

ADJUSTMENT OF INDIAN STOCK MARKET TO THE DEMONETIZATION ANNOUNCEMENT IN 2016

Supriya Sardana

Assistant Professor,
Rukmini Devi Institute of Advance Studies,
New Delhi (India)
e-mail: sardanasupriya1994@gmail.com

Pardeep Gupta

Professor, Haryana School of Business,
Guru Jambheshwar University of Science & Technology,
Hisar, Haryana (India)
e-mail: pardeephbsb@gmail.com

ABSTRACT

The study aims to analyze the adjustment of the Indian Stock Market to the Demonetization Announcement made on November 08, 2016 and thereby test the semi strong form of Efficient Market Hypothesis using Event Study Methodology (Mac Kinlay, 1997). The prices of 500 shares listed on NIFTY 500 indexes are analyzed for 40 days surrounding the demonetization announcement. Patell's Standardized Residual test statistics has been used to standardize the abnormal returns using standard deviation of the abnormal returns of the estimation period. One sample t test is used to test the significance of the average abnormal returns and the cumulative average abnormal returns. Significant average abnormal returns were observed in the pre and post event window for a number of days. Similarly, the CAARs were found to be statistically significant for all the days in the post event window.

Keywords : Demonetization, Event Study Methodology, Patell's Standardized Residual test, t test.

Introduction

Demonetization of high value currency notes was a major economic change introduced by the Government of India on 8th November, 2016. Currency notes of Rs. 500 and 1000 ceased to exist as a legal tender. This step was undertaken to control the terrorism where in counterfeit notes was a major contributor (Rao et.al.). Demonetization left a major impact on the Indian economy. The country faced acute shortage of the currency by removing 86 % of the currency in circulation. Indian stock market was hit largely by this change. The BSE Sensex and NIFTY 50 fall by more than 6 per cent after the announcement. The stock market reaction to the demonetization announcement has been analyzed through event study methodology given by Mac Kinlay. The study attempts to identify how quickly the information was absorbed by the Indian Stock Market i.e. how efficient the market is in its semi strong form. A market where the information is fully reflected by the Indian Stock Market is called an efficient market (Gupta and Sardana, 2018). Fama suggested that the share prices completely reflect all the available information and divided the efficient market hypothesis into three forms: (1) Weak form (past data is already reflected in the stock prices); (2) Semi Strong form (both past and public data is reflected); (3) Semi Strong form of EMH (past, public and private data is already reflected). Demonetization is a public announcement therefore, the study falls under the category of analyzing the semi strong form of EMH in Indian Stock

Market. Empirical evidences are available in the literature on the efficiency of Indian Stock Market. However the literature found is mixed. Various parametric and non-parametric tests are available to test the efficiency in weak form namely Durbin Watson Test, Breusch Godfrey (LM) and Runs test respectively (Gujarati, 2016). Similarly event study methodology by Mac Kinklay is used to test the efficiency in its semi strong form. The present study aims to identify the presence of significant abnormal returns before and after the demonetization announcement based on methodology of event study.

Literature Review

Macroeconomic announcements such as GST implementations, Union Budget Announcements, Demonetization also impact the stock markets along with the corporate announcements of Dividend distribution, Bonus issue, stock splits etc. The study with respect to the adjustment of the stock prices to the new information available dates back to 1997 when MacKinlay tried to identify the information content of the quarterly earnings announcements for 30 firms on Dow Jones Industrial Index. Thereafter, many studies have been undertaken on the reaction of the stock prices with respect to the corporate announcements. Campbell and Ohuocha (2011) analyzed the information content of stock dividend in Nigeria using event study methodology and found that positive abnormal returns were found for actively trading stocks and negative for less traded stocks. Ramachandran (2013) examined no significant impact in Indian Stock Markets around announcements namely dividend, bonus issue, stock split and Merger. Kummata (2015) examined share price reaction to announcements namely Bonus share, Merger and Acquisition, Dividend, Right Issue. The information did not influence the market in significant manner. Tuli and Shukla (2015) investigated the information content of 150 placements of equity shares made by BSE listed companies and found that the opportunity of earning abnormal returns does not exist. Few studies deal with respect to the macroeconomic announcements. Some have been discussed here. Kutchu (2012) attempted to study the speed of adjustment of the stock prices to the publically available information of Union Budget Announcement using event study methodology and found significant impact on various sectors of the market. Similar study was taken by Gupta (2015) examined that the stock market adjusted to the Union Budget information within a short period itself i.e. three days surrounding the budget announcement. Same results were obtained by Patel et.al. (2016). Padmavathy et.al. (2017) found the reaction of the stock prices of Banking and Automobile sector with respect to the demonetization information and found no significant returns. Similar Study was undertaken by Iyegar et.al (2017) where in stock price reaction of FMCG sector, Banking Sector and Automobile Sector was analyzed and found that the demonetization announcement information did have some impact on the capital market through price movements. The present study aims to fill the gap of the literature by finding the impact of demonetization information on Indian Stock Market and analyzing the speed of adjustment of the share prices to the announcement made.

