

# Is bit coin gaining cash during cashless times in India? An event study approach

P. Theerthaana\*, Dr. A.K. Sheik Manzoor

*\*Junior Research Fellow, Associate Professor*

*MBA Department, Anna University, Chennai, India*

sahanatheerthee@gmail.com, sheikmanzoor@annauniv.edu

## Abstract

**Objective:** The unprecedented move of demonetization by the Prime Minister of India- Mr.Modi, to fulfill his vision for cash less and corruption free India, has sparked new interest in Bit coin due to the shortage of supply of cash and lack of liquidity. This study focuses to examine the relevance of abnormal return and volatility of Bit coins and the most significant economic event of demonetization in India in the year 2016.

**Methodology:** An event study framework is adopted to study the tectonic impact of demonetization on Bit coin exchanges. Focusing on daily Bit coin prices from a leading Bit coin exchange in India, Uno coin the subsequent effect on the Demonetization in India is analyzed.

**Findings:** Using the parametric T-Test it is strongly evident that Bit coin prices moves significantly upwards after the announcement of Demonetization. Abnormal return (AR) and cumulative abnormal return (CAR) from the constant mean return model of bit coin prices are statistically significantly revealed. The finding also suggests that demonetization has increased the Bit coin volatility.

**Conclusion:** The increase in volatility and prices of bit coin would be mainly being attributed to the fact that demonetization generates a cashless economy, which attracted large investors in Bit coin, which eventually led to increase in the trading volume in Indian Bit coin exchanges.

**Novelty:** This study is unique from other research contributions as it focuses on analyzing the effects of 2016-demonitization on bit coin prices using an event study methodology. It also provides insights to economist and experts in the field of crypto currencies to assess the impact of economic events like demonetization on crypto currencies. It also gives opportunity for the bitcoin investors to invest in crypto currencies by understanding the impact of economic events on crypto currencies.

**Keywords:** Demonetization Announcement, Abnormal returns, Bit coin, Constant-Mean return model, Event Study, Cumulative Abnormal Return, Volatility, Event Window, Crypto currency, Estimation Period.

## 1. Introduction

Indian Financial and Banking sector has experienced high turbulence when the Indian Prime minister Mr. Narendra Modi announced Demonetization on 8th Nov. 2016. One of the main intents of stopping ₹500 and ₹1000 as legal tender is to curb the menace of black money as these top 2 denominations form the highest percentage of currency notes in circulation is hoarded as 'Black money' and also to prevent counterfeit money in circulation that was used for terrorism activities. Demonetization not only created an immense discomfort for the local vendors and common people due to the high deficit in liquid cash, it also had a negative impact on the Indian Stock market to the extent of 6 month closing low with the Sensex 385 points down. When there was an uncertainty all around India over the economic impact of the government's demonetization move which dragged the domestic sentiment, it was a favorable moment for the people in Bit coin Community as there was a sudden surge in Bit coin Demand and the price of 1 BTC rose from 50,000 INR to 69, 0000 INR (almost 40%) in 3 weeks (BTCX India). The price difference for Bit coin on Indian and US/Canadian BTC exchanges was as high as 150\$. Hence it is highly critical to study if demonetization and the surge in bit coin prices in India are linked.

The claims that the huge cost advantage and speed factor that a bit coin remittance gateway offers is bound to see more and more Indian's looking to process their remittances through bit coin which would be a big boost to people's familiarity, engagement and usage of bit coins in India. Bit coins are viewed as a means to convert black money during demonetization. The 'agents' would buy Bit coin and sell it for very high premium for cash which is no more legal tender. This cash would be exchanged for new valid notes by the agents and deposited in their accounts. The present study analyses the reaction of India's BTC Exchange on the demonetization announcement. The study focuses to investigate the impact of demonetization announcement by examining the reaction of bit coin price to demonetization announcements using event study methodology to explore stock returns around the demonetization announcement date and also analyze demonetization impact on Bit coin volatility on 1 month (short term), 2 months (medium term) and 3 months (long term). This study focuses to determine whether the current demonetization event has an effect on Bit coin Prices. Many economist and experts in the field of crypto currencies have given their views on the reasons for bit coin price surge after demonetization in India. Leading newspapers in India like the Hindustan Times and Mint have also reported on the increased demand for Bit coins in India after demonetization.

