

## **THE STABILITY OF INDIAN STOCK MARKET AFTER DEMONETISATION**

**Narain\* and Asha Rani\*\***

### **ABSTRACT**

*This study attempts to analyse the impact of demonetisation of High Denomination Currency Notes (HDCNs) on the stability of Indian Stock market. The current central government announced the withdrawal of HDCNs from Indian currency in circulation in a move to curb black money from the Indian economy by making Rs. 500 and Rs. 1000 currency notes not remaining legal tender from 9<sup>th</sup> November, 2016. This sudden move of central government has resulted into short-term contraction of money supply in the economy. The change in the money supply has resulted into redistribution of portfolios of Indian investors. The logistics of replacement of currencies has affected all walks of life. The earlier experiences of demonetisation in 1946 and 1978 has alternatively been negative and then positive for Indian stock market. Using Event Study methodology, this study examines the information content of announcement of demonetisation of HDCNs by the central government. The study also employs ARDL methodology to establish a stable long-run relationship between money supply and stock market. It was observed that the current move of reduction in money stock in the economy has both short-term and long-term implication for the investors' wealth. Sooner the restoration of money supply happens, faster the investors regain their lost wealth.*

**KEYWORDS:** Demonetisation, Stock Market Stability, Event Study, ARDL, Money Supply

### **INTRODUCTION**

The price of a stock, in the perception of Fundamentalists, is anchored by the discounted value of future cash flows attributable to stockholders. Any changes in either the cash flows or the discount rate will affect the fundamentals of stocks. The economic theories have suggested strong relationship between money supply and stock price movements. King (1966) reported that stock market is influenced by the macroeconomic factors to the extent of 50 percent on an average. Flannery & Protopapadakis (2002) have concluded these factors to be the most important factors influencing the stock returns.

Monetarists' argument suggests that the changes in money supply affects the real interest rates in the economy, thereby affecting the economic activities via its Transmission Mechanisms. An alteration in the economic activities of the companies represented by their stocks listed in the

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stock exchanges, will affect the future expected cash flows to the stockholders. Thus, a positive relationship between money supply and stock prices are expected. Further, a change in the interest rate also affects the discounting process and thus, accentuates this positive relationship. However, the real side impact of any demonetisation move will also depend upon the relative share of connected and unconnected sectors of the economy (Waknis (2017)).

However, Sellin (2001) argues that the present stance of the monetary authorities reflects the future expectations about the monetary policy. People perceive a positive shock in the money supply as a precursor to the tightened monetary policy in future. The current rate of interest goes up in anticipation, leading to a fall in the discounted future cash flows and thus the stock prices.

Maskay (2007) empirically examined the relationship between money supply and stock prices and also analysed the impact of unanticipated and anticipated changes in money supply on the US stock market using quarterly data from 1959 to 2006. Using regression analysis, the author found that both anticipated and unanticipated changes in money supply are positively related with stock prices. Furthermore, it was concluded that anticipated changes in money supply matter more than the unanticipated changes in money supply in order to determine stock prices.

Bjornland & Leitemo (2009) examined the interdependence between US monetary policy and the S&P 500. Using Structural VAR (SVAR) methodology with monthly data spanning from Jan. 1983 to Dec. 2002, they proposed a solution to the problem of identifying monetary and stock prices shocks with the combination of short term and long term relationships. They found great interdependence between the interest rate setting and real stock prices. More specifically, they have suggested that the monetary policy shock, which raises federal fund rate by 100 basis points, leads to an immediate fall on stock prices by 7-9 percent and stock price shock, i.e. one percent increase in stock prices, results in a rise in the interest rate by 4 basis point.

Raymond (2009) investigated the interrelationship between stock prices and monetary variables namely, money supply, interest rate, inflation rate and exchange rate for Jamaican economy with a sample of monthly data from Jan. 1990 to Mar. 2009. Using Johansen's Co-integration and Granger Causality, he confirmed the existence of a long term relationship. The study found a significant long term relationship between the JSE Index and the monetary variables. Furthermore, the study found only money supply to be a consistent predictor of the stock prices.

Naik & Padhi (2012) investigated the relationships between the Indian stock market index and macroeconomic variables during 1994-2011. They used Johansen's Co-integration and Vector Error Correction model on the monthly data to explore a long run equilibrium relationship between the variables. The study found that macroeconomic variables and stock market index were co-integrated. Stock prices were positively related with the money supply and industrial production; and negatively related with inflation. The study also found bidirectional causality

between industrial production and stock prices and unidirectional causality from money supply to stock prices, stock prices to inflation and interest rates to stock prices.

Patel (2012) analysed the impact of macroeconomic determinants on the Indian stock market performance using monthly data from Jan. 1991 to Dec. 2011. He studied eight variables, namely, interest rate, inflation, exchange rate, index of industrial production, money supply, gold price, silver price & oil price and two stock market indices. Using Johansen's Co-integration, granger causality and vector error correction method, a long run relationship between macroeconomic variables and stock market indices was established. The study also found unidirectional causality from exchange rate to stock market to IIP and Oil prices. He emphatically list money supply as a major factor affecting the stock market, and urged monetary authority to actively control money supply through the operations of repo and reverse repo rates.

