

# Demonetization: a paradigm transformation in cashless payment system

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## Abstract

**Objective:** To see the impact of demonetization on cashless payment system through comparing the significant differences between cashless payment transactions of three time buckets before demonetization, demonetization and after demonetization.

**Method/Statistical Analysis:** The study was done for the three time buckets before demonetization (March 2016-October 2016), demonetization (November 2016-June 2017) and after demonetization (July 2017-February 2018), using the secondary data of cashless payment system from the RBI bulletin. The Welch's mean equality test was used to look at the significant differences of cashless payment transactions of three time buckets.

**Findings:** Looking at the significant differences of different cashless modes of payment system during the specified three time buckets, we found that during demonetization almost every cashless mode picked a sudden increase in value and volume of the transactions due to the currency deficiency and after the demonetization period due to the currency back in June 2017 the increment in use of almost every cashless mode had been stopped or decreased. From the results, we found that the demonetization move had significantly transformed the use of the cashless payment system, during the period of November 2016-June 2017.

**Application/Improvements:** Policy implications arising from the study is to achieve the objectives of demonetization move and to promote the Indian economy as a cashless economy, a well-equipped digital network, sound digital knowledge in people, digital security for the transactions and less availability of cash currency in economy are required.

**Keywords:** Demonetization, Cashless Payment Modes, History of demonetization, Effects of demonetization, Welch test.

## 1. Introduction

Demonetization is an act of elimination of currency from its legal status. On 8<sup>th</sup> November 2016, Government of India demonetized the currency of ₹500 and ₹1000 denomination which was the nearly ₹15.45 trillion and 86% of currency in circulation and announced to exchange the notes of these two denominations with the new currency issued of ₹2000 and ₹500 or deposit in their bank accounts. This event of demonetization was a memorable experience because it affected whole the economy. The revolution of demonetization reduced the money supply in economy and forced the people to stand in long queue outside the banks and ATMs to exchange or deposit their worthless currency. The negative consequences of this event were it affected negatively the small businesses and informal sector where all the transactions are done in cash, created the shortage of currency, reduced the purchasing power of the people, reduced the value of Indian rupee in compare of dollar, decline in GDP by 5.7% after the 4 months of Demonetization (March 2017 to June 2017), people had to struggle to find cash for daily financial transactions and waste their time in exchanging or depositing their worthless currency during business hours by standing in long queues outside the banks or ATMs. Due to the shortage of currency in circulation people shifted towards the cashless or electronic payment system. According to RBI report of November 2017, there was increase in electronic payment transactions i.e.54% in Prepaid Payment Instruments (PPI) volume, 23% in credit and Debit cards usage at ATMs and POS, 109% in IMPS volume and 23% in NEFT volume between November 2016 and August 2017.

## 2. History of demonetization in India

The demonetization of 2016 is not a new thing, in Indian history this type of decision had already taken. The first demonetization of currency of ₹1000 and ₹10000 was done in 1946 but this demonetization was not much affected the people because these high denomination currencies were not accessible to common people. After that in 1954 both currencies were re-introduced with additional currency of ₹5000.

The second demonetization move was taken when in 1978; Prime Minister Morarji Desai announced the currency ban of ₹1000, ₹5000 and ₹10000 out of circulation. The main objective of this decision was to curb the black money. After that note of ₹500 was come back in circulation in October 1987 and note of ₹1000 came in November 2000.

After that in November 2016 currency ₹500 and ₹1000 was demonetized and this decision was much impacted the every citizen of economy because this currency was accessible by common people and also the 86% of total currency in circulation.

## 3. Objectives of demonetization move of 2016

The goals of demonetization move were:

1. To curb the black money generated from money laundering or others illegal activities
2. To check on terror funding activities
3. To control inflation in Indian economy
4. To increase the cashless payment habit in the economy
5. To fight the tax evasion
6. To reduce the income inequality gap between the rich and poor
7. To reduce the corruption in India.
8. To counterfeit the fake currency which was estimated by Indian statistical institute in 2016 amounted 400 crore and 0.22% of total cash circulation in the economy.

