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The Dynamics of Stock Prices, Call Money Rate, Consumer Price Index and Exchange Rates in India: A VAR Analysis for the Period from 2015 to 2023

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ABSTRACT

The importance of the manufacturing sector in a developing or near developed economy like India is well established. The mechanism through which capital is augmented by offering the share of ownership to the public. The stock prices and its variations are the key stones of investor confidence that in fact promotes the speed of public purchase of stocks. The dynamics of stock prices is usually analyzed with the variables of macroeconomic fundamentals especially, call money rate as a reflection of the monetary policy, the consumer price inflation, and exchange rate of rupee against major currencies. After checking for the existence of long run relationships using the Johansen procedure, a VAR model is used to capture the short run dynamics of mean stock prices, call money rate, consumer price index and exchange rates for the period from 2015 to 2023. The result showed that the mean stock prices are affected by its own previous values only rather than being affected by call money rate, CPI and exchange rate.

Key words: VAR model, inflation dynamics, mean stock price, CPI, Call money rate

1. Introduction

Manufacturing sector is the backbone of any developing or developed economy in the world. Indian economic growth also relies upon manufacturing sector. In her march towards a developed economy, the contribution of the manufacturing sector is immense; its share in the GDP has been increased from the low level of around 13 per cent in 1951 to nearly 28 per cent in 2024. This structural shift is not without shocks, interruptions, and fluctuations. Oil shock of 1970s, fiscal crisis during 1980s and 1990s, and a series of security swindle in 1992, 2001 and

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2009, recession in in 2008, and the recent Covid-19 pandemic are some of them along with daily short-term fluctuations. Though some of these interruptions are entirely exogenous to the macroeconomy, while some of them are endogenous. The potential of the manufacturing could be enhanced and optimised through diversification of industries and maintaining reasonable macroeconomic stability. In managing these challenges and stabilising their operations, manufacturers are urgently intervening by—investing in digital technologies, undertaking resource redistribution and repurposing, regionalizing, and localizing, servitizing, and targeting policies that can help them survive in an economy with modern wings and old distortions. These challenges and stabilization also impacted stock prices, the volatility of which is an indication of the strength of the manufacturing for making investments there. Nowadays all investors are hoped to be completely informed about the market. As manufacturing is an important sector in India, analyzing its stock price movements in response to important macroeconomic variables is very crucial. The instability in the manufacturing would reflect in the instability of the whole economy on the one side and on the other, the share of manufacturing should be further increased for rapid growth of the economy.

The growth objective of a developing economy is vast but which require huge investments in the manufacturing among other sectors. considering many options available, an important and widely accepted mechanism for amassing new and or additional capital is offering the ownership of the company to the public in the capital market. Rational investors often seek reasonable return for their investment, which in turn is subject to market fluctuations and macroeconomic fundamentals. The ability of individual investors to assess and predict future macroeconomic events really brings rewards to their investment.

However, the stock prices are highly volatile depending on the relative strength of demand for and supply of stocks. The stock price fluctuation, which often takes place daily, may be viewed as systematic risk, and could not be controlled by the investor as it relates to changes emerging from macroeconomic fundamentals and external shocks. The domestic macroeconomic variables that often impact the stock price variations are inflation and changes in interest rates and exchange rates.

Inflation, indeed, in addition to reducing purchasing power, reduces the value of currency and both generate the risk of losing real income of people in general and investors in particular. Variation in short term interest rate is an indication about the direction of changes in the term deposit and credit rates. In a high-interest rate scenario, investors are left with choices of relatively low risk fixed deposits and risky stocks for parking their funds.

Exchange rate of rupee against major currencies also influences stock prices. Some manufacturing firms import their inputs from foreign countries and some others are export

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oriented. Depreciation of rupee, for instance, makes imports costlier in the domestic country whereas foreigners feel imports from currency depreciated country less costly than before. Besides, if investors feel the forex market is more attractive than capital market, they are likely to switch to the foreign exchange market.

2. Literature Review

Stock prices are regarded a leading and important indicator for economic activity (Stock and Watson, 2003; Rapach and Weber, 2004). What factors drive these markets are very important. Primarily, stock prices are driven by financial variables (Bekaert, Engstrom, & Xing, 2009). However, the importance of macroeconomic variables cannot be ruled out (Rapach and Zhou, 2013).