The unprecedented move of demonetization by PM Modi's vision for cash less and corruption free India has surged Bit coins prices as Bitcoins have been viewed as technology that can help fulfill the government's dream. Kamesh Mupparaju, the CEO of BTCXIndia postulates that RBI and Government are encouraging cash less transactions via digital wallets like Paytm, online banking, debit and credit cards (2016 Nov). By this way, the government's decision to demonetize two currency notes has sparked new interest in Bitcoin and other cashless mechanisms. According to Mohit Kalra, CEO, Coin secure, there is an increased demand for bit coin and India clearly has shortage of supply, making the demand and lack of liquidity push up prices of bit coin as compared to global exchange. Prableen Bajpai, CFA (ICFAI) (2016) claims that the huge cost advantage and speed factor that a bit coin remittance gateway offers is bound to see more and more Indian's looking to process their remittances through bit coin which would be a big boost to people's familiarity, engagement and usage of bit coins in India. Bit coins are viewed as a means to convert black money during demonetization. The 'agents' would buy Bitcoin and sell it for very high premium for cash which is no more legal tender. This cash would be exchanged for new valid notes by the agents and deposited in their accounts. Another reason for adopting Bit coin is the key innovation in Bit coin, compared to other forms of cryptographic cash [1] or virtual currencies, and is its decentralized core technologies. Early adopters praised decentralization and by all indications chose Bit coin because they wanted to use a decentralized system [2].

According to the background on the relevance of demonetization and Bit coin prices argument that bit coin prices incorporate the most significant economic event of demonetization in India, thus one of the most significant economic events, announcement of demonetization interests' academics in addition to investor to conduct event studies to examine the resulting bit coin price and transaction volume reaction. Extant literatures have adopted event study to investigate the impact of macroeconomic effects like announcements of budget on the performance of stock market which includes the work of [3] who postulates that budgetary announcement has no significant impact on the indices. Similarly, [4-14] analyzed the impact of union budgetary announcement on stock market return and volatility. In line with this research, [15,16] conducted event study to compare the Cumulative Average Abnormal Returns (CAAR) of target and bidding firms after M&A announcements and empirically found that post-announcement CAAR of target firm is significantly higher than the pre-announcement returns.

Event study was not limited to study the effect of macroeconomic announcements on performance of stock market; it is also used to study the effects of critical corporate announcements like policy changes [17], M&A announcements [18-20] dividend payout policy [20] on the stock prices of the firm. Event study methodology has been widely used in productions and operations [21], marketing and sales [22], finance, information technology [23-24]. Even though abundant literature exists in studying the impact of macroeconomic announcement on stock market, no studies have focused on analyzing the impact of demonetization on crypto currency markets, which makes the research a novel study, thus contributing to the literatures of crypto currencies and macroeconomic literatures.

## 2. Materials and Methods

### 1. Identification of events of interest: 2016 demonetization announcement

The study focuses to investigate the impact of announcement of demonetization of the 500 and 100 rupee notes on the bitcoin prices, a crypto currency by examining the reaction of bitcoin price to demonetization announcements using event study methodology to explore bitcoin returns around the demonetization announcement date. Event study studies the behavior of bitcoin price around the economic event, demonetization announcements. In the academic accounting and finance field, event studies have been applied to a variety of firm specific and economies wide events.

### 2. Sample selection: sources of bitcoin prices

Moreover, to study the impact of demonetization announcements, Bitcoin prices listed in the Uno coin Exchange of India during the period 08.09.2016 to 02.06.2017 that have price sensitive information around the date of demonetization announcements (08.11.2016) are taken into consideration for this research.

### 3. Definition of the event window

The event date is the demonetization announcement date 08.11.2016, when the Prime Minister of India Narendra Modi has announced the demonetization of 500 and 1000 rupee notes, is defined as  $T=0$ .

The impact of the demonetization event over the Bitcoin Prices of Uno coin Exchange in India is the event period which is in the range of  $-T_2$  to  $T_3$  around the event date which is the demonetization announcement date 08.11.2016 ( $T=0$ ).

The choice of the estimation period is arbitrary and it reflects the expected frequency of data availability, such as 150 days [25], 225 days [26] and 239 days [27]. This paper uses the estimation period as 150 days, which is in the range of  $-T_1 = -182$  to  $-T_2 = -32$ , covers the period with which expected return for the sample of stocks are estimated.

The time window is the estimation period and event period so fix the time period over which the Bitcoin prices of the Unocoin Exchange are involved. The interest period is prior and after the event date to capture the price effect of announcements [28].

### 4. Prediction of normal return: choice of estimation period

This study estimates the expected or normal return for each sample using 150 days of estimation period of  $t = -182$  to  $t = -32$  (where  $t = 0$  is dividend announcement date) using constant-mean return model .

