

The Impact of Demonetization on Indian Stock Market: A Sectoral Analysis of Bombay Stock Exchange

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In 2016, the Indian government demonetized the ₹500 and ₹1,000 notes, the two highest denomination currencies in the system. This was a rare event that affected the entire Indian economy. The present study aims to find out the impact of the demonetization on the stock market by applying the event study methodology on 19 sectoral indices of Bombay Stock Exchange. The period of study spans from April 1, 2015 to November 24, 2016. The estimation period is from April 1, 2015 to September 30, 2016. The Cumulative Abnormal Returns (CAR) are calculated for 25 trading days before the event day to 10 days after it, with November 9, 2016 considered as the event date. The results of the study show that demonetization had a positive impact on indices like the public sector enterprise (CPSE), power (SIPOWE), infrastructure (Infra), banks (SIBANKEX), healthcare (SI0800), metals (SI1200) and utilities (SPBSUTIP), and negative impact on indices like auto (SI1900), FMCG (SI0600), consumer discretionary goods (SPBSCDIP), realty (SIREAL), basic materials (SPBSBMIP), and tech (SIBTEC), while capital goods (BISO200), oil and gas (SI1400), energy (SPBSENIP), industrials (SPBSIDIP), and telecom (SPBSTLIP) indices were not affected. The findings also reveal that there is no leak about the event to the market as the CAR for the pre-event period is not significant for any sector.

Introduction

On November 8, 2016 at 20.00 IST, the Prime Minister of India announced on television that the Indian government would withdraw ₹500 and ₹1,000 notes from November 9, 2016. These notes accounted for 86% of the total currency in circulation at that time. (Dharmapal and Khanna, 2018). The announcement came as a surprise to the nation. The drive of demonetization was intended to remove black money and fake currency from the

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economy that would in turn reduce corruption and terrorist activities (Kumar, 2017). The other motive was to convert the Indian economy into a cashless one (Ghosh *et al.*, 2017). The Reserve Bank of India had allowed the old currencies to be deposited till December 30, 2016, with proper identification documents. There were also restrictions on withdrawals until March 13, 2017.

Though this move of the government was widely criticized by the opposition parties, common man, small traders, etc., there has been mixed views on the impact of the event. The present paper aims to assess the impact of demonetization on the Indian stock market. It is expected that an event of such a large scale would have an overall impact on the stock market like any other fundamental factors such as inflation, money growth, balance of trade, etc. (Flannery and Protopapadakis, 2002).

The stock market is always affected by good or bad news about the economy, industry or company. The market movements are mostly due to the likely future impact of the current events on the bottom line of different companies. As discussed earlier in the paper, demonetization is a rare economic event that is believed to cause mass economic disruption and hence might affect the bottom line of certain companies. The perception in the stock market about the effects of demonetization on the companies is likely to be reflected in the movement of the sectoral indices. In general, stock market reactions represent useful information from parties who have their proverbial 'ear to the ground' and have strong financial incentives to predict these effects correctly (Dharmapal and Khanna, 2018). So, it becomes imperative to observe the movements in the stock market to assess the impact of this rare economic event. There are very few empirical works done in this area. However, their findings are not yet conclusive. The present work aims to contribute towards this research gap.

The paper is structured as follows: it provides a brief review of the literature, followed by a discussion of research relevance and development of hypotheses. Subsequently, it presents the details of the data and methodology used in the study, followed by a discussion of the results. Finally, it offers the conclusion.

Literature Review

Demonetization is a very rare event in any economy. Though rare, it is not the first time India had gone ahead with demonetization. In the last 70 years India has demonetized some of its currencies three times. In 1946, the ₹1,000 and ₹10,000 notes were demonetized, and in 1978, the ₹1,000, 5,000 and 10,000 notes were demonetized in a similar move to reduce unaccounted cash (Vikram, 2016). However, the 2016 demonetization differed from earlier ones because of its vast scale (86% of the then total currency in circulation was demonetized) and in the surprise nature of the announcement which "created the potential for large-scale economic disruption" (Dharmapal and Khanna, 2018).