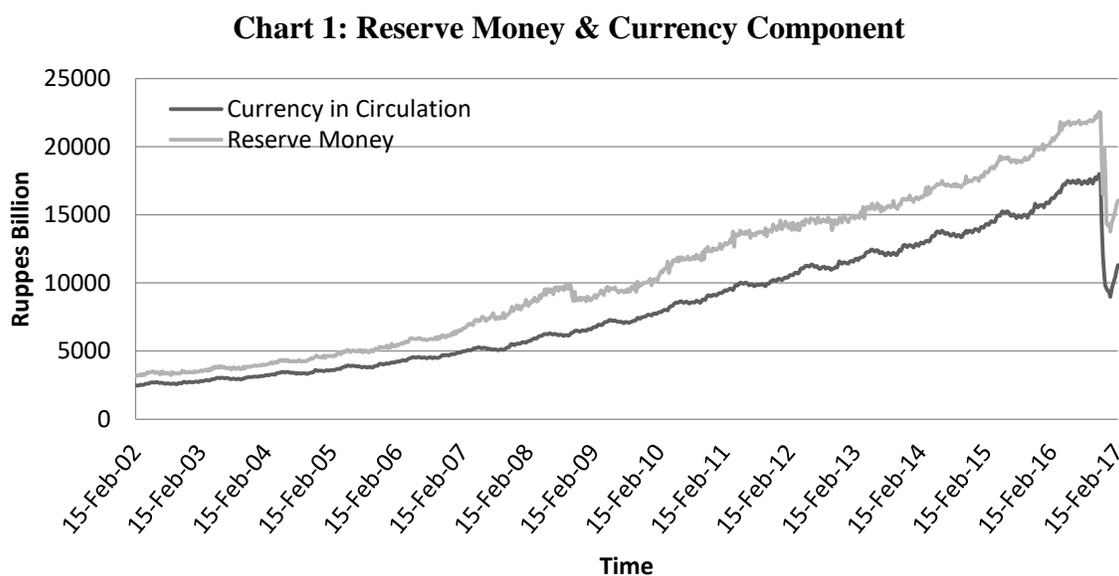
Nisha (2015) analysed the monthly data of various macroeconomic variables, including Index of Industrial Production, Consumer Price Index, Money Supply, Interest Rates, Exchange Rates, Gold Price, MSCI World Index, from January 2000 till December 2015. The author concludes that BSE Sensex returns is considerably influenced by the MSCI World Index, interest rate, gold price, exchange rate and money supply in order of the intensity of their influence. Agrawalla (2006) also reports causality running from economic growth to share price index, and not other way round, using monthly data from November 1965 to October 2000 making stock market as a demand driven and industry led indicator. While Tripathi & Seth (2014) concludes that only exchange rate granger cause BSE Sensex, among the set of variables including T-Bill rate, wholesale price index, money supply, index of industrial production and crude oil price, from a comparatively shorter dataset ranging from July 1997 to June 2011. However, they did established a long-run relationship between stock market performance and money supply with weaker relationships in the later part of the data series.

In the month of November 2016, Indian economy has experienced an economic jolt from the current central government, in the form of sudden reduction in the currency in circulation. On the evening of 8<sup>th</sup> November, the Prime Minister of India, announcement that from Mid-night, the currency notes of denomination Rs. 500 and Rs. 1000 will not remain legal tender, barring for certain emergent & vital transactions. The current central government announced the withdrawal of these High Denomination Currency Notes (HDCNs) from Indian currency in circulation, in a move to curb black money circulating in Indian economy, clamp down the counterfeit notes for terror financing & other illegal activities, and curtail the shadow economy.

The Indian economy had observed such instances of withdrawal of currencies in 1946 as well as in 1978. However, the impact of such previous attempts of demonetization on Indian stock market were mixed, inter alia. The withdrawal of 1000 and 10,000 rupees' currency notes in January 1946 was in the backdrop of Second World War, and the stock market reacted negatively to this move. Whereas, the withdrawal of 1,000, 5,000 and 10,000 rupees' currency

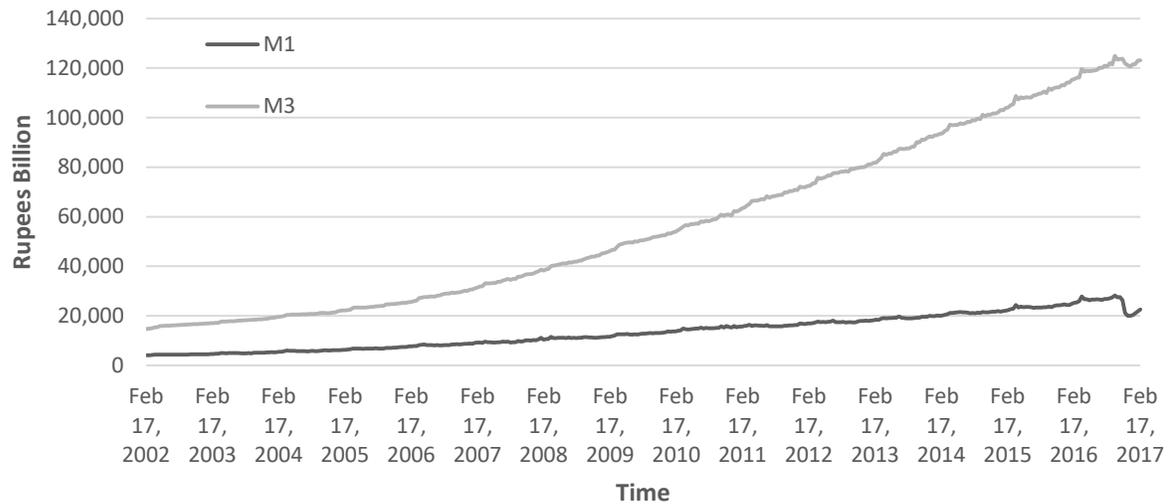
notes in January 1978 was with the similar motives as with the current move of demonetization. However, Indian stock markets shown the signs of positivism at that time, by this populist move of the Janata Party coalition government.

