

# Aim – Digital Payment and Causality – Inflation and Gold Prices: Evidence from India's Demonetization Policy

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**Aim:** Aim of study is to quantify one of objectives of India's demonetization policy implemented on 08 Nov. 2016, - the evolution of digital payment and its causality on inflation and gold-prices.

**Abstract:** We investigated one of key objectives of India's demonetization policy, – the evolution of digital payment and its causality on inflation and gold-prices, which made Rs. 500 and 1000 denomination notes illegal in the circulation on 08 November 2016 onwards. The aim – digital payment, conceived to switching from cash-driven economy to cashless-economy, was studied by analyzing the various modes of the digital payments and volume transacted for the duration of October 2016 - November 2017. Digital payments gateway studied here includes: Real-Time Gross Settlement (RTGS) including - Customer Transactions and Interbank Transactions; CCIL Operated Systems – including Collateralized Borrowing and Lending Obligation (CBLO), Govt. Securities Clearing, Forex Clearing; Paper Clearing including - Cheque Truncation System (CTS), MICR Clearing, Non-MICR Clearing; Retail Electronic Clearing including - Electronic Clearing Service (ECS), National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS), National Automated Clearing House (NACH); Cards including - Credit Cards, Debit Cards; Prepaid Payment Instruments (PPIs) including - m-Wallet, PPI Cards, Paper Vouchers; and finally Mobile Banking. The causality was studied on the monthly inflation rate and on the gold-prices because in absence of new currency notes post-demonetization, prices of common household commodities are expected to surge and common people will explore alternative avenues of arranging money to meet the immediate needs like marriage, business, medical emergency, education fees etc. by selling the reserved gold. Thus, these indicators will allow to access post-demonetization scenario, and were tested in this paper.

**Keywords:** BSE, NSE, Price-return, Digital Payments, Inflation, Gold-prices, Demonetization

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## INTRODUCTION

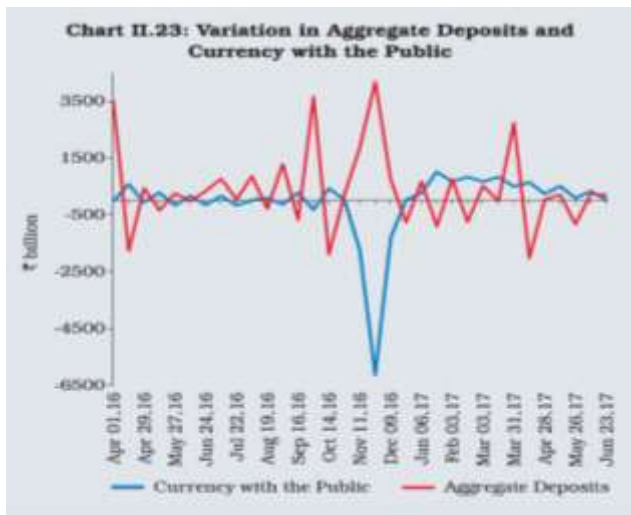
The Government of India unexpectedly enforced demonetization in the night 08 November 2016 and declared around 86% of existing currency notes of Rs. 500 and 1000 denomination in the circulation as illegal.[1] According to official sources key goal demonetization policy were manifold such as curb corruption, counterfeiting, terrorist activities, to target the black money accumulated mostly by high net worth group individuals (HNI) and emphasizing the digital payment.[2] In other words, indirect aim was to eventually make everyone part of the non-cash digital economy.

Because of the surprise nature of the announcement of November 8, 2016 demonetization which targeted fairly high-value notes that made up the vast amount of currency (86 %) in circulation.[3-5] Pre-demonetization, government targeted on the "Aadhar" scheme, the "Jan Dhan" initiative, "PAN" card, and

mobile banking.[6,7] According to some reports, it was belief that only 10 people were aware of plan of demonetization policy.[8] The announcement of new INR 2,000 note months before November 2016[9] appears to be pre-indication of demonetization plan.