Demonetization was criticized for its ineffectiveness in reducing black money, and its long-term impact on the Indian economy is still debated. Reddy (2017) stated that

demonetization will have negative impact on the agriculture and the MSME sector of India as the transactions in these sectors are mostly dependent on cash. He further added that 85% of the Indian workers are engaged in the informal sector that contributes 45% of the GDP, and they would be badly affected in the short run due to lack of cash. Gopalan and Singhi (2017) also wrote about the negative effect of demonetization. They stated that the GDP of India will take three to four quarters to revive its old growth rates. Ghosh *et al.* (2017) also agreed that demonetization would have a negative impact on the economy and reduce the purchasing power among workers, leading ultimately to a fall in the aggregate demand. These negative impacts may be negated in the short term through extension of trade credit. But the large collection of the deposits would burden the banks as they have to pay interest against these deposits. Though economists agreed on the negative impact on the informal sector many also praised the move as it paves way for a digital or a cashless economy.

Coming to the impact on stock market, Upadhyay and Suvarna (2018) found no striking impact of demonetization announcement on the stock returns during their period of study. They investigated the impact of demonetization on the BSE using event study methodology and analyzed the impact of the announcement on its most important index—Standard & Poor's (S&P) BSE SENSEX index and the 30 top trading stocks which comprise this index. Dharmapal and Khanna (2018) observed the impact of demonetization especially on tax evasion and corruption. They computed Abnormal Returns (ARs) for firms on the Indian stock market around this event, and compared these returns for different sub-samples of firms defined by industry, ownership structure, and other characteristics. They found little evidence that sectors thought to be associated with greater tax evasion or corruption experienced significantly different returns. However, the study found substantial positive returns for banks and for State-Owned Enterprises (SOEs). The study documented the reason for this as possible indirect effects of the announcement on perceptions of future corruption among these firms. They also found higher returns for industries that are characterized by a greater dependence on external finance, possibly suggesting an expectation of an easing of financial constraints.

Chellasamy and Anu (2017) studied the impact of demonetization on Nifty Sectoral indices using ordinary least square regression. They observed the closing index for 47 trading days from October 3 to December 9, 2016. The study period was divided into pre-demonetization period (25 trading days before demonetization, from October 3 to November 8) and post-demonetization period (22 trading days after demonetization, from November 9 to December 9). The study reported a negative impact on stock returns across many sectors, which is said to reflect the immediate negative sentiments prevailing in the economy. However the study found stock returns rising for the public sector banking segment, pharma, energy and IT.

Anoop *et al.* (2018) studied the impact of demonetization on stock returns using GARCH model and found a significant negative impact on Nifty 50 Index and on sectoral indices such as Nifty Auto Index, Nifty Financial Services Index, Nifty FMCG Index, Nifty IT

Index, Nifty Media Index, Nifty Private Bank Index, and Nifty Realty Index. The study found the Nifty Realty Index to be affected most because of demonetization. Jain (2017) examined the impact of demonetization on the stock returns of 40 (private and public) listed banks in India. The findings suggested that the overall banking sector returns rose after demonetization for a short period. Segmentation of the sector into public and private reflected differential impacts. The impact on the public sector bank was found to be positive, whereas the private banks recorded a lagged negative impact.

Very few empirical papers have studied the impact of the November 2016 demonetization on the Indian stock market. Also the findings of these studies are not conclusive. This gap in literature is the motivation behind the present work.

Usually, to find out the impact of economic events on the value of firms, event studies are used (Schwert, 1981; MacKinlay, 1997; and McWilliams and Siegel, 1997). Some of the variables on which event studies have been undertaken in the past are stock splits (Dolley, 1933; Myers and Bakay, 1948; Fama *et al.*, 1969; Grinblatt *et al.*, 1984; and Lamoureux and Poon, 1987), mergers and acquisitions (Schipper and Thompson, 1983; Chatterjee, 1986; and Seth, 1990), oil prices (Sehgal and Kapur, 2012), terrorist attacks (Kumar and Liu, 2013; and Rehman and Khan, 2015), etc. As mentioned previously, Dharmapal and Khanna used the event study method to assess the impact of the 2016 demonetization on corruption and tax evasion in India. Based on the literature, the study aims to test the short-term impact of demonetization on stock market using the event study approach.

Objective

In the given background, this study analyzes the impact of demonetization on the various sectoral indices of Bombay Stock Exchange (BSE). The study opts for sectoral analysis as all the sectors are not expected to be affected in the same way. The public sector enterprises, power sector, telecom and banking sector are expected to be affected in a positive way in the short run, as they are likely to get more cash inflows. The FMCG sector, automobiles, consumer discretionary goods, and realty may be affected negatively by cash crunch. There may be no impact on IT (as the main revenue of this sector comes from foreign exchanges), metals, oil and gas, capital goods because of the nature of business.