Such moves of demonetization, among others, affects the portfolios of investors by altering the short term rates of interest, as well as medium to long term availability of funds spared for investment in stocks. By the time replenishment of new currency takes place, the portfolios of the investors have been altered in a significant way. The following chart shows the availability of currency with public in Indian economy and the stock of Reserve Money.



Source: RBI Database

Chart 1 shows the amount of currency in circulation in India together with the total Reserve Money which includes, besides currency in circulation, Bankers' deposits with RBI and other deposits with RBI. The week ending 4<sup>th</sup> November, 2016, the week before the announcement of demonetisation, had total currency in circulation of Rs. 17,977 billion which has been reduced by 50 percent to Rs. 8,980.17 billion for the week ending 6<sup>th</sup> January, 2017. The amount of reserve money has declined by 39 percent during this period. The following chart shows the status of Money Supply during this time span.

**Chart 2: Stocks of money**

Source: RBI Database

Chart 2 shows the stocks of money supplied in Indian economy. Narrow Money (M1) shows the sum total of Currency with public, demand deposits with Banks and Other deposits with Reserve Bank. Broad Money (M3) includes, besides M1, Time deposits with Banks. M1 has declined by 27.5% from Rs. 27,587.07 billion for the fortnight ending 28<sup>th</sup> October, 2016, the fortnight before the announcement of demonetisation, to Rs. 20,004.64 billion for the fortnight ending 23<sup>rd</sup> December, 2016. M3 has also declined by 2.54% during this period. M2 and M4 declines during this period, though not depicted in the chart, were 27% and 2.5% respectively. These declines in the measures of money supply are significant and have ramifications for Indian economy, in general, and Indian stock market investors, in particular. However, the money stocks have already set on its recovery paths. The trend analysis shows that by the end of February 2017, Broad Money (M3) is expected to be restored to the pre-announcement levels.

The present study analyses the impact of these changes in money supply for Indian stock market. The next section discusses the data and methodology adopted for this study. The third section discusses the results and outcome of the study. The final section summaries the study and concludes.

## DATA DESCRIPTION AND MODEL SPECIFICATION

For the purpose of this study, the data has been sourced from the websites of Reserve Bank of India (RBI), the monetary authority in India; Bombay Stock Exchange (BSE), the oldest stock exchange in Asia and the fastest stock exchange in the world; Centre for Monitoring Indian Economy (CMIE) Online Corporate Database ProwessIQ 1.5, the interactive database of Indian Companies; viz. [www.dbie.rbi.org.in](http://www.dbie.rbi.org.in), [www.bseindia.com](http://www.bseindia.com), and [www.prowessiq.cmie.com](http://www.prowessiq.cmie.com).

RBI maintains the Database of Indian Economy for various variables of interest to their policy decisions. This online database was used to collect weekly data of implicit yields at the auctions of 91-Day government of India Treasury Bills (TBILL), daily data of foreign exchange spot rate of the Indian Rupee with US Dollar (EXRATE), fortnightly data of stocks of money (M3) and weekly data of Reserve Money & its components. Daily data of the broad based Index of BSE constituting top 200 stocks listed on BSE (BSE200) and which have reasonable liquidity in the market was taken from the website of BSE and ProwessIQ Database.