The Indian has experienced demonetization on two occasions in past - once in 1946 and then in 1978. In the initial weeks, no clarity on 'why' and 'how' of demonetization. From the anecdotal news reports, middle class and lower middle class was the worst affected because they conducted almost 98% their transactions in cash to facilitate the daily activities. Long queue outside banks and ATM machines for days resulted in over 100 cases of death across India. Reserve Bank of India was mere a mute spectator. Using the currency chest data form the RBI resources, it was found that that 69% of the notes were returned to the banks from circulation by the end of November; 87% of notes were returned by December 15; and 97% of notes were returned by the end of December 2016 thus negating the

assumption of curbing the black money. The very same is evident from the Figure 1 shown below. After demonetization, Reserve Bank of India pumped in 23.8 billion pieces of bank notes between November 09 to December 31, 2016 into circulation aggregating Rs. 5,540 billion in value [10] (pp. 124). However, the availability of new currency notes varied geographically causing huge hardships to common people and bank staff in service.[11-13] As per 2016-17 annual report of RBI[14], the reason for this geographically and heterogenous distribution was acknowledged to “the logistical difficulties in supplying banknotes to all currency chests in a short span”.



**Figure 1. Variation in aggerate despite and currency in circulation with public.**

(Source: RBI annual report 2016-17, pp. 34, <https://rbi.org.in/scripts/AnnualReportPublications.aspx>)

However, the liabilities of RBI or target interest rate remain unchanged as can be seen in Figure2.

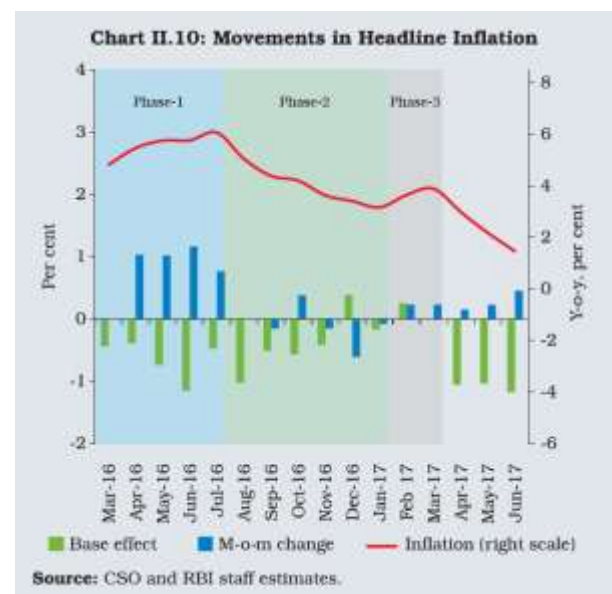


**Figure 2. Key policy rates and other important rate set by the RBI.**

(Source: RBI annual report 2016-17, <https://rbi.org.in/scripts/AnnualReportPublications.aspx>)

In order to investigate one of the aim, i.e., digital payments of India's demonetization policy on the transition towards digital payments, we pinpointed the various gateways of the digital payment and total number of transaction made within the study duration. Results shows a moderate increase in digital payment gateway using cards (credit cards, debit card, ATM, POS etc.) in following month of demonetization. But a significant decrease was evident in the month of November 2019 which can be credited to the paucity of available money with common public. A marginal increase was observed in *Retail Electronic Clearing* including - Electronic Clearing Service (ECS), National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS), National Automated Clearing House (NACH). Also, a moderate increase was noticed *Prepaid Payment Instruments* (PPIs) including - m-Wallet, PPI Cards, Paper Vouchers. In nutshell, the sum of all modes of digital payments altogether represents trend of immediate fall in digital payment in November 2016 and then got some pace until March 2017. Hereafter, the total digital payment gateway seems almost stationary. The concept of cashless economy in case of India, as per the New Keynesian synthesis[15] which outlines that outcomes should depend only on the interest rate not on actual availability of cash money, might not be applicable.