An exhaustive review of literature on the impact of macroeconomic variables on stock market prices show contradictions. Trade-weighted dollar and US stock prices are positively connected (Aggarwal,1981). In contrast to this finding, a high negative association between the US stock index and the value-weighted dollar of fifteen other currencies was discovered (Soenen & Hennigar, 1988). However, a two-way causality was found between stock prices and the effective dollar exchange rate as assessed by the S&P 500 index (Bahmani-Oskooee & Sohrabian, 1992) Ajayi et al., (1998) established unidirectional causation from stock to currency markets in rich countries, but could not find consistent causal link in such markets of developing countries.

Sensoy and Cihat Sobachi (2014) analysed the dynamic relationship between exchange rate (against US dollar), interest rate and the stock market (both in local currency) of Turkey from January 2003 to September 2013. They estimated the dynamic correlations among these variables in high volatile periods using the VAR(p)–FIAPARCH (1, d,1)–cDCC(1,1) approach. They found that the dynamic correlations change in the highly volatile periods; volatility shocks create abrupt changes in the dynamic correlations; however, only for short term without sustaining between consecutive high volatility regimes.

Changes in interest rates had a considerable impact on the stock price index, (Yunita & Robiyanto, 2018). Geske & Roll (1983) also found that stock prices are impacted by macroeconomic fluctuations reflected in inflation rate, interest rate, currency rate, industrial output index, and oil price in their research.

The research on the link between stock prices and macroeconomic factors in Emerging Stock Markets (ESMs) in developing countries began since 1980s. In the course of time, the interest to invest in developing economies has been exploded. The ESM returns and risks had been higher than that in developed markets (Graham & Harvey, 1995). Further, research have been carried out to investigate the factors that influence stock price changes (Fama & French, 1988; Bulmash

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& Trivoli, 1991; Abdullah & Hayworth, 1993). All these researches show a strong correlation between macroeconomic conditions and stock prices in developing market countries.

In contrast to the developed countries, Sensoy and Cihat Sobachi (2014) observed a consistent positive correlation between bond and foreign exchange markets. This turns out to be the evidence for the negative anticipation of the investors when interest rates increase in emerging markets with history of high budget deficits. Accordingly, an increase in the interest rates is perceived as a possible upcoming problem in the budget deficit countries. This event results with a severe capital outflow, thus, creating a pressure favoring local currency depreciation against the US dollar. They also noticed that in many cases, the source of the upwards volatility shifts is external, not caused by Turkey's domestic problems. Such a situation shows that like many emerging countries, Turkey's money and capital markets are not immune to global politic-economic financial conditions. The volatility shocks create severe changes in the dynamic correlations between these markets. An interesting observation is that the direction of these severe changes may be different for the same couple of markets implying that the response of the dynamic correlation against a volatility shock may be time dependent. Hence policymakers do not need to react to volatility shocks to prevent a long run contagion between these markets (Sensoy and Sobachi , 2014).

The impact of exchange rate shocks on stock prices is negligible (Chakravarty & A. Mitra, 2013).

Researches in the United States, G-7 countries and New Sea land found that interest rates have an influence on stock prices (Gallagher and Taylor (2002); Abdullah and Haywort (1993); and Gan, Lee, Yong and Zhang (2006) states that interest rates have an influence on stock prices, but the relationship is only one way.

The Effect of Interest Rates on Emerging Market Stock Prices was studied by Rahman and Mohsin (2011) in Pakistan for the 1998-2011 period and Oladeji, Ikpefan, & Alege (2018) in Nigeria for the 1985-2015 period. These studies showed a negative effect of interest rates on share prices. Besides, the research by Chen, Kim, & Kim (2005) in Nigeria for the period 1989-2003 and El-Nader & Alraimony (2012) in Jordan for the period 1991-2010 also affirmed that the interest rates have a significant effect on stock prices.

There are also mixed results on the research that money supply, which has a negative impact on the rate of interest, has impacts on share prices and the direction of the relationship. Flannery & Protopapadakis (2002), in the research at United Kingdom, Switzerland, Belgium and the United States for the period 1980 to 1996, found that the money supply has an influence on stock prices. But the opposite was the finding of Humpe & Macmillan (2009), in Japan and the United States

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for the research period from 1965 to 2005 and Maysami, Howe, & Hamzah (2004), in Singapore for the research period 1989 to 2001. Money supply had no effect on stock prices. However, a positive effect was confirmed by Kim (2003) in the United States for the research period from 1974 to 1998 and Maysami & Koh (2000), in Singapore for the research period 1988 to 1995.