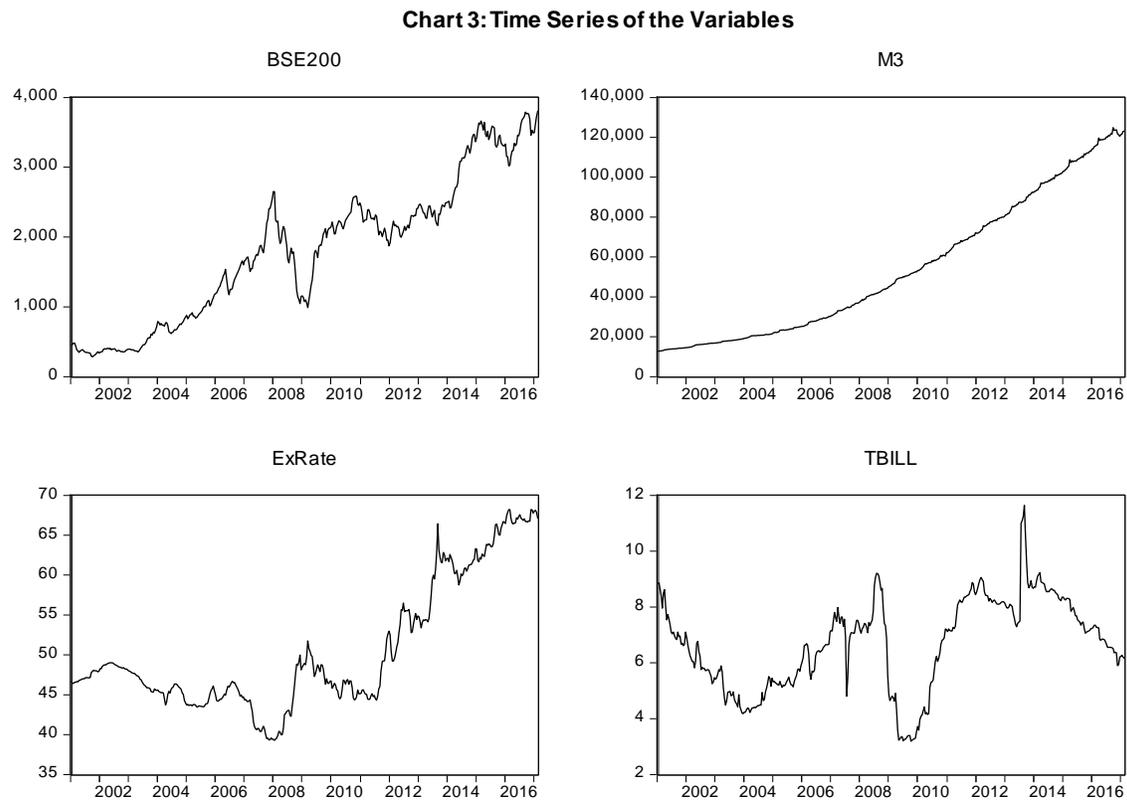
The data so collected was of different frequency, the lowest being the stocks of money supply which was available fortnightly. The parity in the data frequency was enforced by converting higher frequency data into fortnightly frequency. The daily data of BSE 200 Index as well as INR/USD exchange rate data was averaged by simple mean of the values falling in the corresponding fortnight for which money supply data was available i.e. 12<sup>th</sup> January, 2001 – 17<sup>th</sup> February, 2017. Similarly, the daily data of T-Bill rate was averaged by taking geometric mean of the principal amount values falling in the corresponding fortnight used earlier. The following table shows the descriptive statistics of the dataset in common frequency.

**Table 1: Descriptive statistics of different data series**

	BSE200	M3	EXRATE	TBILL
Mean	1803.62	54368.28	50.59	6.68
Median	1939.85	45747.79	47.29	6.87
Maximum	3811.59	124899.90	68.23	11.64
Minimum	282.12	12743.24	39.28	3.19
Std. Dev.	1025.02	34724.89	8.05	1.63
Skewness	0.16	0.52	0.90	-0.14
Kurtosis	1.98	1.93	2.51	2.54
Observations	421	421	421	421
Jarque-Bera	20.1414	39.1411	60.8424	5.1131
Probability	0.00004	0.00000	0.00000	0.07757

Source: Authors' computations using EViews

The following Chart also depicts these variables over the time span taken for the study.



Source: RBI Database

The interrelationship between the variables are presented in the table produced below to set the stage for further analysis of the data.

**Table 2: Correlation Matrix and Variance Inflating Factors (VIF)**

	BSE200	M3	EXRATE	TBILL	VIF
BSE200	1	0.9366	0.6866	0.4230	--
M3		1	0.8638	0.4628	4.2852
EXRATE			1	0.3826	3.9448
TBILL				1	1.2745

Source: Authors' computations

As evident from the Table 2, the variable of our special interest, BSE200, is highly correlated with money stock, followed by the Exchange Rate and then the Treasury Bill rate. The stock of money, M3, is also observed to be highly correlated with the Exchange Rate. However, the Variance Inflating Factors of the independent variables are within reasonable range to proceed further with the analysis.

Having brought the data in same frequency, each series of the variable was tested for weak form of stationarity. The results of the stationarity tests are reported below:

**Table 3: Stationarity tests of different data series**

Series	Model	Break Date	Lags	t-Statistics	p-value
Log(BSE200)	Breakpoint ADF test with Trend & Intercept	4-Jan-08	1	-5.3462	0.0315
Log(M3)	Breakpoint ADF test with Trend & Intercept	27-Dec-13	27	-2.3148	0.9999
EXRATE	Breakpoint ADF test with Trend & Intercept	16-Mar-07	1	-4.0525	0.4863
TBILL	Breakpoint ADF test with Intercept	7-May-10	1	-3.8485	0.2149
Stationarity Tests at First Difference of Data Series					
D(Log(BSE200))	ADF test	-	0	-14.1491	0.0000
D(Log(M3))	ADF test with Intercept	-	13	-4.3819	0.0004
D(EXRATE)	ADF test	-	0	-15.0673	0.0000
D(TBILL)	ADF test	-	0	-16.5953	0.0000

*Source:* Authors' computations using EViews

As evident from Table 3, all the series were non-stationary at level, except logarithm of BSE200 series at 5% level of significance. However, all these non-stationary series were found to be stationary at first difference; whereby all the p-values were reported below 0.01. These stationary series are, thus, been used for further analyses suited to the objective of the study.

The study first analyses the impact of announcement of demonetisation move by the central government. This announcement impact is studied using event study methodology. The event window selected for the study is of 41 days (-20, 0, +20) with 100 days of estimation window. The Event Date is the first trading day after the announcement of demonetisation i.e. 9<sup>th</sup> November, 2016. However, this event is confounded by another event of US Presidential Election held on 8<sup>th</sup> November, 2016. However, the later event is assumed not to contaminate the results of event study severely. The expected return was estimated using Constant Mean Return Model. The results of the Event Study are reported in the next section.