## 4. Effects of demonetization

According to RBI report of November 2017 the demonetization move impacted on the Indian economy in various ways:

1. Increase in income elasticity of currency demand in post-demonetization period up to 0.9
2. Aggregate Bank deposit grow nearly 3 to 4.7% from the period of 11 November 2016 to 30 December 2016
3. 50 million new accounts were opened under PMJDY (Prime Minister Jan Dhan Yojna) in the period starting from November 2016 to the October 2017.
4. Unusual cash deposits detected up to ₹1.6 to ₹1.7 trillion
5. Mutual fund investment increase about ₹1.6 trillion to ₹21 trillion between the period of October 2016 to October 2017
6. Many Indians switched to electronic payment system and increase in digital payment from November 2016 to August 2017 accounted as PPI volume by 54%, credit and debit card usage at ATM and POS by 22.5%, NEFT volume by 23.2% and IMPS volume by 109.2%
7. In post-demonetization period rate of detection of fake currency notes rose which is more than twice of during pre-demonetization period
8. Between the 8 November 2016 and 6 January 2017 total currency in circulation decline by 9 trillion, which had a significant effect on cash holding habit of public and greater digitalization of retail transactions
9. Share of low cost Current Accounts and Saving Accounts (CASA) deposits in total bank deposits increased to 35.2% in October 2016, to 40.6% in March 2017, before declining to 38.6% in June 2017.
10. Metropolitan and Tier 1 cities reported up to 30% fall in house prices

These were the significant effect of demonetization on Indian economy which was reported by RBI on November it

## 5. Cashless payment system

A system in which transactions are done through the electronic payment mode or other than cash mode such as debit cards, cheque, paper vouchers, credit cards, prepaid payment cards, mobile-wallet, RTGS, NEFT, IMPS, Mobile banking, retail electronic clearing, demand draft etc.

### 5.1. Types of cashless payment system

The various cashless payment systems which are mostly using in making transactions are:

#### 1. RTGS

Under this mode, funds are transferred from one account to another as the instructions received normally within 30 minutes and transactions are individually done without netting or combining. This is a large value mode of payment which involves minimum value of ₹200000. This may be used for transactions like cash management transfer, tax payment, trade settlement, supplier payment, loan, hedging, interest payment etc.

#### 2. Paper clearing

It covers all the paper based instruments and governs how they work. It includes all MICR (magnetic ink character recognition) clearing, Non MICR clearing and CTS (cheque truncation system). It involves cheques, demand draft, interest warrant, dividend warrant, pay order etc.

#### 3. MICR clearing

The MICR code used mainly by banking industry to clearing cheque and other documents. This MICR based clearance system introduced in early 1980.

#### 4. Non MICR clearing

This system does not use the MICR technology for clearance of cheque or other documents. This is rarely used in this digital technology world.

#### 5. CTS (cheque truncation system)

In above two clearing system cheques or other documents are physically presented at the bank but in this system there is no need to physically present the cheque or other things because this is a online-image based cheque clearing system where the image of cheque and MICR code are captured at collecting bank branch and transmitted electronically. This system firstly introduced in New Delhi in February 2008.

#### 6. Retail Electronic Clearing Services (RECS)

These services are mainly used for the bulk fund transfer from one account to another through the electronic mode and the bulk transfer usually of low value transactions. It involves the payment or receipts for transactions that are repetitive in nature. These are mostly use for the salary, electricity bills, dividend distribution, water bills, EMI, pension etc. Following are the various forms of RECS.

#### 7. ECS Dr

This service is provided by banks in which customers mandates their banks to take care of automatically debiting the specified fund from their accounts on due date of month without bothering them to visit the branch.

#### 8. ECS Cr

Under this banks automatically credit the specified fund in their customers' accounts on the due date after receiving the fund from other bank with SMS alert.

#### 9. NEFT

National electronic fund transfer operates on a deferred net settlement (DNS) basis which settles the transactions in batches. This system started in November 2005.

**10. IMPS**

Immediate Payment Services works 24/7 hours and allow the fund transfer at any time of day but the other payment mode like NEFT; RTGS etc. are unavailable on bank holiday.

**11. NACH**

NPCI implemented the National Automated Clearing House to facilitate high volume and low value interbank electronically based fund transactions which occur periodically.

**12. Prepaid payment instruments**

These instruments work as online or mobile wallets which allow the purchase or making other transactions against the stored value on such instruments, for example Paytm. Prepaid Payment instruments may be of various types such as closed system PPI, semi-closed system PPI, semi-open system PPI, open system PPI, Mobile PPI. PPIs involve.