Based on the above logic, the study formulates the following hypotheses for empirical testing:

H_0 : *There is no impact of the announcement of demonetization on the sectoral indices of the Indian stock market, i.e.,*

H_0 : *Cumulative Abnormal Return for the sector i (CAR_i) = 0, where i = refers to various sectoral indices.*

H_a : *There is either a positive or negative impact on the sectoral indices, i.e., $CAR_i \neq 0$.*

Data and Methodology

Sample

The study uses the daily closing values of 19 sectoral indices of the BSE and market index, S&P BSE 100 from April 1, 2015 to November 24, 2016. The sample details are presented in Table 1. Data on the sectoral indices and market index S&P BSE 100 are taken from the official website of BSE. The period of study covers the pre-demonetization (from April 1, 2015 to November 8, 2016) and post-demonetization (November 9 to November 24, 2016) trading days.

Table 1: Nineteen Sectoral Indices of Bombay Stock Exchange	
S.No.	Sector
1.	S&P BSE CPSE (BSE CPSE)
2.	S&P BSE India Infrastructure Index (BSE Infra)
3.	S&P BSE Capital Goods (SIO200)
4.	S&P BSE Auto (SI1900)
5.	S&P BSE Bankex (SIbankex)
6.	S&P BSE Basic Materials (SPBSBMIP)
7.	S&P BSE Consumer Discretionary Goods and Services (SPBSCDIP)
8.	S&P BSE Energy (SPBSENIP)
9.	S&P BSE Utilities (SPBSUTIP)
10.	S&P BSE FMCG (SI0600)
11.	S&P BSE Healthcare (SI0800)
12.	S&P BSE Industrials (SPBSIDIP)
13.	S&P BSE Information Technology (SI1000)
14.	S&P BSE Oil & Gas (SI1400)
15.	S&P BSE Power (SIPOWE)
16.	S&P BSE Realty (SIREAL)
17.	S&P BSE Tech (SIBTEC)
18.	S&P BSE Telecom (SPBSTLIP)
19.	S&P BSE Metal (SI1200)

Source: www.bseindia.com

Research Method

The present research uses the standard event study methodology of Fama *et al.* (1969) to assess the impact of demonetization on the stock market. Normally, a large number of companies are taken to study the impact of an event on the share price. In this study, as the focus is on the impact of demonetization on a particular sector, a sectoral index is used whose value is the weighted average value of the share prices of a group of companies. So the variables, AR and Cumulative Abnormal Return (CAR) are the same as Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR) respectively.

The following steps are used to carry out the event study:

1. The Estimation Window¹: The estimation window for demonetization is taken as the period from April 1, 2015 to September 30, 2016, as this can be considered as a normal period devoid of any significant events affecting the market.
2. The Event Window²: The event window is taken as $t = -25$ and $t = +10$ relative to the event $t = 0$. The day of event is taken to be November 9, 2016 as the announcement was made on November 8 night. The pre-event window is taken from October 3 to November 8, 2016. The post-event window is from November 9 to November 24, 2016.
3. Calculation of Returns: The returns for the sectoral indices and the market index are calculated using \log^3 of the proportion of 'closing index value of the current day' to 'closing index value of the previous day' (refer to Equation 1). The advantage of taking log returns is that it provides a convenient compounding basis for calculations and prevents the modeled stock prices from being negative. The returns are calculated on a daily basis.

$$R(l)_t^i = \ln \frac{p_t^i}{p_{t-1}^i} \quad \dots(1)$$

where

$R(l)_t^i$ is the logarithmic return of portfolio i for the period t ;

p_t^i is the closing value of portfolio i at time t ;

p_{t-1}^i is the closing value of portfolio i at time $t - 1$; and

\ln is the natural (base e) logarithm

¹ It is defined as the period prior to the occurrence of the event. The estimators for the parameters of the normal return model are calculated from this period. This period does not include the event period and hence the estimators for the parameters have no influence of the event on it.

² The event window is the period which is taken to calculate the abnormal return before and after the event for some time.

³ The log transformation reduces the skewness and hence improves the power of significance applicable to normally distributed variables.

4. Estimation of Beta and Alpha: After the calculation of index returns, the Augmented Dickey-Fuller test of stationarity is undertaken. It is observed that all the series, i.e., returns on the market index and returns of the various sectoral indices are stationary.