A medium to long-term analyses of the impact of demonetisation move is studied using Auto-Regressive Distributed Lag (ARDL) model, which has improved power over Johansen's Co-Integration Approach, particularly with finite sample, and can easily handle various variables which are integrated of order up to one (Pesaran and Shin (1999)). Another flexibility offered by

the ARDL models is that it does not require symmetry of lag length i.e. each variable can have different number of lag terms. ARDL model  $ARDL(p, q_1, \dots, q_k)$  is another least squares regression having lags of the dependent ( $p$ ) and the lags of  $k$  - explanatory variables ( $q_j$ ), which can be expressed as:

$$y_t = \alpha + \sum_{i=1}^p \gamma_i y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j} X'_{j,t-i} \beta_{j,i} + \epsilon_t$$

Because ARDL model is estimated using least square procedure, the lag selection of the dependent variable ( $p$ ) and that of the different explanatory variables ( $q_j$ ) can be done using standard information criteria, e.g. Schwarz Information Criterion, which is used in this study.

The short-run dynamics of the long-term relationship, the error correction mechanism, can also be expressed as:

$$\Delta y_t = - \sum_{i=1}^{p-1} \phi_i \Delta y_{t-1} + \sum_{j=1}^k \sum_{i=0}^{q_j-1} \Delta X'_{j,t-i} \theta_{j,i} - \hat{\pi} CointEq_{t-1} + \epsilon_t$$

Where

$$\phi_i = \sum_{m=i+1}^p \hat{\gamma}_m$$

$$\theta_{j,i} = \sum_{m=1}^{q_j} \beta_{j,m}$$

$$\hat{\pi} = 1 - \sum_{i=1}^p \hat{\gamma}_i$$

$$CointEq_t = y_t - \alpha - \sum_{j=1}^k X'_{j,t} \frac{\sum_{i=1}^{q_j} \hat{\beta}_{j,i}}{1 - \sum_{i=1}^p \gamma_i}$$

The dependent variable selected for the model is logarithm of BSE200 Index with independent variables EXRATE, TBILL, logarithm of M3 and a dummy variable (D1) representing the structural break in the Index values during Global Financial Crisis 2008 at 4<sup>th</sup> January, 2008 based on the breakpoint obtained while testing the Unit Roots.

The next section reports the results of the Event Study as well as the results of ARDL model with error correction mechanism for short term and long-term stable relationship.

## RESULTS AND OUTPUT

The short-term impact of the demonetisation announcement made on 8<sup>th</sup> November, 2016 after the close of the stock market has been analysed using Event Study methodology. The following table shows the results of the event study:

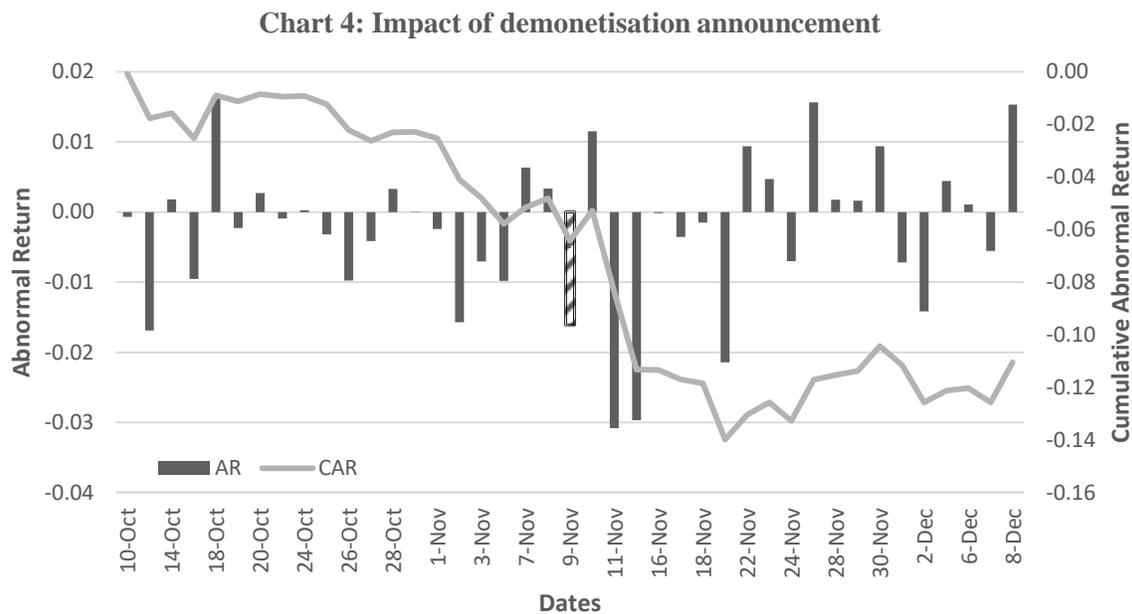
**Table 4: Abnormal Returns around the Announcement of Demonetisation**