**13. PPIs cards**

These instruments work as a smart card or magnetic stripe cards which allow the financial transactions and cash withdrawal from ATM or merchant local locations. Example: visa card, master card, rupay card etc

**14. M-Wallets**

Mobile wallets which enable the customers to perform the financial transactions or money transfer through the use of their mobile handset.

**15. Paper vouchers**

These are the bond of redeemable transactions type which have certain monetary value and may be spent only on specific goods or services such as travel vouchers, food vouchers, mobile recharge vouchers etc.

**16. Plastic cards**

These may be debit card and credit card.

**17. Debit card**

Debit cards are the plastic cards which are issued by the banks and use as a payment mechanism. The customers can spent the money by using debit cards up to the limit of money what is in his account.

**18. Credit cards**

Credit cards which are issued by the banks as a credit and facilitate the holder to use the cards for financial transactions up to the sanctioned credit limit.

Both are the best payment mechanism which eliminates the need of holding cash and danger of theft of cash.

**19. Mobile banking**

These are the services which are provided by the banks or financial institutions to their customers for doing financial transactions such as balance inquiry, fund transfer, mini statement, paying bills or purchasing goods or services etc through the use of a mobile device.

These are the some important payment mechanisms which are mostly using in this digital world for the motive of doing financial transactions in place of cash and contributing in making the economy as a cashless economy.

**6. Accumulated wisdom**

In [1] analyze the impact of demonetization on cashless payment system and conclude that demonetization had significantly affected the almost every cashless payment system in a sustained manner.

In [2] stated that to enhance the financial inclusion, reduce the tax avoidance and fraudulent activities and eliminate the black money Indian economy should be shift towards the cashless payment mode system. In [3] studied that the Indian political system has rooted the black money generation in economy and the main reason that created the unparallel economy is the government only makes the laws for detection of illegal activities but not able to properly implement these laws. In [4] assessed the macro-economic impact of demonetization and reported that the level of digital activity was less in beginning of demonetization, however in December 2016 increased significantly like amount of the UPI transactions from 0.9 billion to 19 billion, value of PPI transactions from ₹13 billion to 19 billion but also reported the ease in cash availability with the progressive re-monetization affected the development of the digital payment activity. In [5] evaluated the impact of demonetization on Indian economy and concluded on the basis of experience of other countries that economy had not benefitted from this move especially which is inflation-ridden economy. In [6] studied the implications of demonetization move on various sectors through comparing the gross value added in pre and post demonetization period with the help of paired t-test and found no any significant difference which suggest no short term impact of demonetization but with the help of regression analysis they confirmed the positive long term effect of demonetization on gross value added.

## 7. Objectives of the study

The objective of the study is to see the impact of demonetization on cashless payment transactions in the periods of demonetization, before-demonetization and after-demonetization.

## 8. Hypotheses

To study the impact of demonetization on cashless payment system, mainly three hypotheses are developed:

1. H<sub>0</sub>: There is no significant difference between the monthly average of cashless payment transactions in after-demonetization period and before-demonetization period.
2. H<sub>0</sub>: There is no significant difference between the monthly average of cashless payment transactions in demonetization period and after-demonetization period
3. H<sub>0</sub>: There is no significant difference between the monthly average of cashless payment transactions of after-demonetization period and demonetization period

If the monthly average of cashless payment transactions of demonetization period is higher and statistically significant in compare of before and after demonetization periods then it can be concluded that demonetization had a significant impact on cashless payment transactions.

## 9. Methodology

The data of cashless payment system was collected from the authentic secondary sources of RBI bulletin of database of Indian economy (monthly data of payment and settlement system published by NPCI), RBI reports, RBI mint street memo, websites, newspapers and various published articles. For analyzing the data Welch's two sample test has been used to check the significant differences between the mean average of volume and value of different cashless mode of payment system during three time buckets i.e. demonetization period (from November 2016 to June 2017), after-demonetization period (July 2017 to February 2017) and before-demonetization period (from March 2016 to October 2016). This Welch test is also similar to independent sample T-test but the T-test can't be used where the variance of two samples is not equal. The assumption of equality of variance of two samples is not required in using the Welch test and this test also can be use in case of skewed distribution

## 10. Analysis and Interpretation

This section involves the analysis of three time buckets i.e. before-demonetization period, demonetization period and after-demonetization period to see the impact of demonetization on cashless payment system.

