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INFORMATIONAL CONTENT OF INDIAN DEMONETISATION FOR SECTORAL INDICES

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Abstract *The present work tries to study the degree and direction of the impact of the demonetisation move of the Central Government in India announced on the eve of November 8, 2016 on various sectors of Indian economy proxied by their barometers in the stock markets of the country. Using event study methodology with parametric and non-parametric testing, it was observed that the impact of demonetisation of High Denomination Currency Notes (HDCNs) was not evenly distributed in the Indian economy. As intended, the move had a foremost impact on the Reality sector which experienced the highest fall of over 12% on the next trading day after the announcement among all the 41 sectors studied in this article. While the IT sector and two business houses could recover to the early losses, few vital sectors succumbed to the overall negative sentiment. These sectors, Food & Agro-based Products, FMCG, Textiles, Small Cap 50 and India Manufacturing, have larger ramifications for the informal sector of Indian economy affecting employment, sustenance and economic activities.*

Keywords: *Demonetisation, Sectoral Index, Event Study*

JEL Classification: *E42, E44*

INTRODUCTION

When a currency is stripped of its status as legal tender, or when circulation of specific currency notes is stopped followed by the withdrawal of old currency notes, this is called demonetisation. It involves a change in the national currency by supplanting the old notes with new notes.

In the month of November 2016, the Indian economy has experienced an economic jolt from the current central government, in the form of a sudden reduction in the currency in circulation. On the evening of November 8, the Prime Minister of India announced 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 the Indian economy, clamp down the counterfeit notes for terror financing and other illegal activities and curtail the shadow economy.

The Indian economy had observed such instances of withdrawal of currencies earlier in the years of 1946 and 1978. However, the impact of such previous attempts of demonetisation on Indian stock market was 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 similar motives as with the present move of demonetisation. However, Indian stock markets showed the signs of positivism by this populist move of the Janata Party coalition government.

The earlier experiences of demonetisation in 1946 and 1978 has alternatively been negative and then positive for the Indian stock market. Narain and Rani (2017) examined the information content of announcement of demonetisation of HDCNs by the central government and found that market perceived this move negatively with 9 per cent reduction in the shareholders' wealth proxied by broader market index of S & P BSE200 during the next eight trading days immediately after the announcement of the demonetisation.

Chellasamy and Anu (2017) examined the impact of demonetisation on the sectoral indices available at the National Stock Exchange. A sample of 47 observations from October 3, 2016 to December 9, 2016 was analysed by using Regression Analysis. The study found widespread negative returns across sectors after demonetisation. Only a few sectors, namely, public sector banking segment, pharma,

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energy and IT sectors witnessed a significant rise in return after demonetisation.

Padmavathy, Umashankar, and Indhu (2017) analysed the impact of the demonetisation announcement on the share prices of listed index companies of Banking and Automobile sectors by employing Event Study Methodology. The study concluded that demonetisation announcement does not have any significant impact on listed index companies of Banking and Automobile sectors.

Sunil and Shenoy (2017) analysed five stocks in five sectors of BSE spanning the data from two months prior to demonetisation to four months after it. The study concludes that the demonetisation event didn't have any impact on the investors' wealth of the analysed stocks as the prices moved back to their trajectories after the few weeks of turmoil in the market.

The limited studies in this area are not conclusive regarding the sectoral impact of the demonetisation move. The present study tries to cover the Indian economy in an extensive number of sectors to gauge any impact of the demonetisation move after its announcement. This study is compiled into five sections including the present one. The next section expresses the objective of the study. The section thereafter discusses the data and methodology used in the study. The fourth section reports the results of the tests conducted in the study. The final section concludes the paper.

OBJECTIVES

The objective of the study is to examine whether demonetisation announcement has any instantaneous effect on the sectoral indices available at NSE, BSE and CMIE prowess.