The intercept alpha and beta of the portfolio are estimated taking returns of the sectoral portfolios and broad based market index BSE 100 for the estimation period, using Sharpe's (1963) single index model:

$$R_t^i = \alpha_i + \beta_i X R_t^m + \varepsilon_t^i \quad \dots(2)$$

where

R_t^i is the return of portfolio i at time t ;

α_i is intercept or model parameter;

β_i is slope or model parameter;

R_t^m is the market return at time t ; and

ε_t^i is the model error term

The Durbin-Watson test of autocorrelation and ARCH test of heteroskedasticity are undertaken on the residuals. It is observed that there is no autocorrelation among the residuals, but the ARCH effect is present. Hence, the GARCH(1, 1) model is applied and the problem of heteroskedasticity is corrected. The beta and alpha values are obtained from the mean equation of the GARCH model.

5. Calculation of Normal Return: The Normal Return (NR) is calculated by substituting the values of alpha, beta with the values obtained in the estimation period and market returns calculated during the event and post event period in Equation (3) or (4).

If the alpha and beta values are significant, then the model given by Equation (3) is employed:

$$NR_t^i = \alpha_i + \beta_i X R_t^m \quad \dots(3)$$

If beta is significant but alpha is not significant, then Equation (4) is used to calculate NR.

$$NR_t^i = \beta_i X R_t^m \quad \dots(4)$$

6. Calculation of AR and CAR: After the estimation of the normal return, the AR is calculated by finding the difference between actual return and normal return.

$$\widehat{AR}_t^i = R_t^i - \widehat{NR}_t^i \quad \dots(5)$$

where

\widehat{AR}_t^i is the estimated AR of portfolio i at time period t ;

R_t^i is the actual return of the portfolio i at time period t ; and

\widehat{NR}_t^i is the estimated normal return of the portfolio i at time period t

The ARs are assumed to be independent and identically distributed.

This is followed by the calculation of the cumulative AR. The cumulative AR is calculated by using the following equation:

$$\widehat{CAR}_i = \sum_{t=t1}^{t2} AR_t^i \quad \dots(6)$$

where

\widehat{CAR}_i is the estimated cumulative AR of portfolio i for the period $(t2 - t1)$; and

AR_t^i is the AR of the portfolio i at time period t .

7. Test of Significance: The t -statistic for CAR is calculated as follows:

$$t\text{-Statistic} = \frac{\widehat{CAR}_t^i}{\sqrt{(t2 - t1)S_{AR}}} \quad \dots(7)$$

where

S_{AR} is the standard error of the regression equation obtained in the estimation period. If the t -statistic is greater than 1.96, then null hypothesis is rejected in favor of the alternative hypothesis.

Results and Discussion

Table 2 presents the beta and alpha of the sectoral indices with respect to S&P BSE 100. Beta is highly significant for all the indices. Table 3 presents the AR and CAR for different periods for the entire sample. The CAR is calculated for the period $(-25, -1)$, $(-10, -1)$, $(0, 2)$, $(0, 5)$, and $(0, 10)$. The t -statistics are given in parentheses below the ARs and CARs to test the null hypothesis at 5% level of significance. Based on the results presented in Table 3, the following findings are offered:

BSE CPSE (The Public Sector Enterprise Index): CAR for the CPSE index is positive and significant at 5% level of significance for the post-demonetization periods $(0, 2)$ and $(0, 10)$. The CAR is not significant for any of the time periods in the pre-event days. This shows that demonetization has a positive impact on the public sector enterprises. The companies in the index are government-owned companies belonging to the power sector, oil and gas, heavy