The relationship between inflation and stock price volatility is also mixed. The analytical literature explains both a positive and negative, as well as short run and long run relationships. Xueting Mai and Xinyu Wang (2024) noticed a positive long run relationship between stock market volatility and CPI inflation in the Shanghai stock exchange of China. Chakravarty & A. Mitra, in a VAR model setting, using monthly data for index of industrial production, wholesale price index, exchange rate, stock prices and foreign institutional investment, noticed that the stock prices have an impact on inflation whereas the causality in the reverse direction is not prominent in India. The impulse response function tends to suggest that the relationship was rather negative. At low stock prices, firms are reluctant to tap the possibility of capital market. Unless finance from banks can substitute the capital market, the investment and production plans of the firms would be hit and the production would decline. In the very long run, however, inflation influences stock prices in a positive direction. Unexpected inflation raises the firm's equity value if they are net debtor. Similarly, in India, tightening of monetary policy can reduce inflation and stock prices both, as individuals will be left with less money to buy goods or buy stocks (Chakravarty & A. Mitra, 2013).

The dynamic interplay between financial markets and macroeconomic variables has long fascinated researchers, policymakers, and investors. In this study, the researchers delve into the relationship among stock prices and fundamental macroeconomic variables, inflation, interest rates, and exchange rates. In this study, specifically, focus is given to the dynamics of manufacturing stock prices on three critical variables: **Consumer Price Index (CPI), call money rates**, and **exchange rate of rupee against a basket of currencies.** The CPI reflects inflationary pressures. As prices rise, investors seek assets that can preserve their purchasing power. Investigating the relationship between CPI and manufacturing stock prices helps to gauge how inflation expectations influence investment decisions. Call money rates (short-term interest rates) are influenced by central bank policies. A rise in call money rates may signal tighter monetary policy, affecting investor sentiment and stock market performance. Exchange rate movements impact export-oriented industries, including manufacturing. Depreciation of the domestic currency can boost manufacturing firms' competitiveness and positively affect stock prices. Incorporating exogenous variables allows to capture external influences beyond the endogenous relationships. Exogenous variables enhance the model's explanatory power and forecasting accuracy.

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In the context of the theoretical framework and scenario depicted in the foregoing paragraphs, this paper answers the question "can we predict any of the variables based on the dynamics of the other variables" among mean stock prices, call money rate, consumer price index and exchange rate in India as explained below for the period from 2015 June to 2023 August. Whether the data supports the theoretical underpinnings enunciated in the foregoing analysis.

3. Research Methods

The present study makes use of advanced time series analysis techniques and related tests which includes Augmented Dickey Fuller tests for stationarity, Johansen test for cointegration, VAR stability test and Granger causality test. After a detailed examination of the data set, the most suitable model for studying the impact of macroeconomic shocks is found to be either a VAR model or a Vector Error Correction (VECM) model which is a variant of the former.

4. Data set and variables

The data set used for this study is entirely collected from secondary sources such as the Data Base on Indian Economy (DBIE) of Reserve Bank of India (RBI) and the official website for Bombay Stock Exchange (BSE) for the period from June 2015 to August 2023. The average monthly estimates for the variables listed below have been collected.

1. The combined average manufacturing monthly closing stock prices valued at INR termed as Manufacturing Stock Price (MSP).
2. The average monthly Consumer Price Index (CPI) with 2012=100 from RBI's DBIE.
3. The monthly average call money rate (CMR), which is an indicator for the short-term cost for funds and the current money supply scenario, from RBI's DBIE.
4. The exchange rate of Rupee (EXR) against the Special Drawing Rights (SDR) which is a weighted basket of currencies of five trading partners, namely the US, European Union, Japan, China, and the UK. The currencies thus included are US Dollar, Euro, Japanese Yen, Chinese Renminbi and Pound sterling. The SDR is valued in Indian Rupee per foreign currency.

5. Results and Analysis

VAR models are apt tools for drawing the mutual interrelationships among a set of endogenous time series variables. When time series variables are non-stationary, a VAR model in levels is not appropriate since it is a spurious regression which is not interpretable. However, although variables are non-stationary, if at least one cointegrating relationship exists a VAR model in

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levels can be estimated which has a long-term interpretation. The long run equilibrium of the variables could be identified and explained. The cointegrating relationship indicate one or more long-run equilibrium or stationary relationships among non-stationary variables.