Objective of the Study

The main objective of this study is to analyze the adjustment of the Indian stock market to the announcement of the Demonetization Information. PM Narendra Modi announced after midnight of November 8 that the notes of Rs. 500 and Rs. 1000 will no longer be a legal tender.

The present study is an attempt to identify how quickly the Indian Stock Market is able to adjust to the new information of the Demonetization Announcement and conclude about the efficiency of the stock market in its semi strong form. The study is considered to be important as this event created panic in the country and largely affected the Indian economy.

Research Methodology

The demonetization announcement was made on 8th November, 2016 at 5:15 in the evening after closing of the market. Therefore, the event date taken for the purpose of the study is 9th November, 2016.

The study involves a series of steps as given by Mac Kinlay: (1) clearly identify the event date. In this study it is Demonetization Announcement made on 9th November, 2016. (2) Define the event window which can vary from 15 days, 20 days, 40 days, 60 days (Elton & Gruber, 2002). In this study an event window of 41 days has been taken i.e. 20 days in the pre event window, event date and 20 days in the post event window. Similar event window has been used in the previous studies namely Gupta (2015); Das et. al, (2014); Ramachandran, (2012) for studying the efficiency of the Indian Stock market via event study. (3). Define the estimation window; for this study an estimation window of 125 days prior to the event window has been taken. (4) Select a suitable market index and choose a suitable model to measure the regression coefficients that are used to calculate the Expected Returns in the event window. For this study, NIFTY 500 has been chosen as the market index as it represents about 95.2 % of the free float market capitalization of the stocks listed on NSE and the market model has been chosen as given by Elton & Gruber, (2002). For any security i , the expected returns are calculated as:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

(5) Thereafter, the abnormal returns are calculated as the difference between the Expected returns and the actual returns. (6) The abnormal returns are averaged along with the event window to remove the firm specific impact using the following formulae:

$$AAR_t = \sum_{i=1}^n \{AR_{it}\} / N, \text{ where } t = -20 \text{ to } +20.$$

The Average Abnormal returns are then cumulated across the event window to calculate the Cumulative Average Abnormal Returns (CAAR). It provides the collective impact of the event i.e. demonetization announcement. It is calculated using the following formulae:

$$CAAR_t = \sum_{i=1}^n \{AAR_{it}\} / N, \text{ where } t = -20 \text{ to } +20.$$

Where, n refers to no. of securities; AAR refers to Average Abnormal returns

For the present study, the companies forming NIFTY 500 has been chosen as the sample. The index comprises of 501 companies. But the sample has been narrowed down to 386 companies. As to avoid the contamination or the confounding effects any major announcements made by the companies during the event window has been excluded from the sample and also for some of the companies the data was not available. The details of the sample has been given below in Table 1.

Table 1 : Details of the sample for the study

Total Companies in NIFTY 500	501
Less	
Dividend Announcements	40
Acquisitions	5
Buy Back	9
Allotment of Securities	18
Redemption of Securities	2
No data available	41
<i>Final Selected for the Study</i>	386

For the Study, the following Null Hypotheses have been formulated:

H01: The AARs of the sample firms during the event window are not significantly different from zero.

H02: The CAARs of the sample firms during the event window are not significantly different from zero.

Before the significance testing of the abnormal returns, Patell's Standardised Residual test statistics has been used where in using the standard deviation of the estimation window the abnormal returns are standardized. This assumes cross sectional independence and therefore reduces the impact of stocks with large returns. Patell (1976) is considered to be pioneer in providing the solution to the existence of residual variances across securities (Tuli & Shukla, 2015). The standardized abnormal returns are calculated by dividing the actual abnormal returns of each company across the event window by the standard deviation of the Estimation Window.

The formula for the same is given below:

$$SAR_{it} = AR_{it} / siC_{it}$$

Where, s_i is the standard error of residuals of the estimation window and C_{it} is the adjustment factor and is given by:

$$C_{it} = \sqrt{1 + \frac{(R_{mt} - R_m)^2}{\sum_{t=1}^{T_i} (R_{mt} - R_m)^2}}$$

Where, T_i is the length of the estimation window i.e. 125 days for the firm i . R_{mt} is the market return and R_m is the average of the market return over the estimation period. The Standardised Abnormal Returns are then used to calculate the Standardised Average Abnormal Returns (Std. AAR) which are then further cumulated to show the direction of the overall impact of the event using Cumulative Average Abnormal Returns (Std. CAAR). Thereafter, One sample t test is used in the study to test if the standardised abnormal returns are statistically significant. The statistics for the same is as follows:

$$Z(AAR) = \text{Std. AAR} / \sigma(\text{Std. AAR})$$

Similarly the significance testing has been done with the Standardised Cumulative Average Abnormal Returns.

$$Z(CAAR) = \text{Std. CAAR} / \sigma(\text{Std. CAAR})$$

The Z (AAR) and Z (CAAR) represent the test statistics value for Std. AAR and Std. CAAR respectively. The t test has been carried at 5 per cent level of significance.