Date	Daily Return	Expected Return	Abnormal Return (AR)	Cumulative Abnormal Return	t-statistic (AR)	p-value (AR)
10-Oct-16	0.06%	0.13%	-0.07%	-0.0007	-0.9302	0.3545
13-Oct-16	-1.56%	0.13%	-1.69%**	-0.0176	-22.5447	0.0000
14-Oct-16	0.31%	0.13%	0.18%*	-0.0158	2.4351	0.0167
17-Oct-16	-0.83%	0.13%	-0.95%**	-0.0253	-12.6939	0.0000
18-Oct-16	1.76%	0.13%	1.64%**	-0.0089	21.8246	0.0000
19-Oct-16	-0.10%	0.13%	-0.23%**	-0.0112	-3.0443	0.0030
20-Oct-16	0.40%	0.13%	0.27%**	-0.0085	3.5919	0.0005
21-Oct-16	0.03%	0.13%	-0.09%	-0.0094	-1.2160	0.2269
24-Oct-16	0.15%	0.13%	0.03%	-0.0092	0.3692	0.7128
25-Oct-16	-0.19%	0.13%	-0.32%**	-0.0124	-4.2683	0.0000
26-Oct-16	-0.85%	0.13%	-0.98%**	-0.0221	-13.0432	0.0000
27-Oct-16	-0.29%	0.13%	-0.41%**	-0.0263	-5.4904	0.0000
28-Oct-16	0.46%	0.13%	0.33%**	-0.0229	4.4095	0.0000
30-Oct-16	0.13%	0.13%	0.01%	-0.0229	0.0719	0.9428
1-Nov-16	-0.11%	0.13%	-0.24%**	-0.0253	-3.2006	0.0018
2-Nov-16	-1.44%	0.13%	-1.57%**	-0.0410	-20.9471	0.0000
3-Nov-16	-0.58%	0.13%	-0.7%**	-0.0480	-9.3708	0.0000
4-Nov-16	-0.86%	0.13%	-0.98%**	-0.0578	-13.0835	0.0000
7-Nov-16	0.76%	0.13%	0.63%**	-0.0515	8.4477	0.0000
8-Nov-16	0.46%	0.13%	0.34%**	-0.0481	4.4958	0.0000
9-Nov-16	-1.48%	0.13%	-1.61%**	-0.0642	-21.4762	0.0000
10-Nov-16	1.28%	0.13%	1.15%**	-0.0527	15.3661	0.0000
11-Nov-16	-2.96%	0.13%	-3.08%**	-0.0836	-41.1197	0.0000
15-Nov-16	-2.84%	0.13%	-2.97%**	-0.1133	-39.6046	0.0000
16-Nov-16	0.11%	0.13%	-0.02%	-0.1134	-0.2104	0.8338
17-Nov-16	-0.23%	0.13%	-0.35%**	-0.1169	-4.6993	0.0000
18-Nov-16	-0.03%	0.13%	-0.15%*	-0.1184	-2.0158	0.0465
21-Nov-16	-2.01%	0.13%	-2.14%**	-0.1398	-28.5431	0.0000
22-Nov-16	1.06%	0.13%	0.94%**	-0.1305	12.5027	0.0000
23-Nov-16	0.60%	0.13%	0.47%**	-0.1257	6.3063	0.0000
24-Nov-16	-0.57%	0.13%	-0.7%**	-0.1327	-9.3290	0.0000
25-Nov-16	1.69%	0.13%	1.57%**	-0.1171	20.8778	0.0000
28-Nov-16	0.30%	0.13%	0.18%*	-0.1153	2.3434	0.0211
29-Nov-16	0.29%	0.13%	0.16%*	-0.1137	2.1419	0.0347
30-Nov-16	1.07%	0.13%	0.94%**	-0.1043	12.5265	0.0000
1-Dec-16	-0.59%	0.13%	-0.72%**	-0.1115	-9.5867	0.0000
2-Dec-16	-1.29%	0.13%	-1.42%**	-0.1257	-18.9049	0.0000

5-Dec-16	0.57%	0.13%	0.44%**	-0.1213	5.9042	0.0000
6-Dec-16	0.23%	0.13%	0.11%	-0.1202	1.4171	0.1596
7-Dec-16	-0.43%	0.13%	-0.55%**	-0.1257	-7.3693	0.0000
8-Dec-16	1.66%	0.13%	1.53%**	-0.1104	20.4265	0.0000

Source: Authors' computations

As evident from Table 4, 9<sup>th</sup> November saw a significant fall in the index value since 2<sup>nd</sup> November, -1.48 percent. However, this fall was corrected next day with a rise of 1.28 percent, purporting an over-reaction; but the correction succumbed to fall in line with highest fall in the index value occurring the next day, approx. 3 percent, maximum during the entire event window. The negative sentiments at the close of the announcement week persisted for the next week too, and the market further fell by approx. 3 percent at the beginning of week after the announcement week. Cumulatively, the market fell 6.2 percent during next seven trading days immediately after the announcement. In other words, the market has abnormally fallen by 9.2 percent during eight successive trading days after the announcement. A more expanded view of these abnormal returns, over and above the expected returns, are depicted in the following chart:



Source: Authors' computations

Chart 4 depicts that the Cumulative Abnormal Return (CAR) line was stable before 2<sup>nd</sup> November and after 15<sup>th</sup> November. However, the origin of this stability has shifted downward during the fortnight falling between the two dates. This downward shift of approximately 920 basis points is clearly attributable to the events that have taken place in that fortnight.