Sectors	Estimations									
	Alpha	p-Value	Beta	p-Value	Standard Error	R ²	Durbin-Watson	No. of Observations		
BSECPSE	0.000112	0.7196	0.967145	0	0.005942	0.734519	1.874856	370		
BSEInfra	-0.00014	0.6622	1.153308	0	0.005927	0.797442	2.0821	370		
SIO200	-0.00057	0.1208	1.12514	0	0.008376	0.66922	2.165491	370		
SI1900	0.000102	0.7511	1.099843	0	0.006124	0.771907	1.931721	370		
SI bankex	3.35E-06	0.9913	1.223525	0	0.006281	0.794126	1.965521	370		
SPBSBMIP	0.000435	0.1927	1.119079	0	0.006422	0.75685	1.884914	370		
SPBSCDIP	0.000507	0.0218	0.978251	0	0.004267	0.842133	1.89315	370		
SPBSENIP	0.000383	0.3419	0.980914	0	0.007675	0.636589	1.914662	370		
SI0600	0.00027	0.4779	0.734398	0	0.007204	0.519426	2.017015	370		
SI0800	-0.00035	0.4369	0.860123	0	0.008583	0.506356	1.843417	370		
SPBSIDIP	-0.0001	0.7046	1.215278	0	0.0057	0.823611	2.166191	370		
SI1000	-0.0003	0.5386	0.67639	0	0.009149	0.369373	1.98777	370		
SI1400	0.000486	0.2329	1.031579	0	0.00764	0.650909	2.059521	370		
SIPOWE	-0.00011	0.7497	1.051746	0	0.006625	0.728986	2.026114	370		

Table 2 (Cont.)

Sectors	Estimations							No. of Observations
	Alpha	p-Value	Beta	p-Value	Standard Error	R ²	Durbin-Watson	
SIREAL	-0.00036	0.5718	1.501444	0	0.01235	0.614413	2.018946	370
SIBTEC	-0.00034	0.3935	0.712874	0	0.007695	0.472182	2.01134	370
SPBSTLIP	-0.00072	0.2767	0.853242	0	0.012536	0.30155	2.179384	370
SPBSUTIP	-3.90E-05	0.9105	0.967843	0	0.006829	0.680671	2.006451	370
SI1200	4.43E-05	0.9407	1.215522	0	0.011099	0.551948	1.898004	370

Source: Author calculations using daily closing indices data from BSE website

Table 3: Cumulative Abnormal Returns (CAR) and Abnormal Return (AR) for Various Sectoral Indices

Sectors	CAR for Period (-25, -1)	CAR for Period (-10, -1)	AR on Day 0	CAR for Period (0, 2)	CAR for Period (0, 5)	CAR for Period (0, 10)
BSECPSE	0.058127 (1.9565)	-0.0014 (-0.075)	0.0106 (1.781)	0.0270 (3.209)	0.0248 (1.868)	0.0396 (2.110)
BSE Intra	0.042242 (1.4254)	-0.0255 (-1.362)	0.0001 (0.010)	0.0166 (1.985)	0.0166 (1.252)	0.0316 (1.684)
SIO200	-0.00524 (-0.12517)	-0.0192 (-0.724)	0.0018 (0.212)	0.0084 (0.709)	0.0215 (1.146)	0.0164 (0.618)
SI1900	0.01193 (0.3897)	0.0161 (0.831)	-0.0120 (-1.957)	-0.0297 (-3.433)	-0.0686 (-5.009)	-0.0613 (-3.166)
SI bankex	0.02515 (0.8008)	0.0023 (0.115)	0.0169 (2.688)	0.0407 (4.577)	0.0363 (2.587)	0.0203 (1.022)

Table 3 (Cont.)

Sectors	CAR for Period (-25, -1)	CAR for Period (-10, -1)	AR on Day 0	CAR for Period (0, 2)	CAR for Period (0, 5)	CAR for Period (0, 10)
SIREAL	-0.00948 (0.2995)	-0.0206 (-0.527)	-0.0894 (-7.241)	-0.0842 (-4.822)	-0.1163 (-4.212)	-0.0786 (-2.012)
SPBSBMIP	0.05604 (1.7454)	0.0080 (0.392)	-0.0143 (-2.220)	0.0037 (0.408)	-0.0475 (-3.306)	-0.0340 (-1.675)
SPBSCDIP	-0.00946 (-0.4436)	-0.0079 (-0.584)	-0.0185 (-4.341)	-0.0314 (-5.205)	-0.0693 (-7.261)	-0.0713 (-5.286)
SPBSENIP	0.00477 (0.1242)	-0.0246 (-1.012)	0.0121 (1.571)	0.0192 (1.767)	0.0205 (1.194)	0.0470 (1.937)
SI0600	0.02243 (0.6227)	0.0296 (1.298)	-0.0123 (-1.705)	-0.0125 (-1.224)	-0.0486 (-3.018)	-0.0473 (-2.078)
SI0800	-0.05093 (-1.1868)	-0.0586 (-2.158)	0.0253 (2.947)	0.0292 (2.409)	0.0223 (1.161)	0.0611 (2.250)
SPBSIDIP	0.0191 (0.67014)	-0.0140 (-0.775)	-0.0016 (-0.274)	-0.0001 (-0.009)	-0.0241 (-1.891)	-0.0238 (-1.320)
SI1000	-0.03129 (-0.684)	-0.0198 (-0.683)	-0.0250 (-2.735)	-0.0387 (-2.995)	-0.0093 (-0.454)	-0.0163 (-0.564)
SI1400	0.05546 (-0.81367)	-0.0208 (-0.860)	0.0129 (1.688)	0.0189 (1.748)	0.0189 (1.109)	0.0449 (1.860)
SIPOWE	0.00992 (-0.1536)	-0.0002 (-0.009)	0.0005 (0.068)	0.0168 (1.793)	0.0304 (2.055)	0.0400 (1.908)
SIBTEC	-0.03131 (1.452)	-0.0173 (-0.709)	-0.0200 (-2.594)	-0.0275 (-2.524)	-0.0037 (-0.217)	-0.0136 (-0.557)