DATA AND METHODOLOGY

For the purpose of this study, the data has been collected from the Centre for Monitoring Indian Economy (CMIE) Online Corporate Database Prowess IQ 1.8. Daily index values of the following indices were collected from 23rd May 2016 to 1st December, 2016.

Table 1: Sectoral Indices Selected for the Study

NSE	CMIE Prowess	BSE
Nifty 200	Chemicals and chemical product	BSE 200
Auto Index	Construction Materials	Base Materials
Bank Index	Diversified	Capital Goods
Financial Services	Food and Agro based product	Discretionary goods and services
FMCG	Mining	Durables
IT	Textiles	Healthcare
Media	Transport Equipment	India Manufacturing
Metal		Industrials
Pharma		Telecom
Private Banks		Utilities
PSU banks		
Reality		
Commodities		
Energy		
Consumption		
Infra		
Service sector		
Sheriah 25		
Birla Group		
Mahindra Group		
Tata Group		
Nifty 50		
Mid Cap 50		
Small Cap 50		

The event study methodology has been used to estimate Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) during the Event Window period. This methodology seeks to determine whether there is an abnormal stock price effect associated with an event. The event study methodology has been widely used in corporate finance to analyse the impact of corporate announcements on their value. Event Study is an empirical research technique that enables an observer to assess the impact of a particular event on a firm's stock price.

The event is what one wishes to investigate and see their impact on the stock prices. For the purpose of this study, the first trading day immediately after the demonetisation announcement, November 9, 2016, has been taken as the event date i.e. day zero. An event window is a period in which an event occurs. In this study, the event window has been taken from -15 days to the demonetisation announcement to +15 days. The Estimation window has been taken as 100 days before the event window.

Table 2: Event Window and Estimation Window

Event Window	31 Days (i.e. 19.10.2016 to 1.12.2016)	The period for which AR and CAR has been estimated
Estimation Window	100 Days (i.e. 23.05.2016 to 18.10.2016)	The period for which regression has been run to estimate the alpha and beta coefficients.

Estimation of Actual Returns

The return of each index of NSE, BSE and CMIE has been calculated by using the following formula:

$$R_{it} = \ln (P_{it} / P_{it-1})*100$$

Where,

R_{it} = The return of Index i on day t;

P_{it} = Closing price of the index i on day t;

P_{it-1} = Closing price of the index i on day t-1;

ln = Natural logarithm

Estimation of Expected Returns

The expected returns for each day in the event window period for all the indices have been estimated by using the market model. This model has been used to estimate the alpha and beta coefficients of the returns over an estimation window.

$$\text{Expected Return} = \alpha + \beta R_{mt} + e$$

Where,

α = y-intercept of the market model regression;

β = slope in the market model regression;

R_{mt} = Return on the market portfolio at time t.

The return on the market portfolio is proxied by the BSE 200 Index for the sectoral indices available at BSE, and by the NSE 200 Index for sectoral indices available at NSE and CMIE.

Estimation of Abnormal Returns

The daily abnormal returns for each index in 31 days' event window have been calculated by subtracting the expected returns from the actual returns.

Abnormal Return (AR)= Actual Return – Expected Return

Estimation of Cumulative Abnormal Returns (CAR)

The CAR has been estimated to capture the total effect of the demonetisation announcement for each of the indices during the event window.

$$\text{CAR} = \sum_{i=-n}^{n} AR_t$$

Where,

CAR = Cumulative abnormal returns of the demonetisation announcement;

-n to n = Event window period i.e. 31 days.

Statistical Significance of AR & CAR: The null hypothesis that there are no abnormal returns associated with the demonetisation announcement needs to be statistically tested using parametric and non-parametric test. For this, the statistical significance of the daily abnormal returns has been examined by using the independent t-test and Wilcoxon rank sum test.

$$\textbf{t-statistic of AR} = AR_t / S(AR)$$

Where,

AR_t = Abnormal returns for t days in the event window period;

S (AR) = Standard deviation (σ) of Abnormal returns of sample companies during Estimation window.