The question to ponder upon is, whether this downward shift of origin will ever move back along the time line; and if it does, how much time will the process take? To help enabling in answering these questions, we analysed the long-term relationship between the money supply in the economy and the stock market using ARDL model.

Leaving the lag selection to Schwarz Information Criterion (SIC), we selected ARDL(2, 0, 2, 0) model as most parsimonious. Given below is the ARDL regression model followed by the estimated results:

$$\text{Log(BSE200)} = \alpha + \gamma_1 * \text{Log(BSE200(-1))} + \gamma_2 * \text{Log(BSE200(-2))} + \beta_1 * \text{Log(M3)} + \beta_2 * \text{EXRATE} + \beta_3 * \text{EXRATE(-1)} + \beta_4 * \text{EXRATE(-2)} + \beta_5 * \text{TBILL} + \beta_6 * \text{D1} + \varepsilon$$

**Table 5: Regression Results of ARDL (2,0,2,0) Model**

Sample (adjusted): 9 Feb. 2001 to 17 Feb. 2017		
Dependent Variable: Log(BSE200)		
Method: OLS with White Heteroscedasticity consistent estimation		
Explanatory Variables	Coefficient	p-value
C	-0.4713	0.0008
LOG(BSE200(-1))	1.2657	0.0000
LOG(BSE200(-2))	-0.3110	0.0000
LOG(M3)	0.0878	0.0004
EXRATE	-0.0315	0.0000
EXRATE(-1)	0.0383	0.0000
EXRATE(-2)	-0.0085	0.0095
TBILL	-0.0028	0.0313
D1	-0.0394	0.0022
R-squared		0.99814
Adjusted R-squared		0.99811
F-statistics		27521.50
Prob. (F-statistics)		0.0000
Durbin-Watson statistic		2.0036
Observations		419

Source: Authors' computations using EViews

The result of the regression was free from serial correlation and was corrected for the heteroscedasticity using White Correction method. Moreover, Breusch-Godfrey Serial Correlation LM Test was conducted along with charting the Correlogram of the residuals; however, these results are not reported here for brevity. Bounds Test helps in inferring the existence of the long-run relationship between dependent variable and the regressors. The following table reports the results of this test:

**Table 6: ARDL Bounds test result**

<b>Null Hypothesis</b> : No long-run relationships exist		
Observations: 419		
F-statistic	6.7223	k=3
Critical Values	I0 Bound	I1 Bound
5%	2.79	3.67
1%	3.65	4.66

Source: Authors' computations using EViews

As evident from Table 6, the value of F-statistic is above the I1 Bounds, as regressors are Integrated of order one I(1), a long-run relationship between stock index, money supply and other variables does exist. Such Long-Run relationship and the Co-Integrating Form is reported below after the Co-Integrating Equation:

$$\text{CointEq} = \text{Log}(\text{BSE200}) + 10.3983 - 1.9368 * \text{Log}(\text{M3}) + 0.0394 * \text{EXRATE} + 0.0627 * \text{TBIL} + 0.8697 * \text{D1}$$

**Table 7: Co-integrating and long run form of relationship**

<b>Sample:</b> 12 Jan. 2001 to 17 Feb. 2017		
Observations: 419		
Dependent Variable: Log(BSE200)		
Co-integrating Form		
Variables	Coefficient	p-value
D(LOG(BSE200(-1)))	0.3110	0.0000
D(LOG(M3))	0.0878	0.0004
D(EXRATE)	-0.0315	0.0000
D(EXRATE(-1))	0.0085	0.0095
D(TBILL)	-0.0028	0.0313
D(D1)	-0.0394	0.0022
CointEq(-1)	-0.0453	0.0006
Long-Run Coefficients		
Variables	Coefficient	p-value
LOG(M3)	1.9368	0.0000
EXRATE	-0.0394	0.0000
TBILL	-0.0627	0.0305
D1	-0.8697	0.0000
C	-10.3983	0.0000