Table 3 (Cont.)

Sectors	CAR for Period (-25, -1)	CAR for Period (-10, -1)	AR on Day 0	CAR for Period (0, 2)	CAR for Period (0, 5)	CAR for Period (0, 10)
SPBSTLIP	-0.01424 (-0.22715)	-0.0187 (-0.471)	-0.0018 (-0.141)	0.0230 (1.300)	0.0279 (0.997)	0.0229 (0.579)
SPBSUTIP	0.03287 (0.9627)	-0.0038 (-0.177)	0.0066 (0.973)	0.0247 (2.560)	0.0270 (1.771)	0.0415 (1.923)
SI1200	0.08408 (1.5151)	0.0411 (1.172)	0.0040 (0.364)	0.0510 (3.246)	0.0253 (1.018)	0.0457 (1.303)

Note: The *t*-values are given in the brackets. The AR and CAR values which are statistically significant are given in bold.

Source: Author calculations using daily closing indices data from BSE website

industries like steel, coal, etc. The government had allowed old notes to be used at the petrol pumps, for payment of electricity bills, etc. People have taken advantage of this and paid money in advance to the petrol pumps and also repaid their past electricity dues in this time period. So there is likely to be a significant increase in the collections of these companies which may be the reason for the positive response of the stock market. The alternative hypothesis of positive impact is accepted here.

BSE Infra (Infrastructure Index): The infrastructure index shows positive and significant CAR in the post-demonetization period (0, 2). The majority of infrastructure index stocks belongs to power, ports, oil, etc. These stocks are not likely to be negatively affected by demonetization as the companies are involved in long-term projects and are dependent on the government initiatives. The government has been allocating huge funds in this sector. The alternative hypothesis of positive impact is accepted here.

SI0200 (Capital Goods Index): There is no significant CAR for any of the periods considered in the study. As most of the companies in this index are heavy engineering companies, and are mostly into B2B sales, the impact of demonetization is not likely to be felt here. Null hypothesis is accepted here.

SI1900 (Auto Index): For the automobile sector, the CAR is not significant for any of the time periods in the pre-event days. The index shows significant negative ARs on the day of announcement. In the post-demonetization period, it shows significant negative CAR for the periods (0, 2), (0, 5), and (0, 10). The negative impact on stock returns can be attributed to a decline in automobile sales due to the lack of liquidity in the hands of the people. The two-wheeler sales reported a decline in the

post-demonetization period, as it depends on availability of cash; usually 60% of the total two-wheeler sales are on cash. Companies like Hero Motocorp had reduced their production due to fall in demand (Livemint, 2016). The footfalls in showroom had also declined. The auto component parts market have also seen a decline which is reflected in the share prices and the overall index value (Dovall, 2016). The alternative hypothesis of negative impact is accepted here.

SIBANKEX (Bank Index): The SIBANKEX shows positive movement during the post-demonetization period. The CAR is not significant for any of the time periods in the pre-event days. The index shows significant positive ARs on the day of announcement. In the post-demonetization period, the CAR for periods (0, 2), and (0, 5) is positive and significant. The positive sentiment reflected in the stocks can be mostly due to huge inflow of cash that came to the banks from all sections of the society. With cash coming in, there was anticipation of a possible decline in the interest rates on the deposits and increase in lending ultimately resulting in higher profitability of banks. Moreover, the liquidity problem due to large defaults and write-offs reduced due to large inflow of cash to banks. This seems to have a positive impact on the sector. The alternative hypothesis of positive impact is accepted for the banking sector.