Table 1. Monthly average of cashless payment indicators during before-demonetization, demonetization and after-demonetization

Cashless payment system indicators		before-Demonetization Period (from March 2016 to October 2016)	Demonetization Period (from November 2016 to June 2017)	after-Demonetization Period (From July 2017 to February 2018)
		$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$
RTGS	Volume (in Millions)	8.7550	9.6875	10.2463
	Value (in Billions)	101699.6150	113011.9900	120924.4225
Paper Clearing	Volume (in Millions)	88.1663	112.0600	96.0400
	Value (in Billions)	6649.7000	7074.7938	6620.0500
Retail Electronic payment	Volume (in Millions)	321.9125	405.3875	455.2625
	Value (in Billions)	9829.1875	13291.8925	15690.9850
M-Wallet	Volume (in Millions)	64.5175	243.9363	246.6188
	Value (in Billions)	27.8650	66.5950	98.2913
Prepaid Instruments Cards	Volume (in millions)	21.3575	35.3025	38.2700
	Value (in Billions)	23.8963	25.8238	25.3813
M-Banking	Volume (in Millions)	64.1288	106.1950	161.8850
	Value (in Billions)	802.4763	1601.5300	971.5175
Card Usage	Volume (in Millions)	204.8400	395.8375	396.1375
	Value (in Billions)	413.9775	727.4413	767.8325

Source: RBI bulletin

Table 2. Robust tests of equality of means of cashless payment transactions during before-demonetization and demonetization period

		Statistic <sup>a</sup>	df1	df2	Sig.
RTGS (Volume in Millions)	Welch	3.238	1	8.938	.106
RTGS (Value in Billion)	Welch	2.262	1	11.646	.159
Paper clearing (Volume in Millions)	Welch	13.603	1	7.777	.006
Paper clearing (Value in Billion)	Welch	1.537	1	11.607	.239
Retail electronic payments (volume in Millions)	Welch	28.309	1	8.531	.001
Retail electronic Payments (Value in Billion)	Welch	16.025	1	9.290	.003
M-wallets (volume in Millions)	Welch	72.256	1	8.221	.000
M-wallets (value in Billion)	Welch	44.018	1	7.885	.000
Prepaid-Payments Instruments Cards (Volume in Millions)	Welch	38.506	1	11.815	.000
Prepaid Payments Instruments Cards (Value in Billion)	Welch	.741	1	9.965	.410
Mobile-banking (volume in Millions)	Welch	66.245	1	13.938	.000
Mobile-banking (Value in Billion)	Welch	36.931	1	13.659	.000
Card usage at POS (Volume in Millions)	Welch	69.196	1	7.725	.000
Card usage at POS (value in Billion)	Welch	68.964	1	10.441	.000

Asymptotically F distributed

Source: RBI Bulletin

The analysis of mean equality test results (Table 1-4) of three time buckets i.e. before-demonetization and demonetization period, before-demonetization and after-demonetization period, demonetization and after-demonetization period shows that:

1. The demonetization move had not significantly impacted on RTGS payment system because in demonetization period there are no any significant difference in value and volume in compare of before and after demonetization period. But in after-demonetization period value and volume of RTGS are significantly increase in compare of before-demonetization period which may be because of the increased use of RTGS payment system for the high value transactions.
2. The demonetization had significantly impacted on the volume of Paper clearing transactions because in demonetization period there was a sudden increase in volume of the transactions but after the demonetization period a sudden decrease came in volume. However, there is no any significant difference in monthly average value for all three time buckets.

The results implies that the use of paper mode of payment system increased in demonetization period but not the amount of paper transactions which may be because of the cash deficiency in demonetization period, but after the demonetization the use of paper transactions decreased which may be because of currency-back or more time involved in clearing of paper transactions in compare of cash or other electronic payment system.