Under the Mean-Adjusted return Model, the expected daily return  $E(R_{i,t})$  for stock  $i$  on day  $t$  is calculated as the mean return is the average return over the estimation period. Each stock can use the average return during the estimation period as its own expected return [27], [29]. Under the Mean-Adjusted return Model, the expected daily return  $E(R_{i,t})$  for stock  $i$  on day  $t$  is calculated as follows:

$$E(R_{(i,t)}) = \left(\frac{1}{T}\right) \sum_{t=T_1}^{T_2} R_{(i,t)} \quad (1)$$

Where  $i$  is the stock index, and  $T=T_2-T_1+1$ , which equals the number of days during the estimation period. In this study  $T=150$  days and  $T_1 = -182$  to  $T_2 = -32$ .

The Stock Return for day  $t$  and stock  $i$  is calculated as follows:

$$= \frac{P_{(i,t)} - P_{(i,t-1)}}{P_{(i,t-1)}} \quad (2)$$

Where  $i$  is the stock index and  $t$  refers to time (day),  $P_{i,t}$  is stock price for day  $t$  and stock  $i$ . Although the Mean-Adjusted return Model is perhaps the simplest model, Brown and Warner (1980, 1985) find it often yields results similar to those of more sophisticated models.

### 5. Prediction of abnormal return and cumulative abnormal returns

Abnormal returns ( $AR_{i,t}$ ) are calculated as the difference between actual returns on time (t) in the event window [-15, 15] (15 days before and 15 days after the event) and the expected return of an individual stock predicted by the Mean-Adjusted return Model.

$$AR_{(i,t)} = R_{(i,t)} - E(R_{(i,t)}) \quad (3)$$

Event studies usually focus on examining cumulative abnormal return (CAR). CAR indicates the extent to which the market adjusts the firm's value in response to the new information signal obtained through the firm-related announcement or economic-related announcement. CARs are expected to be positive or negative depending on whether investors overall believe that the event will result in incremental positive or negative future cash flows. Cumulative abnormal return (CAR) for an individual stock, the abnormal return of each stock is aggregated over the event window (-T2 to T3) as follows:

$$CAR_{(-T2,T3)} = \sum_{t=-T2}^{T3} AR_{(i,t)} \quad (4)$$

Where:

$R_{it}$  is the return of the sample firm i on day t; -T2 to T3 is the time period of the event window. In our study, event window period is -T2= -15 and T3 = 15 (15 days before and 15 days after the event).  $AR_{i,t}$  is the abnormal or excess return of the sample firm i on day t.

### 6. Measurement of volatility

Volatility has been measured as standard deviation of the rates of return. The rates of returns have been computed by taking a logarithmic difference of prices of two successive periods. Symbolically, it may be stated as follows:

$$r_t = \log_e \left( \frac{p_t}{p_{t-1}} \right) = \log_e(p_t) - \log_e(p_{t-1}) \quad (5)$$

Where

$\log_e$  is natural logarithm,

$p_t$  and  $p_{t-1}$  are the closing prices for the two successive periods.

The logarithmic difference is symmetric between up and down movements and is expressed in percentage terms for ease of comparability with the straightforward idea of a percentage change.

## 3. Results and Discussion

This study ought to test the abnormal trading behavior in Bitcoin after the Demonetization announcements as measured by cumulative abnormal Bitcoin return, the following hypotheses were proposed:

1.  $H_0$ : Cumulative abnormal return (CAR) of Bitcoins after demonetization announcement is zero.  $\mu_{CAR} = 0$
2.  $H_1$ : Cumulative abnormal return (CAR) of Bitcoins after demonetization announcement is not equal to zero.  $\mu_{CAR} \neq 0$

Table 1 shows the occurrence of abnormal return (AR) and cumulative abnormal return (CAR) centric to demonetization announcement date for 30 days event window comprising 15 days prior/ post to demonetization announcement.

Table 1. Average abnormal returns and cumulative abnormal returns of stocks in the event window

Pre- Announcement			Post- Announcement		
Days	AAR	CAR	Days	AAR	CAR
-15	-0.06077	-1.33551	0	-0.28892	-0.46834
-14	-0.2451	-0.30588	1	3.108785	2.819869
-13	2.289082	2.043977	2	-1.62531	1.48347
-12	-0.25009	2.038991	3	1.343288	-0.28203
-11	0.69493	0.444839	4	-0.98299	0.360296
-10	5.534471	6.229401	5	-0.07395	-1.05694
-9	-1.38778	4.146692	6	1.372283	1.298333
-8	1.430731	0.042952	7	1.79073	3.163013
-7	4.312865	5.743596	8	4.019177	5.809907
-6	-0.62666	3.686201	9	4.12469	8.143867
-5	-4.08	-4.70667	10	1.682924	5.807614
-4	1.241529	-2.83847	11	2.177252	3.860176
-3	1.737871	2.9794	12	-4.29105	-2.11379
-2	-0.723	1.014875	13	3.734527	-0.55652
-1	-0.17943	-0.90242	14	1.876126	5.610652
0	-0.28892	-0.46834	15	0.317541	2.193666

Although, abnormal returns computed for the Bitcoins seems to have a positive incidence of abnormal returns around 15 days post-demonetization, it must be proved statistically that the results are not gained by unexpectedly or by biased time series. A basic assumption that is the daily abnormal returns are identically and independently distributed. The proposed hypothesis can be tested by computing t-statistic for the sample of 30 observations in the event window (-15,15).