SIREAL (Real Estate Index): The CAR of the real estate sector is not significant for any of the time periods in the pre-event days. The index shows significant negative ARs on the day of announcement. In the post-event trading days, the CAR for all the periods (0, 2), (0, 5), and (0, 10) is negative and significant. As the real estate market is dominated by black money and a lot of transactions are undertaken in cash, the withdrawal of the high denomination notes affected the overall demand in the sector which seems to be reflected in the stock prices. Thus, the null hypothesis is rejected in favor of the alternative hypothesis, i.e., there is a negative impact of demonetization on the real estate index.

SPBSBMIP (Basic Materials Index): The basic materials index shows significant negative ARs on the day of announcement. The CAR of the sector is not significant for any of the time periods in the pre-event days. But in the post-event trading days, the CAR is found negative and significant for the period (0, 5). The basic materials index comprises the cement companies and chemical companies. These companies are mostly dependent on the realty and construction sectors. As demonetization has a negative impact on the realty and construction sector, its negative impact is also seen on the materials index. The alternative hypothesis is accepted.

SPBSCDIP (Consumer Discretionary Goods Index): This index comprises companies which are linked to the real estate, ceramics, hotels, vehicles, fashion, etc. The index shows significant negative returns on the event day. The CAR is negative for the periods (0, 2), (0, 5), and (0, 10) as well. In the pre-event days, the CAR is not significant for any of the time periods. Usually, people forgo the discretionary consumption items in a liquidity crunch, and since the liquidity problem was expected to stay there in the short run, the index continued to be in red in apprehension of an adverse impact on the bottom line of these companies. The

null hypothesis of no impact is rejected in favor of the alternative hypothesis of negative impact.

SPBSENIP (Energy Index): There seems to be no impact of demonetization on the returns of energy index and it continues to earn the risk adjusted normal return. There is no significant CAR for any of the periods taken in the study. This may be due to the nature of business and the increasing demand for energy. Also, the anticipation of fall in interest rates due to huge liquidity in banks and hence an improvement in the bottom line of these companies may also be the reason. The null hypothesis of no impact is accepted.

SI0600 (FMCG Index): The CAR for the periods (-25, -1) and (-10, -1) for the FMCG index is positive but insignificant. In post-demonetization days, the CAR for the periods (0, 5) and (0, 10) is negative and significant. The negative returns on the index can be attributed to the decline in the sales of the FMCG companies mostly in the rural areas which contribute 40% to the total revenues of these companies (Indian Brand Equity Foundation, 2017). Hence, the alternative hypothesis is accepted. Demonetization has adversely affected the FMCG sector.

SI0800 (Healthcare Sector Index): The CAR of the healthcare sector for the pre-event period (-10, 0) is negative, but it is positive for the post-event periods (0, 2) and (0, 10). The positive CAR in post-demonetization period can be attributed to the fact that healthcare sector is a defensive sector for investment and at that time many sectors were not doing well. Moreover, the government had allowed exchange of demonetized currency in hospitals and medicine shops for which the impact of liquidity crisis was missing in the sector. Hence, the alternative hypothesis of positive impact is accepted.

SPBSIDIP (Industrials Index): In the industrial sector, the impact is not significant for any of the time periods. As most of the companies in the index are heavy industries with long-term projects, they seem to be least affected by demonetization. Hence, the null hypothesis is accepted.

SI1000 (IT Index): The IT index shows significantly negative AR on the event day. The CAR for the period (0, 2) is also negative and significant. But the CAR for the periods (0, 5) and (0, 10) is not significant, though negative. The IT industry cannot be seen in isolation from the global events as majority of earning in this sector is from overseas. On November 8, 2016, the day when demonetization was declared in India, another important event also happened which was more likely to affect the IT sector. Donald Trump won the US presidential election and there was lack of clarity in policies by the Trump regime towards the Indian IT companies. So the negative impact on the IT sector can be attributed more to the Trump effect. Demonetization ideally should have a positive impact on IT stock as the government was trying to provide an impetus to digital India. Hence, from our analysis it cannot be inferred that the negative impact on IT is due to demonetization.