To determine which model the VAR model in levels or a VECM in first differences (with error correction terms), we need to transform VAR model in levels into a VECM in first differences (with error correction terms) and to the latter the Johansen test for cointegration can be applied. If at least one cointegrating relationship is detected, it could be the evidence for long run equilibrium or relationship among the variables, naturally the apt model would be the VECM. The graphical view of the variables (Fig 1), however, shows that none of the variables move together over time and hence may not be cointegrated themselves.

Fig. 1 Graphical view of manufacturing Stock Price (MSP), Consumer Price Index (CPI), Call Money Rate (CMR) and Exchange Rate (EXR)

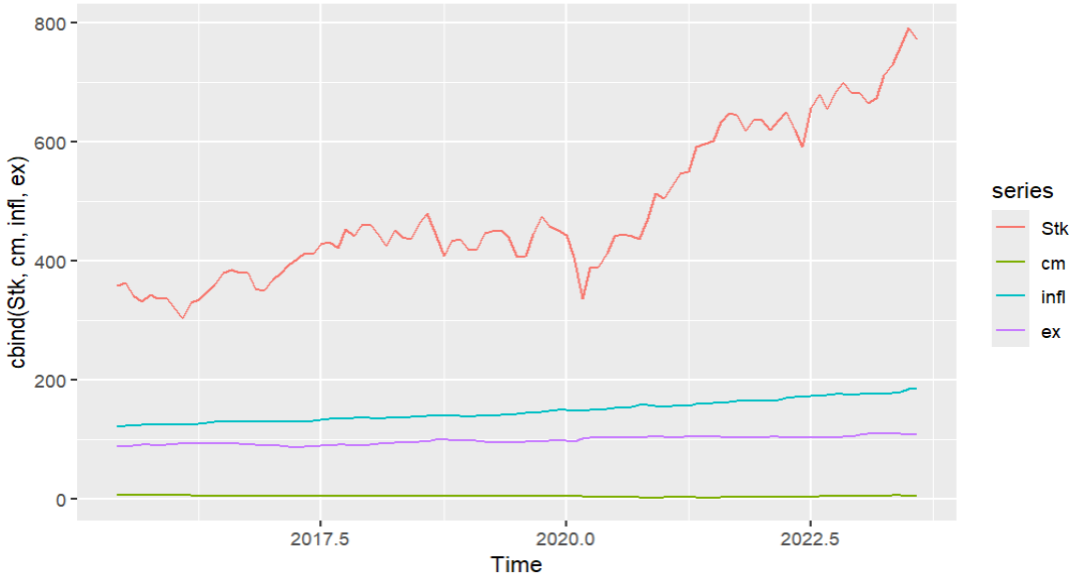

Table 1 shows the augmented Dickey Fuller Test result of the variables under analysis.

Table 1. ADF test result of variables in levels I (0)

Sl. No	Variable	ADF Value	Prob.
1	MSP	1.931744	0.9869
		(-2.588772)	0.01

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2	CMR	-0.459842	0.5135
		(-2.589273)	0.01
3	CPI	4.117486	1.0000
		(2.58920)	0.01
4	EXR	1.656347	0.9758
		(-2.588772)	0.01

Figures in brackets are critical values of the ADF statistic at 1% level of significance

Source: authors calculations

All the variables, MSP, CMR, CPI and EXR are nonstationary in levels. The probability value for each estimated ADF value is much higher than the accepted significance levels, 0.05 and therefore the test evidence does not conform to the rejection of the null hypothesis that the variables are nonstationary. However, transforming the variables into first differences or integrated of order I (1) and performing ADF test again leads to table 2.

Table 2. ADF test result of variables in I (1)

Sl. No	Variable	ADF Value	Prob.
1	MSP	-9.045470	0.0000
		(-2.589020)	0.01
2	CMR	-3.907312	0.0001
		(-2.589273)	0.01
3	CPI	-5.620895	0.0000
		(2.58920)	0.01
4	EXR	-9.405970	0.0000
		(-2.589020)	0.01

Figures in brackets are critical values of the ADF statistic at 1% level of significance.