Data Analysis and Interpretation:

The results have been divided into two sections. Section 1 explains the significance testing of the AARs and Section 2 explains the significance testing of the calculated CAARs using t test and graphs.

1. Analysis of the Average Abnormal Returns of the sample firms during the event window.

The following table 2 shows the Average Abnormal Returns, Standardised Average Abnormal Returns and their significance testing using the t values calculated in SPSS.

Table 2 : Representing AAR, Std AAR, their t values and p-values

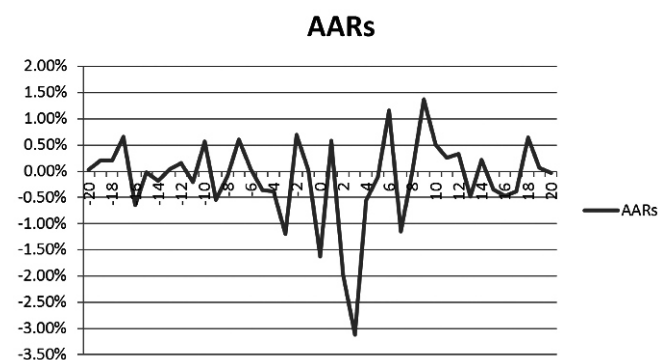
Event Window	AAR	Std. AAR	T values	P values*
-20	0.03%	-2.70%	-.211	.833
-19	0.20%	-2.66%	-.473	.636
-18	0.20%	18.19%	3.148	.002
-17	0.65%	3.76%	.637	.525
-16	-0.64%	-41.53%	-2.777	.006
-15	-0.02%	8.36%	.338	.736
-14	-0.18%	-1.72%	-.291	.771
-13	0.05%	-0.25%	-.041	.967
-12	0.16%	8.22%	1.256	.210
-11	-0.21%	-9.29%	-1.616	.107

-10	0.57%	10.45%	1.853	.065
-9	-0.55%	-26.10%	-4.387	.000
-8	-0.09%	6.67%	1.096	.274
-7	0.61%	32.02%	7.547	.000
-6	0.04%	-4.14%	-.638	.524
-5	-0.36%	-18.28%	-3.120	.002
-4	-0.39%	-36.81%	-6.309	.000
-3	-1.19%	-51.96%	-8.341	.000
-2	0.70%	13.85%	1.630	.104
-1	0.02%	-18.38%	-3.295	.001
0	-1.62%	-55.25%	-5.328	.000
1	0.58%	27.00%	2.827	.005
2	-1.97%	-50.97%	-2.166	.031
3	-3.12%	-86.78%	-6.688	.000
4	-0.56%	-15.48%	-1.981	.048
5	-0.10%	-11.89%	-1.576	.116
6	1.17%	21.81%	2.825	.005
7	-1.14%	-49.88%	-6.318	.000
8	0.03%	-0.37%	-.049	.961
9	1.38%	38.02%	4.909	.000
10	0.50%	36.54%	3.983	.000
11	0.26%	11.56%	.611	.541
12	0.33%	27.45%	3.632	.000
13	-0.49%	13.14%	2.208	.028
14	0.22%	5.21%	.774	.439
15	-0.35%	-4.45%	-.634	.526
16	-0.47%	-5.22%	-.973	.331
17	-0.39%	-7.00%	-1.072	.284
18	0.65%	8.82%	1.493	.136
19	0.07%	4.60%	.789	.430
20	-0.03%	-25.01%	-3.072	.002

Significant at 5 % level

From the above table it has been observed that the AARs are significant for majority of the days in the event window. The AARS are found to be statistically different from zero starting from the -5th day in the pre event window stating that the information was leaked and this continues till +7th day in the post event window. This shows that the stock prices took time to adjust the new demonetisation announcement information leaving behind the scope of earning abnormal returns. Thus the Hypothesis (H1) stating that the AARs are not statistically different from zero is rejected.

Figure 1 : AARs across the event window



From the above Figure 1, it has been observed that the demonetisation information was not completely reflected immediately on the event day. There are statistically significant negative AARs on majority of days in the event window. A significant downfall is observed in three stages i.e. in pre event window, event date and then in the post event window indicating that the share prices were not able to adjust itself completely to the information in one go. This shows the

existence of the possibility of earning the abnormal returns which means rejection of the Hypothesis (H1).