Hypothesis

H_{0j} Demonetisation announcement has no effect on sectoral index 'j' i.e. $AR_j = 0$

H_{1j} Demonetisation announcement does have an impact on sectoral index 'j' i.e. $AR_j \neq 0$

ANALYSIS AND OUTCOMES

The following table reports the reaction of Sectoral Indices on the trading day following the announcement of demonetisation, i.e., November 9, 2016:

Table 3: Abnormal Returns on Event Day and its Significance

Sector	Event Day AR	t-values	p-values
Reality	-9.8331	-8.9031	0.0000
Durables	-3.0112	-4.3444	0.0000
Discretionary Goods & Services	-1.5985	-4.0283	0.0001
Construction Materials	-2.3938	-3.9573	0.0001
Mahindra Group	-2.3926	-3.7248	0.0003
MNC	-1.3911	-3.4618	0.0008
Consumption	-1.2034	-3.4516	0.0008
Tata Group	-2.5671	-2.9918	0.0035
SmallCap50	-2.1023	-2.8700	0.0050
IT	-2.3766	-2.6109	0.0104
Basic Materials	-1.2612	-2.3486	0.0209
Shariah25	-0.6848	-2.3393	0.0213
Birla Group	-1.7467	-1.9387	0.0554
Food & Agro-Based Products	-1.2025	-1.8596	0.0659
Transport Equipment	-0.8747	-1.7492	0.0834
FMCG	-1.1401	-1.5713	0.1193

Sector	Event Day AR	t-values	p-values
Auto	-0.8120	-1.3436	0.1822
Diversified	-0.9822	-1.1831	0.2396
Textiles	-0.7060	-0.9506	0.3441
MidCap50	-0.5116	-0.7970	0.4274
Commodities	-0.1382	-0.3133	0.7547
Metal	0.2466	0.2614	0.7943
Mining	0.3088	0.2658	0.7910
Telecom	0.3801	0.3235	0.7470
Media	0.3975	0.3846	0.7014
Services Sector	0.1242	0.4147	0.6792
Industrials	0.2732	0.4882	0.6265
India Manufacturing	0.1475	0.5579	0.5782
Capital Goods	0.8813	0.9608	0.3390
Infra	0.7630	1.3270	0.1876
Nifty50	0.1844	1.4204	0.1587
Utilities	1.0353	1.8414	0.0686
Financial Services	0.8639	2.1024	0.0381
Energy	1.3345	2.1254	0.0361
PSE	1.1451	2.1508	0.0340
Chemicals & Chemical Products	1.3319	2.5339	0.0129
Private Banks	1.4164	2.7424	0.0073
PSU Bank	4.5837	3.3854	0.0010
Bank	1.8953	4.0344	0.0001
HealthCare	2.6631	4.1889	0.0001
Pharma	3.1224	4.1994	0.0001

As evident from Table 3, reality sector was among the worst hit by the demonetisation move. The prime objective of the demonetisation move to curb black money circulating in the high valued reality transactions was an obvious target. The ancillary index of construction materials also following the downfall in its value. Few other unfortunate sectors observing a fall in their index values on the event day were: Durables, Discretionary Goods & Services, Consumption, Small Cap 50, Food & Agro-based products, etc.

However, few sectors reacted positively to the demonetisation move. This group was led by PSU Bank index. A heavy flux of funds into the banking channel was to be experienced by these banks. Continued acceptance of old currency notes for payment of Utilities and Healthcare services lead these sectors to garner more business for a short span. Allied sectors of bank, private banks, financial services, energy, pharma, chemicals and chemical products also continued the euphoria. The following Fig. 1 also depicts the spectrum of sectors affected by the demonetisation move on the event day.