Source: Authors' computations using EViews

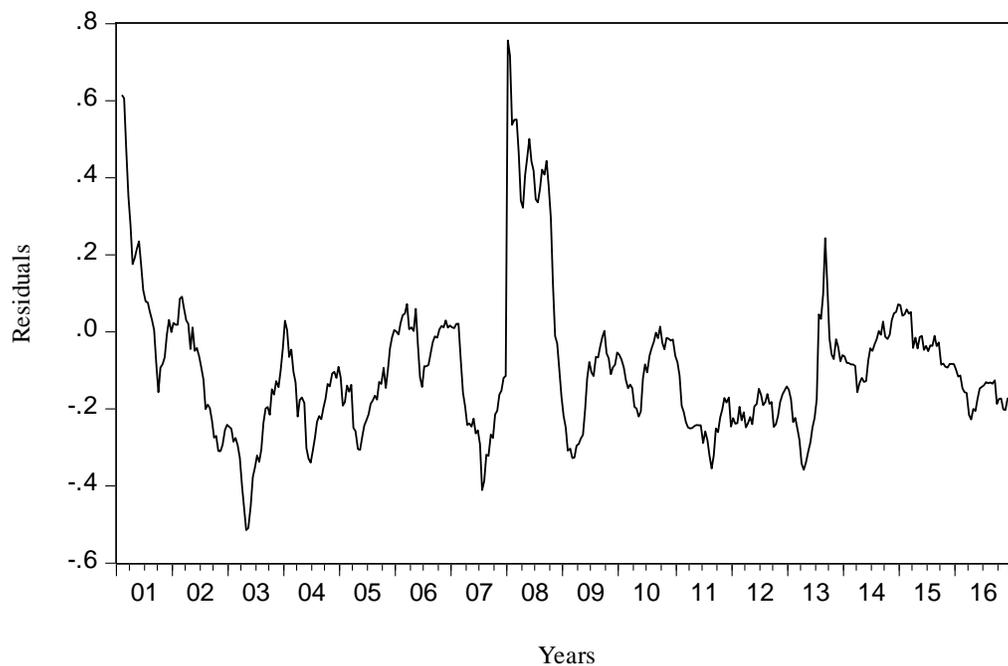
As evident from Table 7, the error-correction coefficient of the Co-Integrating Equation is negative (-0.0453) and statistically significant as required for the model's implications. Money supply exhibit a short run as well as long run positive relationship with the stock index with the elasticity factors of 0.09 and 1.9 respectively. Therefore, a fortnightly drop of 10% in the money stock results in 0.9% contemporaneous drop in the BSE200 index value, whereas, a 10% change in the money stock results in a long-run change of 19% in the BSE200 index. Quite obvious, the strength of such relationship is lesser in the short run. The above results also show that the appreciation of domestic currency leads to higher valuation of BSE200 in the same fortnight. But such valuation is corrected in the subsequent fortnight. This relationship shows an application of J-Curve effect for stock returns. However, this correction is lesser in magnitude so much so that it could not overpower the contemporaneous impact. Resultantly, a negative relation between stock return and exchange rate persists in long-run. Treasury Bill rate is also observed to have negative relationship with the stock returns. A rise in the T-Bill rate has a portfolio re-distribution effect in favour of T-Bills, leading to decrease in the stock market investments. Such permanent fall in stock returns is also evident from the long-run relationship with the Treasury Bill rate.

An indirect impact of monetary changes can also be analysed in terms of the impact on stock market arising from the exchange rates and interest rates being in turn affected by the monetary changes. It is theoretically argued that the contraction of money stocks leads to appreciation of domestic currency, and hardening of the interest rates. While the appreciation of domestic currency will enhance the stock return while hardening of interest rate will lower the stock return. A net impact will, however, depend upon the strength of individual relationships among the three variables: money stock, interest rate and exchange rate.

Stockholders' wealth represented by broader liquid index, BSE200, fell 2% during first fortnight of demonetisation. It again fell by another 6% during the second fortnight. Based on the above short term error-correction results, this 8% fall in stockholders' wealth will be recovered by the end of next fiscal year 2017-18, if such recovery is propelled solely by the monetary variable, *ceteris paribus*. However, BSE200 Index has already achieved the pre-announcement level by the middle of January 2017. The factors enabling this faster recovery have been the interest rate and the exchange rates, among others. In a boost to the stock investing activities, the interest rates have remained lower till the end of December 2016. Interest rates have still not been able to cross the pre-announcement levels. Similarly, the exchange rate has been depreciated making it attractive for foreign investors to invest in Indian Stock Market. It is at the end of February 2017 that the exchange rate could attain its pre-announcement levels. However, full replenishment of the money stock to its pre-announcement levels, is expected to complete within eight to nine fortnights, that is, by the end of February 2017.

These results have been stable. The result of Ramsey RESET Test supports the model specification. However, RESET test results are not reported here for brevity. The Stability of the conclusions are further evident from the following Co-Integration Chart signifying a stable pattern except for the period of Asset Bubbles during crises:

**Chart 5: Co-integration Graph of Residuals across Time**



Source: Authors' computations using EViews

Given the results presented in this section, the next section concludes the study.

## SUMMARY AND CONCLUSIONS

This study tries to investigate the impact of recent move of Demonetisation for the investors in Indian stocks. The study employs Event Study methodology and Auto-Regressive Distributed Lag (ARDL) models to visualise the impact of changes in money supply for Indian stockholders. The results of event study, based on daily data of BSE 200 stock index, reveals a 9 percent reduction in the shareholders' wealth during eight trading days immediately after the announcement of the demonetisation. The market perceived the move negatively. The study further utilises the fortnightly data of money supply (M3), INR/USD exchange rate, 91 days Treasury Bill rate and BSE 200 Index. This further analysis of the data using ARDL regression reveals that the sudden change in the money supply will further pulls down stockholders' wealth during intermediate term, with fortnightly monetary elasticity of BSE200 Index being 0.09 i.e. one percent fall in money stock will reduce the stock index value by 0.09 percent. In long-run,

the elasticity of stock index with respect to money stock is 1.9, thereby signifying an urge to replenish the money supply in order not to reduce the availability of funds to invest in stock market in the intermediate & long run. As the phenomenon of Demonetisation is a short-run concept and does not signify a long-run permanent reduction in money stock, the stock index will eventually catch up with its long-run trajectory. The task before the monetary authorities is to contain this revival period which is estimated to extend up to the end of the next fiscal 2017-18 in the event where no other measures, whether monetary or fiscal, is taken. However, such monetary and fiscal measure are unavoidable, and hence, such measures will contain the impact of demonetisation for Indian stock investors within few months.

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