This study uses parametric test of T statistics [30] to test the significance of abnormal returns (AR) and cumulative abnormal returns (CAR) in order to observe whether demonetization event have an impact on Bitcoin prices.

Table 2. Parametric T-Test

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
CAR	3.558	32	.001	1.83212	.7833	2.8809

The results found from the Parametric T-Test (Table 2) signifies that since the p-value <.001, it has an enough evidence to reject the null hypothesis and can be concluded that CAR of Bitcoins after demonetization announcement is not equal to zero. And hence it is statistically proved that demonetization event is believed to significantly affect the Bitcoin prices and is having a positive incidence in prices after the event demonetization.

Table 3 presents the volatility of Bitcoin for pre and post period of demonetization and found that the volatility in the Bitcoin has been increasing after introduction of the demonetization in 2016 i.e. Standard Deviation values has gone up. Like, when volatility has been compared before 1 month, 2 month, 3 month with the period after introduction of demonetization, the volatility was 0.019, 0.021, 0.0254 as against 0.0331, 0.0295, 0.0193 in post period.

Table 3. Volatility pre and post demonetization

	VBE	VAE
1 Month	0.01917778	0.033105869
2 Months	0.02098014	0.029542506
3 Months	0.02546393	0.019276943

VBE-Volatility before event (before introduction of demonetization)

VAE- Volatility after event (after introduction of demonetization)

The study also proposes to test the following hypothesis,

$H_0$ : Introduction of Demonetization has no impact on Bitcoin volatility.

$H_1$ : Introduction of Demonetization has impact on Bitcoin volatility.

Table 4. Paired samples T- test

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
VBE-VAE	0.00543449	0.010415938	0.006013645	-0.904	2	0.02

This study uses a test statistic for mean abnormal returns in the presence of stochastic volatility during both event and nonevent windows and in the presence of event-induced variance increases. These findings have further been statistically tested by t-test and found that the findings led to the rejection of null hypothesis at appropriate levels and acceptance of the alternative hypothesis. This proves that introduction of demonetization of highest denominations in 2016 has impact on Bitcoin volatility and secondly, post-event volatility exceeds the pre- event volatility as shown in Table 4.

#### 4. Conclusion

The findings of the study enhance our ability to understand that Digital currencies like Bitcoin (or crypto currencies) aspire to compete against other online payment methods such as credit/debit cards and PayPal, as well as serve as an alternative store of value without the central authority, for the people during cashless times like demonetization. It also has important implications in the field of Electronic commerce and International Trade as crypto currencies like Bitcoin is gaining popularity as it is viewed to have more utility in the digital era, particularly in country like India which is focusing on digitally empowered society. The goal of this research is to provide investors with insight into the important drivers associated with the rise in Bitcoin prices and volumes apart from statistically proving the sudden price and volume surge of Bitcoin during the event demonetization. Some fundamentals pillars that drove bitcoin from a fledgling technology to a \$100 billion market cap (Times of India, June 2017) today are intrinsic value as a payment technology without a central authority, an increasingly attractive asset for institutional investors and professionally managed money, it is a new and better Gold and a an increasingly legitimate asset with government recognition and regulation. The implications drawn from this research should be considered in light of several constraints. This result of the study is robust to changes in event window definitions over the short run 30 days around the event. Subsequent study can be conducted for different event windows and can provide more insights for future research.