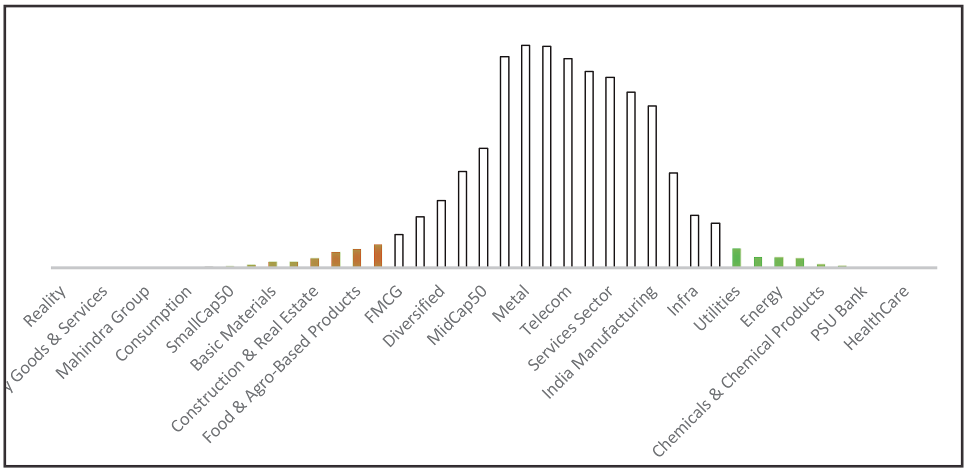

Fig. 1: Distribution of Sectors on the Event Day

The impact of demonetisation move can also be studied cumulatively across a few more days after the announcements so as to infer the aggregate impact of such action. The following table depicts the cumulative abnormal return of the sectoral indices across two, five and seven days after the announcement of demonetisation.

Table 4: Post-Event Cumulative Abnormal Return on Different Event Windows

Sector	2Days CAR	5Days CAR	7Days CAR
Auto	-3.0799**	-5.4054**	-4.4398**
Bank	3.7836**	4.8803**	4.4299**
Basic Materials	0.0293	-4.1145**	-5.0131**
Birla Group	-0.1951	-4.6435*	-3.7396
Capital Goods	0.9193	5.1142*	5.3965*
Chemicals & Chemical Products	1.4276	0.3704	1.646
Commodities	1.1852	-0.4422	0.2877
Construction Materials	-4.5558**	-11.3189**	-12.7509**
Consumption	-2.7071**	-3.9542**	-4.6954**
Discretionary Goods & Services	-3.2032**	-5.8169**	-6.3277**
Diversified	0.1016	-4.4248*	-5.8365**
Durables	-4.1285**	-9.1224**	-9.8334**
Energy	1.5821	3.1815*	4.6992**
Financial Services	1.2549*	2.358*	1.8535
FMCG	-1.3744	-4.1404*	-4.7271*
Food & Agro-Based Products	-1.0201	-5.0133**	-5.5089**
HealthCare	2.9297**	2.8897*	4.7956**
India Manufacturing	-0.7383	-1.6252**	-1.1579
Industrials	-0.0794	-0.5812	-0.1562
Infra	1.7828*	5.2103**	5.9823**
IT	-3.2371*	-0.0515	-1.3805
Mahindra Group	-3.9787**	-2.7973	-2.508
Media	0.1867	-0.0098	-4.1918
Metal	4.6098**	2.7249	1.9957
MidCap50	0.5118	-0.9132	-0.5799
Mining	1.8393	2.3758	2.5925
MNC	-2.8005**	-3.7321**	-4.3943**
Nifty50	0.0517	0.5781*	0.4341
Pharma	3.2992**	3.7299*	5.8796**
Private Banks	2.6448**	2.237	1.9846
PSE	2.4621**	2.6895*	4.5947**
PSU Bank	10.5605**	18.73**	19.2429**
Reality	-10.5996**	-12.9429**	-9.7242**
Services Sector	0.3253	2.0548**	1.4651
Shariah25	-1.3223**	-1.8609**	-1.9957*
SmallCap50	-1.5204	-4.7865**	-5.0159*
Tata Group	-3.2104**	-2.3352	-3.8045
Telecom	2.7403	5.3432*	4.4741
Textiles	-0.7249	-5.8241**	-4.9708*
Transport Equipment	-2.76**	-5.0395**	-4.696**
Utilities	2.4774**	4.3061**	6.817**