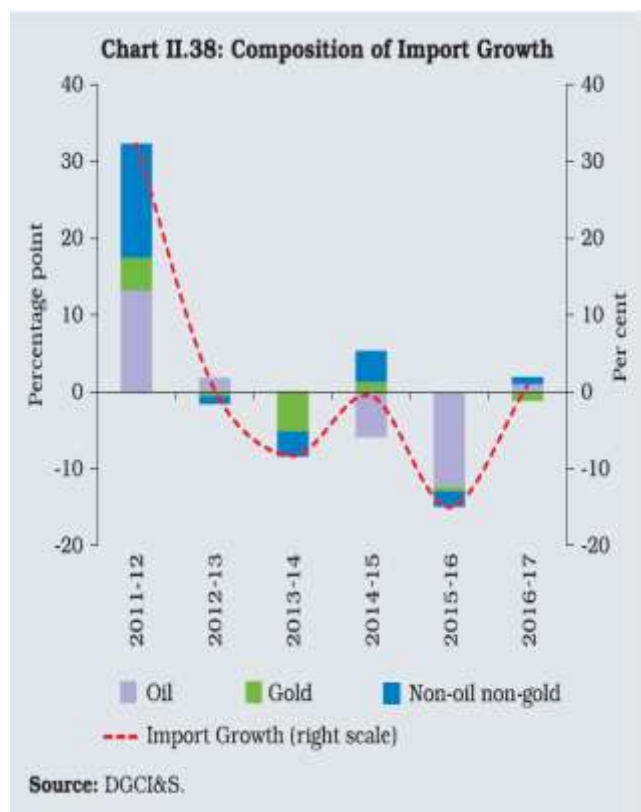
After investigating one of the aim of demonetization, authors studies its ripple effects on the inflation and changes in the gold-prices. Because these two sectors are assumed to be highly affected. Regarding to the price situation, inflation eased to its lowest level in the new consumer price index (CPI) series that came into existence in June 2017.



**Figure 3. Various drivers of overall inflation**

(Source: RBI 2106-17Annual Report, pp. 26, published 30 Aug 2017 <https://www.rbi.org.in/Scripts/AnnualReportMainDisplay.aspx>)

The net import and export, selling of the gold and hence gold-prices was a vivid indicator to measure the post-demonetization volatility in this segment because gold is considered as reserved and emergency resource of money.



**Figure 4. Composition of import including Gold**

(Source: RBI 2016-17 Annual Report, pp. 57, published 30 Aug 2017  
<https://www.rbi.org.in/Scripts/AnnualReportMainDisplay.aspx>)

## LITERATURE REVIEW

A few of earlier studies used descriptive statistics[14,16-18] to dissection the causality of demonetization on Indian economy. **Rogoff** investigated the societal costs of cash and facilitating illegal activity and tax evasion, and cautioned that huge participation of public is necessary to phase-out of the cash-based economy.[19] **Rao et. al.** discussed that growth in public expenditure, a fall in aggregate real supplies, wrong mix of anti- inflationary policies, economically impractical controls and black money leading were the key reasons the inflation problem of the Indian economy around 1972-73.[20] **Rangarajan** and **Arif** explained the interrelationship between money, output and prices using an econometric model in context to Indian economy and concluded that price effects of an increase in money supply are relatively stronger than output effects.[21] **Ghoshal's** finding says that both the demand pull, and cost push factors fueled a cumulative price rise of around 25.7% during 1990-92.[22] In his book **Brahmadanda P.R.** argued that the inflation is outcome of imbalance between the rate of growth of commodities (essential for production) and the rate of growth in money