2. Analysis of the CAARs of the sample firms during the event window.

The table 3 represents the results of Cumulative Average Abnormal Returns, Standardised Cumulative Returns and their significance testing using t values as calculated in the SPSS.

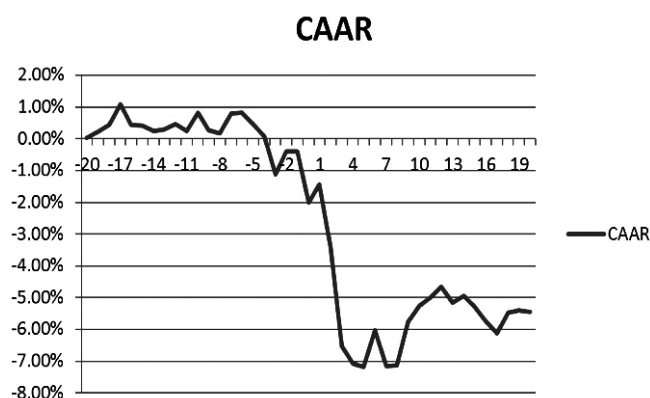
Table 3 : Representing CAAR, Std. CAAR, t-values and p-values

Event Window	CAAR	Std. CAAR	T values	P values
-20	0.03%	-2.70%	-.152	.879
-19	0.23%	-5.36%	-.357	.722
-18	0.44%	12.83%	.832	.406
-17	1.09%	16.59%	1.001	.318
-16	0.44%	-24.94%	-1.038	.300
-15	0.42%	-16.58%	-.452	.651
-14	0.25%	-18.30%	-.530	.596
-13	0.30%	-18.55%	-.558	.577
-12	0.45%	-10.33%	-.275	.784
-11	0.24%	-19.62%	-.551	.582
-10	0.82%	-9.16%	-.243	.808
-9	0.27%	-35.26%	-.994	.321
-8	0.18%	-28.59%	-.804	.422
-7	0.79%	3.43%	.122	.903
-6	0.84%	-0.71%	.000	1.000
-5	0.47%	-18.98%	-.529	.597
-4	0.09%	-55.79%	-1.559	.120
-3	-1.11%	-107.75%	-2.996	.003
-2	-0.41%	-93.90%	-2.568	.011
-1	-0.39%	-112.28%	-3.026	.003
0	-2.01%	-167.54%	-4.404	.000
1	-1.43%	-140.54%	-3.501	.001
2	-3.40%	-191.51%	-4.107	.000
3	-6.52%	-278.29%	-5.434	.000
4	-7.08%	-293.78%	-5.816	.000
5	-7.18%	-305.66%	-5.994	.000
6	-6.01%	-283.85%	-5.437	.000
7	-7.16%	-333.74%	-6.277	.000
8	-7.13%	-334.10%	-6.368	.000
9	-5.75%	-296.08%	-5.698	.000
10	-5.25%	-259.54%	-4.836	.000
11	-4.99%	-247.99%	-4.383	.000
12	-4.66%	-220.54%	-3.888	.000
13	-5.15%	-207.40%	-3.655	.000
14	-4.93%	-202.19%	-3.556	.000
15	-5.28%	-206.63%	-3.570	.000
16	-5.74%	-211.85%	-3.612	.000
17	-6.13%	-218.85%	-3.642	.000
18	-5.48%	-210.03%	-3.470	.001
19	-5.41%	-205.42%	-3.395	.001
20	-5.44%	-230.44%	-3.779	.000

*Significant at 5% level.

From the above analysis it has been observed that the CAARs are statistically significant right from three days prior to the announcement of demonetisation and these significant CAARs continue thereafter, therefore leaving a huge scope for earning abnormal returns. This indicates that the stock prices took time to adjust to the new information of demonetisation in the market. Thus the Hypothesis (H2) i.e. the CAARs are not statistically different from zero is rejected

Figure 2 : CAAR across the event window



From the above figure, it has been observed that the demonetisation announcement information lead to the negative abnormal returns. There market reacted negatively to the demonetisation information and the information was not reflected immediately. The market over reacted to the information of demonetisation announcement. Thus rejecting the Hypothesis (H2) i.e. the CAARs are no different from zero.

Conclusion

The demonetisation announcement made by the Modi Government lead to the opportunity of earning significant abnormal returns for the investors. The Indian Stock Market started showing statistically significant abnormal returns prior to the announcement indicating the leakage of the information. Also the market took 4 to 7 days to completely reflect the information in the share prices. This indicates that the Indian Stock Market is inefficient in its semi strong form. The investors and other portfolio managers can make use of this inefficiency by studying the nature of the market and earn huge possible abnormal returns. The possibility to earn abnormal returns would attract more investment in the capital market.

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