* Significant at 5%; ** Significant at 1%

Table 4 shows that Reality sector index had more than 10% consistent drop in its value over three different event windows. Construction Materials index followed this bloodbath. Durables index dropped more than 4% over the three event windows. Sectors like Auto, MNC, Transport Equipment and Shariah25 continued to underperform during the three event windows; whereas sectors like IT, Tata Group index and Mahindra Group index were successful to overcome the earlier losses due to demonetisation. However, unfortunately, sectors like Food & Agro-based Products, Textiles, Small Cap 50, FMCG, India Manufacturing index succumb to the move affecting the informal sector of the Indian economy at a huge scale.

The following Fig. 2 depicts the reaction of different sectors of the Indian economy based on 5 days' post-announcement event window.

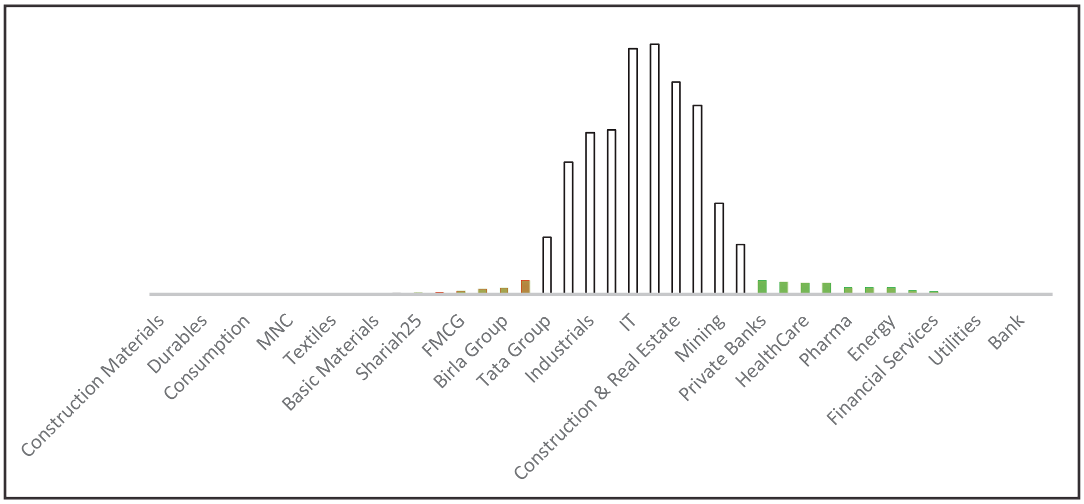

Fig. 2: Distribution of Sectors During 5 Days Event Window

For drawing robust conclusions, a non-parametric test of the abnormal returns is conducted using the Wilcoxon Rank Sum test wherein ascending order ranks were assigned to various Abnormal Returns observed by a single sectoral index. The following tables report the results of the non-parametric test.

Table 5: Wilcoxon Rank Sum Test of Ranks on the Event Day

Sector	Rank Difference on Event Day	z-stat	p-value
Reality	-65	-1.7189	0.0856
Mahindra Group	-65	-1.7189	0.0856
Durables	-65	-1.7189	0.0856
MNC	-64	-1.6924	0.0906
Shariah25	-64	-1.6924	0.0906
Tata Group	-64	-1.6924	0.0906
Construction Materials	-64	-1.6924	0.0906
IT	-63	-1.666	0.0957
Consumption	-63	-1.666	0.0957
SmallCap50	-63	-1.666	0.0957
Basic Materials	-63	-1.666	0.0957
Discretionary Goods & Services	-63	-1.666	0.0957
Birla Group	-60	-1.5867	0.1126
Food & Agro-Based Products	-60	-1.5867	0.1126
FMCG	-58	-1.5338	0.1251
Transport Equipment	-58	-1.5338	0.1251
Auto	-56	-1.4809	0.1386
Diversified	-53	-1.4015	0.1611
Textiles	-45	-1.19	0.2340
MidCap50	-39	-1.0313	0.3024
Commodities	-18	-0.476	0.6341
Metal	12	0.3173	0.7510
Mining	13	0.3438	0.7310
Telecom	13	0.3438	0.7310
Services Sector	19	0.5024	0.6154
Media	24	0.6347	0.5256
India Manufacturing	30	0.7933	0.4276
Industrials	34	0.8991	0.3686
Capital Goods	52	1.3751	0.1691
Infra	53	1.4015	0.1611
Nifty50	53	1.4015	0.1611
Utilities	55	1.4544	0.1458
Financial Services	61	1.6131	0.1067
Energy	61	1.6131	0.1067