supply.[23] The impact on economic growth due to demonetization, RBI has revised the growth forecast from 7.6% to 7.1% for 2016-17. As per RBI view there will be short run disruption in the economic activity, but the impact will "ebb with progressive increase in the circulation of new currency notes and greater usage of non-cash-based payment instruments in the economy". However, overall, there is a concern, as mentioned by RBI, to maintain the inflation rate at 5% in Q4 of 2016-17.[24] **Kishore and Poornima** examined other demonetization attempts occurred in Russia, Zimbabwe, and Australia, and compared them with the pros and cons in Indian situation. The purpose was to do a survey of macroeconomic situation after demonetization. Their comparative findings were - at the outset, one can argue that Australian situation was well managed, Russian situation was dictatorial, and Zimbabwe case was chaotic.[25] **Mukherjee and Tripathi** discussed the various aspects which triggers an increase in inflation in the Indian economy since 2012 and further discusses the inescapable causes of increase in general price level.[26] **Narain and Patnaik** studied the purpose, the process and the impact of this mega exercise on service sector through a natural experiment.[27] **Mukherjee and Ahuja** identified the overall impact of demonetization in the Indian Economy with special reference to price level, i.e., inflation.[28] **Kumar et. al.** studied the impact of demonetization On Inflation, and Interest Rate in Indian Economy.[29] News report by **Tim Worst** opined that India's post-demonetization caused the flood of cash being deposited which in turn lowered Interest Rates and Also Inflation. This is an interesting and welcome macroeconomic effect and summarized as - A lower budget deficit, lower interest rates and also lower inflation.[30] For example, the largest public sector bank in India, State Bank of India (SBI) reduced rates on deposits from one year to 455 days to 6.90%, down 15 basis points, while keeping the 7% rate for deposits between 211 days to one year unchanged. Also, the then SBI Chairman Arundhati Bhattacharya said, "All rates will fall," because "The bank has seen huge inflow of deposits but demand for credit has slowed down. Therefore, lending rates too will fall but after a gap."

Another news report on 24 November 2016 by **Shamika Ravi and Eswar Prasad** commented

That given the magnitude of black money, and the way business is done in this India, tax evasion is a way of life, and transforming a cash economy into a formal, mobile, electronic payment economy into a modern financial economy will require a lot of moves.[31] Dr. Prasad expressed his view that in the short run, clearly it is not a big positive but a significant negative in many ways. But in the long run, this is going to be good for India. This involves (i) taking government out of the economy where it does not really have a place; and (ii) trying to change the basic incentives that many public servants face,



in terms of their dealing with temptations for corruption.

A report with title “*Forget demonetization. India's central bank is worried about inflation*” in CNBC on 08 Feb. 2017 by **Leslie Shaffer** said that Economists may have fretted over how demonetization would hit India's economic growth, but the subcontinent's central bank is focused more on its old foe, inflation.[32] Another reports read Demonetization impact: Retail inflation hit two-year low in December.[33]

## DATA COLLECTION AND METHODOLOGY

The daily historical stock prices index data (S&P BSE 100) was obtained from the Bombay Stock Exchange (BSE) and NIFTY100 index data was obtained from the National Stock Exchange (NSE) for the duration of 03 October 2016- 29 September 2017. The weekend data was missing in both the stocks. Consumer price index (CPI) monthly data was obtained from the Federal Reserve Bank of St. LOUIS, USA[34] for INDIA. Wherein the year 2015-16 was marked as baser year (Index 2015=100) for estimation of the CPI data. Therefore, author obtained the CPI data for the year 2015-16 and the year 2016-17 and then estimated the Inflation (in percentage). The traded value of Bullion GOLD price historical data (Rupees in Lakhs) was retrieved from Multi Commodity Exchange (MCX).[35] And the monthly price (in INR) of 10 grams Gold was obtained from the RBI source.[36] Finally, monthly data of various digital payment gateways was procured from the RBI database as well.[36] In addition to that, the RBI annual report for the year 2016-17 was studied to derive a conclusion on the cross-sectional effects of the demonetization. Some of the graphs were also taken from the aforesaid annual reports (reference were cited properly wherever required). The study was carried out with the help of simple data analysis, without using any economic model, and findings were derived and discussed in this paper

## RESULTS AND DISCUSSION

Sensex was the first cross-sectional metric to identify the India's demonetization policy shock because it reflects the overall economic health status of any country on account of any significant dynamic change occurring both at national and International level, which is well understood and synchronizes with real-world entrepreneurial theory. Figure 5 shows the BSE100 and NIFTY100 stock-market index variation.

**Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) closing index and index-to-return from October 2016 – September 2017**

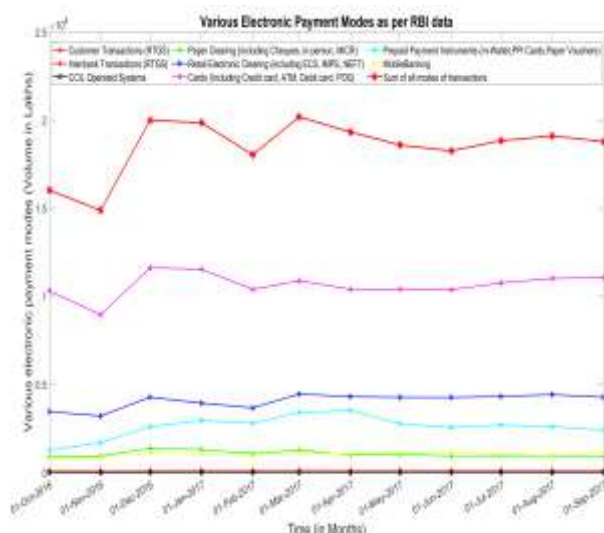


**Figure 5. BSE100 and NIFTY 100 SEXSEX data (daily data in the left column) form the October 2016 – 29 September 2017 (weekended data was unavailable), and their price-return (right column). Index-to-return values eventually starts one datetime lagged as per method of estimation.**

The daily closing share-price value of BSE100 and NIFTY 100 overlaps well on each other. The logic of presenting two stock-market index here is to show

that both provide exactly the same index values. From the index-return (right column), it is very much evident the volatility clustering around the month of November 2016. In other words, the market index is the direct reflection of shock of any significant policy change or sudden event happening at national level.

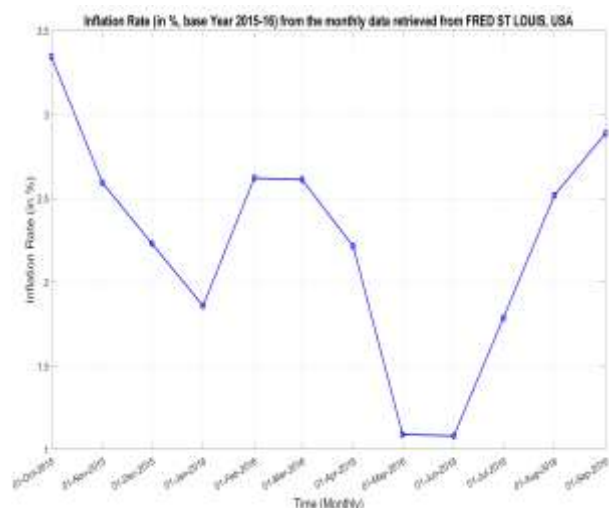
Out of several objectives of the India's 08 November 2016 demonetization policy, transitioning to digital payment was one of them. To explore the influence on various digital payment gateways, we analyzed the data which is shown in Figure 6. It is clear from the figure that Prepaid Payment Instruments including - m-Wallet, PPI Cards, Paper Vouchers; and finally, *Mobile Banking*; *Retail Electronic Clearing* including - Electronic Clearing Service (ECS), National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS), National Automated Clearing House (NACH) and payment through *Cards* including - Credit Cards, Debit Cards have experienced moderate rise after the demonetization.