Source: authors calculations

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Integrating all variables I (1) makes them stationary. There is ample evidence to reject the null hypothesis that the variables are non-stationary even at 1 per cent level of significance.

Johansen has formulated the trace test and maximum eigen value tests as procedures for determining the number of cointegrating vectors, r.

$$\text{trace}(r_0 / 4) = -T \sum_{i=r_0+1}^{k} \ln(1-\hat{\lambda}_i)$$

$$\lambda_{\max}(k-1) = -T\ln(1-\lambda_k)$$

The trace and maximum eigen value test result is displayed in table 3.

Table:3 Trace and Maximum Eigen value test result

Sample (adjusted): 2015M09 2023M08

Included observations: 96 after adjustments

Trend assumption: Linear deterministic trend

Series: MSP CMR CPI EXR

Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.105224	25.23072	47.85613	0.9124
At most 1	0.083588	14.55731	29.79707	0.8079
At most 2	0.059838	6.177529	15.49471	0.6745
At most 3	0.002643	0.254026	3.841466	0.6143

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

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Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.105224	10.67341	27.58434	0.9731
At most 1	0.083588	8.379781	21.13162	0.8790
At most 2	0.059838	5.923503	14.26460	0.6231
At most 3	0.002643	0.254026	3.841466	0.6143

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The null hypothesis that $r = 0$ against the alternative $r \geq 1$ (trace test) or the null $r = 0$ against the alternative $r = 1$ (maximum eigen value test) cannot be rejected at 5 per cent level of significance based on the test result given in table.3 . The data do not support evidence for at least one cointegrating relation among the variables, MSP, CMR, CPI and EXR. Therefore, the data involves no implied long run relationships, instead the underlying relationship is found to be for short periods and hence the suitable model is the VAR in first differences which ensures stationarity with appropriate lag length.

The direction of change or the causality can be checked using the granger causality test for the four endogenous variables. First, need to determine the model with appropriate lag length, a model with lags up to 4 is tried and estimated the AIC, BIC and HQC values (table 4). The minimum AIC and HQC value are relating to lag 2 comparing the minimum value for BIC for lag 1. The minimum value for AIC is less than the minimum for BIC value. The average measure of AIC and BIC, the HQC also recommends the optimum lag length as 2.

Table 4. VAR system, maximum lag order 4

The asterisks below indicate the best (that is, minimized) values

of the respective information criteria, AIC = Akaike criterion,

BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

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lags	loglik	p(LR)	AIC	BIC	HQC
1	-650.77206		14.271746	14.812873*	14.490321
2	-626.52766	0.00004	14.096333*	15.070361	14.489769*
3	-618.62191	0.46619	14.268551	15.675480	14.836848
4	-609.26633	0.28393	14.409922	16.249752	15.153079

The VAR output for first differenced variables with the optimum lag length 2 is displayed in table 5.

Table. 5 Vector Autoregression Estimates

Sample (adjusted): 2015M09 2023M08

Included observations: 96 after adjustments

Standard errors in ( ) & t-statistics in [ ]

	D(MSP)	D(CMR)	D(CPI)	D(EXR)
D(MSP(-1))	0.089633	0.000305	-0.001187	-0.006475
	(0.11417)	(0.00080)	(0.00477)	(0.00636)
	[0.78509]	[0.37969]	[-0.24864]	[-1.01798]
P value	0.4345	0.7051	0.8042	0.3115
D(MSP(-2))	-0.269471	0.002088	0.009783	0.005795
	(0.11398)	(0.00080)	(0.00477)	(0.00635)
	[-2.36413]	[2.60379]	[2.05291]	[0.91261]
P value	0.0203 **	0.0108 **	0.0431 **	0.364
D(CMR(-1))	7.409673	0.198671	0.715489	0.729974
	(13.9209)	(0.09794)	(0.58200)	(0.77556)
	[0.53227]	[2.02840]	[1.22937]	[0.94122]
P value	0.5959	0.0456 **	0.2222	0.3492
D(CMR(-2))	-8.798911	0.386412	-0.696513	-0.065279
	(13.8677)	(0.09757)	(0.57977)	(0.77260)
	[-0.63449]	[3.96034]	[-1.20135]	[-0.08449]

