM3	-0.357054	0.422276	-0.845548	0.398
DLSP	-0.048097	0.042640	-1.127982	0.260
C	0.009559	0.007440	1.284745	0.200

R-squared	0.192818	Mean dependent var	0.00852
Adjusted R-squared	0.164707	S.D. dependent var	0.06747
S.E. of regression	0.061665	Akaike info criterion	-2.69668
Sum squared resid	0.764313	Schwarz criterion	-2.56874
Log likelihood	289.8031	Hannan-Quinn criter.	-2.64495
F-statistic	6.859208	Durbin-Watson stat	2.06889
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LBSE30) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-13.32629	0.0000
Test critical values:	1% level	-3.461478	
	5% level	-2.875128	
	10% level	-2.574090	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LBSE30,2)
Method: Least Squares
Date: 11/01/17 Time: 19:31
Sample (adjusted): 2000M03 2017M08
Included observations: 210 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LBSE30(-1))	-0.920993	0.069111	-13.32629	0.0000
C	0.007702	0.004684	1.644395	0.1016

R-squared	0.460567	Mean dependent var	-0.000332
Adjusted R-squared	0.457974	S.D. dependent var	0.091429
S.E. of regression	0.067312	Akaike info criterion	-2.549474
Sum squared resid	0.942432	Schwarz criterion	-2.517597
Log likelihood	269.6948	Hannan-Quinn criter.	-2.536587
F-statistic	177.5901	Durbin-Watson stat	1.983088
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LCPI,2) has a unit root
Exogenous: Constant
Lag Length: 10 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.93432	0.0000
Test critical values:	1% level	-3.463235	
	5% level	-2.875898	
	10% level	-2.574501	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LCPI,3)
Method: Least Squares
Date: 11/01/17 Time: 19:33
Sample (adjusted): 2001M02 2017M08
Included observations: 199 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LCPI(-1),2)	-7.816498	0.654960	-11.93432	0.0000
D(LCPI(-1),3)	6.118151	0.618222	9.896373	0.0000
D(LCPI(-2),3)	5.363388	0.568277	9.437983	0.0000
D(LCPI(-3),3)	4.732069	0.507768	9.319357	0.0000
D(LCPI(-4),3)	4.073223	0.445059	9.152105	0.0000
D(LCPI(-5),3)	3.349116	0.388296	8.625160	0.0000
D(LCPI(-6),3)	2.798128	0.319703	8.752263	0.0000
D(LCPI(-7),3)	2.022489	0.260263	7.770939	0.0000
D(LCPI(-8),3)	1.399720	0.194946	7.180047	0.0000
D(LCPI(-9),3)	0.837061	0.127174	6.582012	0.0000
D(LCPI(-10),3)	0.376251	0.067689	5.558546	0.0000
C	9.64E-06	0.000454	0.021204	0.9831

R-squared	0.828732	Mean dependent var	-0.000106
Adjusted R-squared	0.818658	S.D. dependent var	0.015048
S.E. of regression	0.006408	Akaike info criterion	-7.204099
Sum squared resid	0.007679	Schwarz criterion	-7.005508
Log likelihood	728.8079	Hannan-Quinn criter.	-7.123724
F-statistic	82.25970	Durbin-Watson stat	2.065784
Prob(F-statistic)	0.000000		

Null Hypothesis: LCMR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.094119	0.0000
Test critical values:	1% level	-3.461327	
	5% level	-2.875062	
	10% level	-2.574054	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LCMR)
Method: Least Squares
Date: 11/01/17 Time: 19:32
Sample (adjusted): 2000M02 2017M08
Included observations: 211 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCMR(-1)	-0.219955	0.043178	-5.094119	0.0000
C	0.404551	0.080935	4.998482	0.0000