#### 5. References

1. D. Chaum. Blind signatures for untraceable payments. In *Advances in cryptology*. Springer, Boston, MA. 1983; 199-203.
2. US agencies to say bit coins offer legitimate benefits. <https://www.bloomberg.com/news/articles/2013-11-18/u-s-agencies-to-say-bitcoins-offer-legitimate-benefits>. Date accessed: 19/11/2013.
3. R. Deepak, N. Bhavya. An event study analysis of union budget announcement on broad and sectoral indices of Indian stock market. *International Journal of Innovative Research and Development*. 2014; 3(12), 1-21.
4. P. Chotalia. Impact of union budgets on NSE from 2007 to 2011. *VSRD International Journal of Business and Management Research*. 2013; 3(8), 337-43.
5. D.V. Gakhar, N. Kushwaha, V. Ashok. Impact of Union Budget on Indian Stock Market. *Scholedge International Journal of Management & Development*. 2015; 2(11), 21-36.
6. M. Ghani, A.K. Kotli. Stock market response to policy announcement: evidence from banking sector of Pakistan. *Developing Country Studies*. 2016; 6(1), 1-14.
7. A. Gupta, D. Kundu. A study on the impact of union budgets on stock prices in India. *The ICFAI Journal of Applied Finance*. 2006; 12(10), 65-76.
8. K. Khanna, N. Gogia. A Pragmatic Study of Budget Announcements & Stock Market Performance: India. *VSRD International Journal of Business and Management Research*. 2014; 4, 1-4.

9. V. Kutchu. Testing semi-strong efficiency of Indian stock market-A study on effect of union budget 2012 on six select sectoral stocks. *Researchers World*. 2012; 3(3), 1-74.
10. I.H. Pandya. Impact of the union budget on the Indian stock market. *Indian Journal of Finance*. 2014, 8(3), 44-57.
11. P.R. Saraswat, J.A. Banga. Volatility of Sensex with respect of Union Budget of India: A pragmatic study. *Transstellar International Journal of Accounting and Financial Management Research*. 2012; 2(1), 19-31.
12. G. Singh, S. Kansal. Impact of Union Budget on Indian stock market-A case study of NSE. *Asia-Pacific Journal of Social Sciences*. 2010; 2(1), 148-60.
13. A. Singhvi. Impact of Union Budget on NIFTY. *Pacific Business Review International*. 2014; 6(12), 6-14.
14. A. Soni. Reaction of the stock market to union budget and monetary policy announcements. *Asia Pacific Journal of Research in Business Management*. 2010; 1(2), 155-75.
15. P. Shah, P. Arora. M&A announcements and their effect on return to shareholders: An event study. *Accounting and Finance Research*. 2014; 3(2), 1-170.
16. S. Sharma, B. Singh. Determinants of equity share prices in Indian corporate sector: An empirical study. *The ICAI Journal of Applied Finance*. 2006; 12(4), 21-38.
17. M. Mohanty. Stock Market Reaction to Announcement of Policy Changes. *The ICAI Journal of Applied Finance*. 2004; 12(10), 34-42.
18. K. Papadatos. The wealth effects of takeover announcement on acquiring firms: the case of the athens stock exchange. *European Journal of Economics, Finance and Administrative Sciences*. 2011; (43), 155-167.
19. N. Vazirani. Mergers and acquisitions performance evaluation-a literature review. *SIES Journal of Management*. 2012; 8(2), 37-42.
20. T. Suwanna. Impacts of dividend announcement on stock return. *Procedia-Social and Behavioral Sciences*. 2012; 40, 721-5.
21. S. Ba, L.L. Lisic, Q. Liu, J. Stallaert. Stock market reaction to green vehicle innovation. *Production and Operations Management*. 2013; 22(4), 976-90.
22. B. Danaher, M.D. Smith, R. Telang, S. Chen. The effect of graduated response anti-piracy laws on music sales: evidence from an event study in France. *The Journal of Industrial Economics*. 2014; 62(3), 541-53.
23. B. Dehning, V.J. Richardson, R.W. Zmud. The value relevance of announcements of transformational information technology investments. *Mis Quarterly*. 2003; 27(4), 637-56.
24. Y. Konchitchki, D.E. O'Leary. Event study methodologies in information systems research. *International Journal of Accounting Information Systems*. 2011; 12(2), 99-115.
25. Lummer SL, McConnell JJ. Further evidence on the bank lending process and the capital-market response to bank loan agreements. *Journal of Financial Economics*. 1989; 25(1), 99-122.
26. K. Small, O. Ionici, H. Zhu. Size does matter: an examination of the economic impact of Sarbanes-Oxley. *Review of Business*. 2007; 27(3), 47-55.
27. S.J. Brown, J.B. Warner. Using daily stock returns: The case of event studies. *Journal of Financial Economics*. 1985; 14(1), 1-3.
28. A.C. MacKinlay. Event studies in economics and finance. *Journal of Economic Literature*. 1997; 35(1), 13-39.
29. N. Lambertides. Sudden CEO vacancy and the long-run economic consequences. *Managerial Finance*. 2009; 35(7), 645-61.
30. B.M. Barber, J.D. Lyon. Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics*. 1997; 43(3), 341-72.

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