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P value	0.5274	0.0002 ***	0.2329	0.9329
D(CPI(-1))	0.496474	0.012240	0.416364	-0.063462
	(2.62376)	(0.01846)	(0.10969)	(0.14618)
	[0.18922]	[0.66306]	[3.79572]	[-0.43415]
P value	0.8504	0.509	0.0003 ***	0.6653
D(CPI(-2))	0.907702	0.034930	-0.302047	0.054213
	(3.02122)	(0.02126)	(0.12631)	(0.16832)
	[0.30044]	[1.64322]	[-2.39131]	[0.32208]
P value	0.7646	0.1039	0.0189 **	0.7482
D(EXR(-1))	1.971605	-0.005251	0.117630	0.021464
	(1.98668)	(0.01398)	(0.08306)	(0.11068)
	[0.99241]	[-0.37567]	[1.41622]	[0.19393]
P value	0.3237	0.7081	0.1603	0.8467
D(EXR(-2))	-0.479590	-0.006597	0.019826	-0.075080
	(1.94548)	(0.01369)	(0.08134)	(0.10839)
	[-0.24652]	[-0.48195]	[0.24376]	[-0.69270]
P value	0.8059	0.6311	0.808	0.4903
C	4.019253	-0.038247	0.485389	0.229198
	(3.05194)	(0.02147)	(0.12759)	(0.17003)
	[1.31695]	[-1.78119]	[3.80415]	[1.34798]
			0.0003 ***	0.1812
P value	0.1913	0.0784 *		
R-squared	0.080753	0.358193	0.191768	0.064366
Adj. R-squared	-0.003776	0.299176	0.117448	-0.021670
Sum sq. resids	42709.36	2.114229	74.65083	132.5643
S.E. equation	22.15654	0.155889	0.926313	1.234394
F-statistic	0.955333	6.069338	2.580292	0.748132
Log likelihood	-428.9137	46.93348	-124.1448	-151.7087

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Akaike AIC	9.123202	-0.790281	2.773851	3.348097
Schwarz SC	9.363610	-0.549873	3.014258	3.588505
Mean dependent	4.494688	-0.005046	0.640104	0.200586
S.D. dependent	22.11483	0.186214	0.986024	1.221233

Determinant resid covariance (dof adj.)	11.54100
Determinant resid covariance	7.784589
Log likelihood	-643.3754
Akaike information criterion	14.15365
Schwarz criterion	15.11528

* significant at 10 per cent level, ** significant at 5 per cent level and *** significant at 1 per cent level.

Each of the four equations can be read column wise. For the first equation, among the explanatory variables which are lagged values (up to 2 periods) of change in all endogenous variables, the second period lagged values of MSP is the sole factor affects change in the mean stock price in the current period and all other variables are insignificant at all acceptable levels of significance. Change in the mean stock price is affected by its own second lagged values with the coefficient –0.269471. implying that change in the D(MSP) two months back causes to vary the current month D(MSP) 27 per cent in the opposite direction.

The second equation, change in the call money rate (D(CMR)) is significantly affected by the second lagged values of mean stock price, the first and second lags of changes in the CMR. One unit change in the D(MSP) in two months back causes to change D(CMR) in the current period about 0.21 per cent in the same direction. The first and second lagged values of D(CMR) also significantly affecting its current value at the rate of 19.9 per cent and 38.6 per cent respectively. No other variables included in the model do affect the change in the call money rate.

In the third equation also, some explanatory variables are significant. The change in the consumer price index is mostly affected by the second lagged values of mean stock prices and its own first and second lagged values. A one unit change in the mean stock price two months before causes 0.98 per cent change in the current D(CPI) values. Further, the change in the CPI values one month and two months ago affects change in the current CPI values at the rates of 41. 6 per

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cent and 30.2 per cent respectively. All other variables do not significantly affect the current change in the inflation rate.

In the equation for change in the exchange rate (D(EXR)), none of the explanatory variables are significant implying that domestic stock prices, inflation rate and call money rate do not systematically affect the exchange rate of rupee against SDR, the weighted basket of currencies for five major trading partners.

The VAR model presented in table 5 is stable. The stability condition requires that the inverse roots of AR characteristic polynomial is less than one and lie inside the unit circle. The test result is given in table 6.