*Table 3. Robust tests of equality of means of cashless transactions during before-demonetization and after-demonetization period*

		Statistic <sup>a</sup>	df1	df2	Sig.
RTGS (Volume in Millions)	Welch	22.871	1	12.725	.000
RTGS (Value in Billion)	Welch	15.114	1	13.025	.002
Paper clearing (Volume in Millions)	Welch	22.911	1	9.967	.001
Paper clearing (Value in Billion)	Welch	.024	1	9.212	.881
Retail electronic payments (volume in Millions)	Welch	210.154	1	11.900	.000
Retail electronic Payments (Value in Billion)	Welch	96.524	1	12.113	.000
M-wallets (volume in Millions)	Welch	82.255	1	8.360	.000
M-wallets (value in Billion)	Welch	60.147	1	7.354	.000
Prepaid Payments Instruments Cards (Volume in Millions)	Welch	48.579	1	11.100	.000
Prepaid Payments Instruments Cards (Value in Billion)	Welch	.316	1	9.056	.588
Mobile-banking (Volume in Millions)	Welch	27.194	1	7.590	.001
Mobile-banking (value in Billion)	Welch	2.950	1	11.175	.113
Card usage at POS (volume in Millions)	Welch	477.863	1	12.700	.000
Card usage at POS (value in Billion)	Welch	191.383	1	13.878	.000

a. Asymptotically F distributed

Source: RBI bulletin

- The demonetization move had also significantly impacted on retail electronic payment system because due to the demonetization move there was a suddenly higher amount of increase in value and volume in demonetization period over the before-demonetization period in compare of increase in after demonetization period over the demonetization period.
- The demonetization move had also impacted the M-wallet payment system because in demonetization period a significantly higher amount increase in value of transactions over the before-demonetization period in compare of increment in after-demonetization period over the demonetization period. But in volume of transaction the increment came only in demonetization period and in after-demonetization period there was no any significant difference which may be due to the cash deficiency in demonetization period.
- In demonetization period a significant rise came in only volume not value of PPI cards transactions and in after-demonetization period the increment had been also stopped in volume of transactions which suggesting the people shift towards cashless payment mode of PPI cards due the currency shortage even for small amount of transactions and after currency back the use of PPI cards also decreased.

*Table 4. Robust tests of equality of means of cashless transactions during demonetization and after-demonetization period*

		Statistic <sup>a</sup>	df1	df2	Sig.
RTGS (Volume in Millions)	Welch	1.043	1	10.546	.330
RTGS (Value in Billion)	Welch	1.255	1	9.896	.289
Paper clearing (Volume in Millions)	Welch	6.376	1	7.173	.039
Paper clearing (Value in Billion)	Welch	2.281	1	7.849	.170
Retail electronic payments (volume in Millions)	Welch	8.831	1	10.536	.013
Retail electronic Payments (Value in Billion)	Welch	6.476	1	11.717	.026
M-wallets (volume in Millions)	Welch	.009	1	13.958	.925
M-wallets (value in Billion)	Welch	8.933	1	11.814	.011
Prepaid Payments Instruments Cards (Volume in Millions)	Welch	1.093	1	13.850	.314
Prepaid Payments Instruments Cards (Value in Billions)	Welch	.019	1	13.495	.892
Mobile-banking (Volume in Millions)	Welch	8.870	1	7.517	.019
Mobile-banking (value in Billion)	Welch	31.963	1	10.184	.000
Card usage at POS (volume in Millions)	Welch	.000	1	8.398	.990
Card usage at POS (value in Billion)	Welch	1.098	1	11.034	.317

a. Asymptotically F distributed

Source: RBI Bulletin

6. In demonetization period a significant increment came in value of M-banking and after the demonetization a significant decrement came in value of transactions but the increment in volume of M-banking transactions has been continued also after the demonetization period. This implies that after the demonetization period only use of M-banking increase and value of M-banking transactions decrease which may be due to the reason of only change in payment habit of the Indian economy.
7. The cards usage at POS had also significantly impacted by the demonetization move both in value and volume terms but after the demonetization, increment has been stopped which may be because of currency back.

## 11. Conclusion

The demonetization had significantly impacted almost every cashless mode of payment system like Retail Electronic payment system, M-wallet, PPI cards, M-banking, POS usage etc. But after the currency back in June 2017 the increment in use of the mostly cashless mode of payment has been stopped or decreased. This implies that in demonetization period due to the currency deficiency in economy people shifted towards the cashless payment mode but the re-monetization of currency had impacted the development of cashless payment mode. Therefore further efforts are needed for the progress of cashless mode of payment system like increase in financial literacy of the people, improvement in digital infrastructure, develop the secured and easily scalable cashless payment system, creating awareness about the benefits of digital mode of payment system, reduce the cash availability in economy which will further help in maintaining the interest and trust of the people in cashless mode of payment system.

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