Sector	Rank Difference on Event Day	z-stat	p-value
PSE	61	1.6131	0.1067
PSU Bank	63	1.666	0.0957
Private Banks	64	1.6924	0.0906
Chemicals & Chemical Products	64	1.6924	0.0906
Bank	65	1.7189	0.0856
Pharma	65	1.7189	0.0856
HealthCare	65	1.7189	0.0856

As the powers of non-parametric tests are lower than that of the corresponding parametric test, the conclusions drawn from Table 5 are been drawn with a higher level of significance. The table above confirms the sectors that have lost and gained from the demonetisation move. The table below also corroborates the broad conclusions of the cumulative impact of demonetisation over different event windows.

Table 6: Post-Event Sum of Ranks over Different Event Windows

Sector	Cumulative Ranks over 2 Post-Event Days	Cumulative Ranks over 5 Post-Event Days
Auto	11**	135**
Bank	261**	521**
Basic Materials	130	162**
Birla Group	131	179*
Capital Goods	190	487*
Chemicals & Chemical Products	209	342
Commodities	179	297
Construction Materials	6**	106***
Consumption	4**	140**
Discretionary Goods & Services	5**	138**
Diversified	137	207
Durables	13**	29***
Energy	219	505**
Financial Services	236*	519**
FMCG	53	98***
Food & Agro-Based Products	98	109***
HealthCare	218	425
India Manufacturing	97	198
Industrials	134	300
Infra	244**	585***
IT	20**	299
Mahindra Group	6**	234
Media	143	299
Metal	209	344
MidCap50	152	250
Mining	199	430
MNC	3**	183*
Nifty50	135	405
Pharma	212	447
Private Banks	259**	442
PSE	257**	469*
PSU Bank	259**	536**
Reality	33*	130**
Services Sector	182	534**
Shariah25	7**	143**
SmallCap50	111	211
Tata Group	31*	237
Telecom	206	466
Textiles	81	145**
Transport Equipment	10**	139**
Utilities	252**	560***

* Significant at 10%; ** Significant at 5%; *** Significant at 1%

CONCLUSION

This study undertakes to examine the impact of demonetisation on the sectoral indices of the Indian economy. The data for this study includes all sectoral indices available on NSE, BSE and CMIE so as to cover the broadest set of sectors encompassing Indian economy. The data has been collected from the Prowess database of the Centre for Monitoring India Economy. The analysis has been conducted using the Event Study Methodology using both parametric and non-parametric tests. The study found that demonetisation didn't have the impact evenly across the sectors. There were some sectors for which demonetisation announcement does have a significant negative impact, e.g. reality, discretionary goods and services, etc. while some sectors observed significant positive impact, e.g. PSU Banks, Healthcare, etc. leaving few such sectors which observed no such impacts, e.g. Media, Mining, Industrials, etc. While the IT sector index and indices representing two major business houses could recover to the early losses, few vital sectors succumbed to the overall negative sentiment. These sectors namely, Food & Agro-based Products, FMCG, Textiles, Small Cap 50 and India Manufacturing, have larger ramifications for the informal sector of Indian economy distressing employment, sustenance and economic activities.

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