R-squared	0.110449	Mean dependent var	-0.001368
Adjusted R-squared	0.106193	S.D. dependent var	0.217791
S.E. of regression	0.205903	Akaike info criterion	-0.313390
Sum squared resid	8.860775	Schwarz criterion	-0.281618
Log likelihood	35.06259	Hannan-Quinn criter.	-0.300547
F-statistic	25.95005	Durbin-Watson stat	2.091602
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LFR) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.889219	0.0001
Test critical values:	1% level	-3.462095	
	5% level	-2.875398	
	10% level	-2.574234	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LFR,2)
Method: Least Squares
Date: 11/01/17 Time: 19:40
Sample (adjusted): 2000M05 2017M06
Included observations: 206 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFR(-1))	-0.401097	0.082037	-4.889219	0.0000
D(LFR(-1),2)	-0.287379	0.081713	-3.516929	0.0005
D(LFR(-2),2)	-0.207026	0.068781	-3.009935	0.0029
C	0.004689	0.001734	2.705033	0.0074

R-squared	0.343492	Mean dependent var	5.68E-05
Adjusted R-squared	0.333742	S.D. dependent var	0.025579
S.E. of regression	0.020879	Akaike info criterion	-4.880966
Sum squared resid	0.088054	Schwarz criterion	-4.816347
Log likelihood	506.7395	Hannan-Quinn criter.	-4.854832
F-statistic	35.22951	Durbin-Watson stat	2.015617
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LER) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.38943	0.0000
Test critical values:	1% level	-3.461478	
	5% level	-2.875128	
	10% level	-2.574090	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LER,2)
Method: Least Squares
Date: 11/01/17 Time: 19:39
Sample (adjusted): 2000M03 2017M08
Included observations: 210 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LER(-1))	-0.684046	0.065841	-10.38943	0.0000
C	0.001233	0.001132	1.089297	0.2773

R-squared	0.341648	Mean dependent var	-4.38E-05
Adjusted R-squared	0.338482	S.D. dependent var	0.020053
S.E. of regression	0.016310	Akaike info criterion	-5.384582
Sum squared resid	0.055332	Schwarz criterion	-5.352704
Log likelihood	567.3811	Hannan-Quinn criter.	-5.371695
F-statistic	107.9402	Durbin-Watson stat	1.949671
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LGP) has a unit root
Exogenous: Constant
Lag Length: 11 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.471541	0.0003
Test critical values:	1% level	-3.463235	
	5% level	-2.875898	
	10% level	-2.574501	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGP,2)
Method: Least Squares
Date: 11/01/17 Time: 19:41
Sample (adjusted): 2001M02 2017M08
Included observations: 199 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGP(-1))	-1.890176	0.422712	-4.471541	0.0000
D(LGP(-1),2)	0.923726	0.391380	2.360178	0.0193
D(LGP(-2),2)	0.836189	0.360870	2.317147	0.0216
D(LGP(-3),2)	0.410227	0.324025	1.266035	0.2071
D(LGP(-4),2)	0.428894	0.292069	1.468466	0.1437
D(LGP(-5),2)	0.345245	0.259699	1.329403	0.1853
D(LGP(-6),2)	-0.016773	0.220788	-0.075968	0.9395
D(LGP(-7),2)	0.003663	0.189916	0.019289	0.9846
D(LGP(-8),2)	-0.074734	0.157449	-0.474654	0.6356
D(LGP(-9),2)	-0.444557	0.114749	-3.874159	0.0001
D(LGP(-10),2)	-0.388977	0.091148	-4.267524	0.0000
D(LGP(-11),2)	-0.472557	0.064509	-7.325413	0.0000
C	0.017753	0.006079	2.920224	0.0039

R-squared	0.871410	Mean dependent var	0.000201
Adjusted R-squared	0.863114	S.D. dependent var	0.177477
S.E. of regression	0.065663	Akaike info criterion	-2.545467
Sum squared resid	0.801964	Schwarz criterion	-2.330326
Log likelihood	266.2739	Hannan-Quinn criter.	-2.458394
F-statistic	105.0385	Durbin-Watson stat	1.977344
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LSP) has a unit root
Exogenous: Constant
Lag Length: 11 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.144830	0.0000
Test critical values:	1% level	-3.463235	
	5% level	-2.875898	
	10% level	-2.574501	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LSP,2)
Method: Least Squares
Date: 11/01/17 Time: 19:44
Sample (adjusted): 2001M02 2017M08
Included observations: 199 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSP(-1))	-2.343344	0.455475	-5.144830	0.0000
D(LSP(-1),2)	1.268399	0.425036	2.984211	0.0032
D(LSP(-2),2)	1.233587	0.392058	3.146438	0.0019
D(LSP(-3),2)	0.721835	0.358226	2.015029	0.0453
D(LSP(-4),2)	0.667452	0.325071	2.053251	0.0414
D(LSP(-5),2)	0.605133	0.288873	2.094806	0.0375
D(LSP(-6),2)	0.247334	0.248774	0.994209	0.3214
D(LSP(-7),2)	0.197009	0.214529	0.918332	0.3596
D(LSP(-8),2)	0.164416	0.176800	0.929955	0.3536
D(LSP(-9),2)	-0.162382	0.131626	-1.233659	0.2189
D(LSP(-10),2)	-0.238048	0.104236	-2.283750	0.0235
D(LSP(-11),2)	-0.268140	0.070655	-3.795060	0.0002
C	0.019337	0.009399	2.057430	0.0410