SI1400 (Oil and Gas Index): There is no impact on the index as observed from Table 3. There is no significant CAR for any of the periods considered in the study. The share prices of the companies in the index were not affected as the government had allowed the demonetized notes to be used at their outlets and so the problem of liquidity was not felt. The

companies in exploration and refining were also not affected as their nature of business was B2B. The demand for oil was also growing at a compounded annual growth rate of 3.3% as reported by Indian Brand Equity Foundation in Oil and Gas Report (p. 8) of March 2017.⁴ Thus, the null hypothesis of no impact is accepted.

SIPOWE (Power Sector Index): In the pre-event days, the CAR of the sector is not significant for any of the time periods. The CAR for period (0, 5) is observed to be positive and significant. After demonetization the power sector companies recovered huge amounts of pending dues as government had allowed the use of demonetized notes for payment of power bills. The collections of these companies increased in the short run. So the positive CAR in the post-event period can be attributed to demonetization.

SPBSTLIP (Telecom Index): The CAR for none of the period is found to be significant. But it can be seen that the sign of CAR before demonetization is negative, while post it is positive. Ideally demonetization should have a positive impact on telecom sector as the government was encouraging online payments using mobile technology. Demonetization had a positive impact on the index movement. But the null hypothesis cannot be rejected as the results are not statistically significant.

SIBTEC (Technology Index): This index mostly comprises of the stocks of the media, telecom and IT. The index has reacted negatively on the event day and the CAR for the period (0, 2) is also significantly negative. The CARs for other periods are also negative though not significant. The negative AR and CAR observed in the post-demonetization period can be due to negative fluctuations in the IT and media stocks as the study finds no impact on the telecom sector (SPBSTLIP index). The negative impact may be a reflection of the use of black money in media. The alternative hypothesis of negative impact is accepted.

SPBSUTIP (Utilities Index): The utilities index mostly comprises of energy and electricity distribution-based companies. The index shows positive returns post demonetization. The CAR is positive and significant for the period (0, 2). As discussed earlier, the revenues of the utilities companies increased after demonetization as lots of people repaid their pending dues in this period. The improvement in collection seems to have played a role in improving the market sentiment towards utilities scrip. The null hypothesis of no impact is rejected in favor of the alternative hypothesis of positive impact.

SI1200 (Metals Index): For the metal sector, the CAR for period (0, 2) is found to be positive and significant, rejecting the null hypothesis. The positive impact can be due to the nature of business being B2B, so cash crunch has no role in the business performance. Also the companies earning are more dependent on exports.

Conclusion

Demonetization is a rare event which may have far-reaching impact on different sectors of an economy. In the present study, the impact of the November 2016 demonetization on various sectors in the Indian stock market is examined using event study methodology. The

⁴ www.ibef.org

AR for day zero, one and two and the CAR for the periods (-25, -1), (-10, -1), (0, 2), (0, 5) and (0, 10) are calculated and analyzed. The study found seven sectors—auto (SI1900), FMCG (SI0600), consumer discretionary goods (SPBSCDIP), realty (SIREAL), basic materials (SPBSBMIP), IT (SI1000) and tech (SIBTEC)—to be negatively affected by demonetization. However, the effect on IT sector can be attributed to the US election result and its IT policy. The public sector enterprises (CPSE), power (SIPOWE), infrastructure (Infra), banks (SIBANKEX), healthcare (SI0800), utilities (SPBSUTIP) and metals (SI1200), are the seven sectors that are positively affected. But capital goods (BISO200), oil and gas (SI1400), energy (SPBSENI), telecom (SPBSTLIP) and industrials (SPBSIDIP) are found to be not affected by demonetization. Since the government was pushing for cashless transactions and digitalization, the telecom stocks are expected to reflect a positive response. Though post-demonetization CAR is found to be positive, it is not significant. From the paper, it can be clearly seen that the sectors that are mostly dependent on liquid cash are the ones whose share prices are adversely affected. But where the government had allowed the use of demonetized money, those sectors exhibit a positive impact. Also the sectors that depend on government initiatives are found to benefit directly from demonetization and the indices reflect the same. The sectors that are engaged in heavy industrial production, long-term projects and B2B business are observed not to have been affected by demonetization. This pre- and post-demonetization analysis of the Indian stock market also reveals that there was no leak about the event to the market as the CAR for the pre-event period is not significant for any sector. The present study has observed the short-term effect of demonetization, as in a longer period, the effect may be diluted by other factors. In future, the study can be extended to observe the long-term effects of the event, especially in sectors such as banking, auto and realty where the impact was most visible. A detailed study of the banking sector can also be done to observe the impact on the bottom line of the banks. ❖

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