Table 6: Roots of Characteristic Polynomial

Endogenous variables: D(MSP) D(CMR) D(CPI) D(EXR)

Exogenous variables: C

Lag specification: 1 2

Root	Modulus
0.702726	0.702726
0.128992 - 0.567304i	0.581784
0.128992 + 0.567304i	0.581784
-0.468351	0.468351
-0.030878 - 0.444238i	0.445310
-0.030878 + 0.444238i	0.445310
0.147765 - 0.199981i	0.248650
0.147765 + 0.199981i	0.248650

No root lies outside the unit circle.

VAR satisfies the stability condition.

The VAR model estimated in table 5 can be reiterated and confirmed by detecting the direction of change using the Granger Causality test, the result of which is presented in table 7.

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Table 7: VAR Granger Causality/Block Exogeneity Wald Tests

Sample: 2015M06 2023M08

Included observations: 96

Dependent variable: D(MSP)

Excluded	Chi-sq	df	Prob.
D(CMR)	0.487662	2	0.7836
D(CPI)	0.200861	2	0.9044
D(EXR)	1.034292	2	0.5962
All	1.476441	6	0.9610

Dependent variable: D(CMR)

Excluded	Chi-sq	df	Prob.
D(MSP)	7.070102	2	0.0292
D(CPI)	4.702710	2	0.0952
D(EXR)	0.382493	2	0.8259
All	18.26849	6	0.0056

Dependent variable: D(CPI)

Excluded	Chi-sq	df	Prob.
D(MSP)	4.229863	2	0.1206
D(CMR)	2.077962	2	0.3538
D(EXR)	2.083255	2	0.3529

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All	8.539805	6	0.2012

Dependent variable: D(EXR)

Excluded	Chi-sq	df	Prob.
D(MSP)	1.762757	2	0.4142
D(CMR)	1.004977	2	0.6050
D(CPI)	0.216061	2	0.8976
All	4.278139	6	0.6391

By checking the probability value of χ^2 statistic, it can be noticed that;

1. D(CMR) does not cause D(MSP)
2. D(CPI) does not cause D(MSP)
3. D(EXR) does not cause D(MSP)
4. D(CMR), D(CPI) and D(EXR) together do not cause D(MSP).
5. D(MSP) cause D(CMR)
6. D(CPI) cause D(CMR) at 10 per cent significance.
7. D(EXR) does not cause D(CMR)
8. D(MSP), D(CPI) and D(EXR) together cause D(CMR)
9. D(MSP) does not cause D(CPI)
10. D(CMR) does not cause D(CPI)
11. D(EXR) does not cause D(CPI)
12. D(MSP), D(CMR) and D(EXR) together do not cause D(CPI)
13. D(MSP) does not cause D(EXR)
14. D(CMR) does not cause D(EXR)
15. D(CPI) does not cause D(EXR)
16. D(MSP), D(CMR) and D(CPI) together do not cause D(EXR)

The causality test result is also similar to the VAR model findings except that the lagged values of D(MSP) have a significant impact on the D (CPI).

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6. Conclusion

From the very outset, it could be stated that at least one cointegrating vector does not exist among the variables under study so that no long run relationship could be established. Thus, the analysis needs to be confined to short term variations. During the period from 2015 June to 2023 August, based on the data set available, the stock price variation could not be traced with respect to any of the endogenous variables, call money rate, consumer price index and exchange rate. The investors could depend on the previous values of mean stock price itself, however though marginally (about 27 per cent) rather than on other variables to predict the stock price variations. The stock price movements are seemed to be independent of major macroeconomic fundamentals and are being wandering due to factors other than those analyzed in this paper. The changes in the call money rate can be predicted but with low adjusted R^2. The lagged values of change in mean stock price explains variations in change in the call money rate and so the later can be predicted tracing the previous values of change in the stock prices, and the latter's own previous values. The change consumer price index is also predictable to some extent, the previous values of change in the mean stock price and its own previous values are predictors. None of the variables under discussion does not predict the exchange rate significantly.

The call money rate reflects an easy monetary policy, however remains without impacting, as perceived, on inflation as measured by CPI, mean stock price, and average exchange rate. Though the CPI over the period of analysis, shows a rising trend from 123 to 186.2, it only affects the call money rate, that too at 10 per cent level of significance. The rising inflation rate leaves mean stock price and exchange rates unaffected.

The result of the overall analysis is surprising that the mean stock prices cause call money rate and consumer price index but the bilateral causality is found to be detached. The investors are left with no predictable variables which could predict the variations in stock prices rather than to depend on its own previous trends.

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