R-squared	0.745284	Mean dependent var	0.000553
Adjusted R-squared	0.728851	S.D. dependent var	0.234186
S.E. of regression	0.121945	Akaike info criterion	-1.307396
Sum squared resid	2.765935	Schwarz criterion	-1.092255
Log likelihood	143.0859	Hannan-Quinn criter.	-1.220323
F-statistic	45.35213	Durbin-Watson stat	1.971534
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LM3,2) has a unit root
Exogenous: Constant
Lag Length: 10 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.61635	0.0000
Test critical values:	1% level	-3.463235	
	5% level	-2.875898	
	10% level	-2.574501	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LM3,3)
Method: Least Squares
Date: 11/01/17 Time: 19:43
Sample (adjusted): 2001M02 2017M08
Included observations: 199 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LM3(-1),2)	-10.49316	0.831712	-12.61635	0.0000
D(LM3(-1),3)	8.443896	0.796739	10.59806	0.0000
D(LM3(-2),3)	7.445182	0.745984	9.980353	0.0000
D(LM3(-3),3)	6.431871	0.683026	9.416723	0.0000
D(LM3(-4),3)	5.425941	0.605688	8.958318	0.0000
D(LM3(-5),3)	4.449340	0.518077	8.588182	0.0000
D(LM3(-6),3)	3.676520	0.417158	8.813257	0.0000
D(LM3(-7),3)	2.842767	0.320405	8.872427	0.0000
D(LM3(-8),3)	2.069277	0.227149	9.109790	0.0000
D(LM3(-9),3)	1.282356	0.143845	8.914823	0.0000
D(LM3(-10),3)	0.479345	0.068742	6.973082	0.0000
C	-0.000414	0.000626	-0.661375	0.5092

R-squared	0.880841	Mean dependent var	0.000122
Adjusted R-squared	0.873832	S.D. dependent var	0.024819
S.E. of regression	0.008816	Akaike info criterion	-6.566161
Sum squared resid	0.014533	Schwarz criterion	-6.367570
Log likelihood	665.3330	Hannan-Quinn criter.	-6.485786
F-statistic	125.6667	Durbin-Watson stat	2.095080
Prob(F-statistic)	0.000000		

IX. Acronyms

S. No	Acronyms	Used for
	IIP	Index of Industrial Production of respective countries
	WPI	Wholesale Price Index of respective countries
	GP	Gold Prices in the respective countries
	FII	Foreign Institutional Investors in the respective countries
	REER	Real Effective Exchange Rates of the respective countries
	ANOVA	Analysis of Variance
	MS	Money Supply of the respective countries
	ER	Exchange Rate of the respective currencies
	ADF	Augmented Dickey-Fuller unit root test to examine stationarity of data
	VECM	Vector Error Correction Model
	IR	Interest Rate
	CPI	Consumer Price Index of the respective countries
	SP	Silver Prices in the respective countries
	OP	Oil Prices in the respective countries
	S&P CNX Nifty	Standard & Poor's 50 largest stocks on the National Stock Exchange (NSE) of India
	CMR	Call Money Rate of the respective countries
	FR	Foreign Reserves of the respective countries
	GFD	Gross Fiscal Deficit of the respective countries
	BSE 500	Bombay Stock Exchange Top 500 stocks index
	OMXS30	A stock market index of Stockholm Stock Exchange consisting of 30 most-traded stocks
	GB	Government Bonds of the respective countries
	DF-GLS Test	A test for a unit root in an economic time series sample