**Figure 6. Digital payments gateway studied here are: *Real-Time Gross Settlement (RTGS)* including - Customer Transactions and Interbank Transactions; *CCIL Operated Systems* – including Collateralized Borrowing and Lending Obligation (CBLO), Govt. Securities Clearing, Forex Clearing; *Paper Clearing* including - Cheque Truncation System (CTS), MICR Clearing, Non-MICR Clearing; *Retail Electronic Clearing* including - Electronic Clearing Service (ECS), National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS), National Automated Clearing House (NACH); *Cards* including - Credit Cards, Debit Cards; *Prepaid Payment Instruments (PPIs)* including - m-Wallet, PPI Cards, Paper Vouchers; & *Mobile Banking*.**

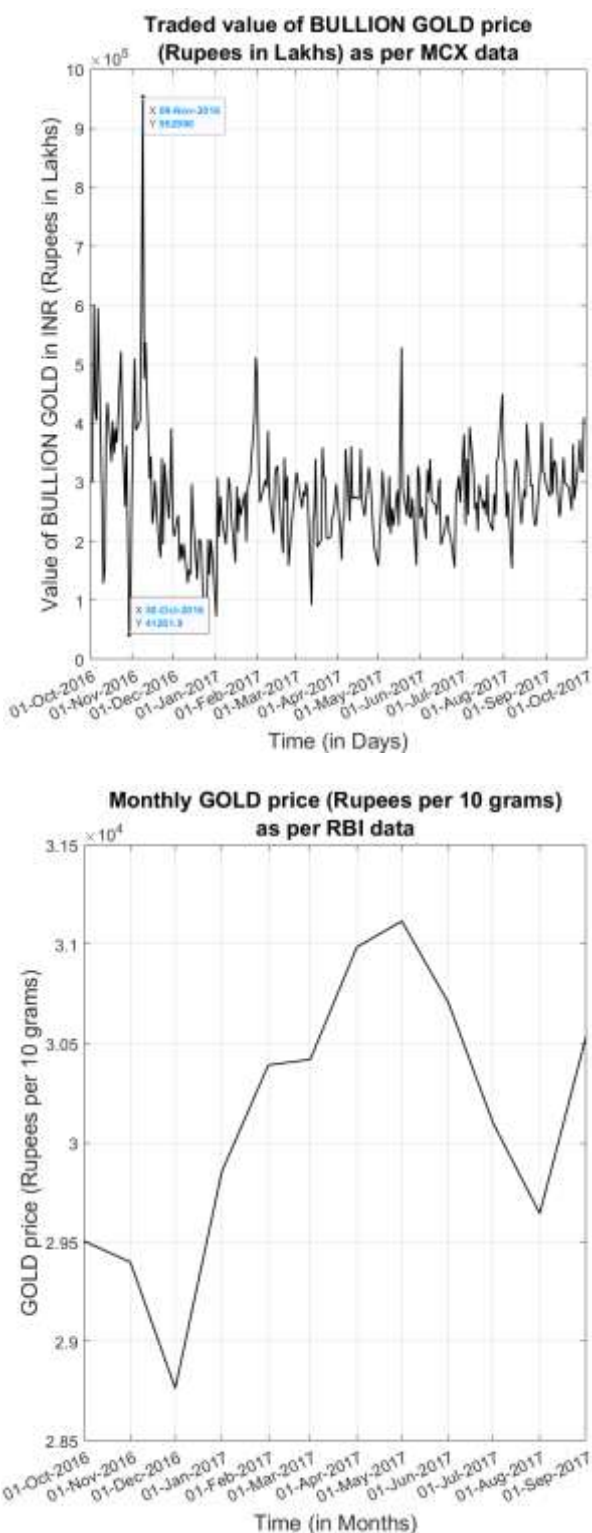
To study the causality of the demonstration policy, authors have chosen the inflation and gold-price because of these two commodities were deemed to be highly affected aftermath the policy came into force. The effect on inflation is reasoned because, in the

following months immediate to demonetization, huge shortage of new currency notes was experienced demographically. However, as can be seen from Figure 7 below that inflation rate keep on decreasing from October 2016 onwards which reached to its negative peak in the month of January 2017. The inflation trough around January 2017 is credited to the implication of the demonization policy.



**Figure 7. Inflation rate (in percentage).**

Another causality was studied on the precious metal Gold prices. Till today, gold is considered the 'safe haven' in India to meet the demand for any unforeseen emergent situations. The demonetization policy can be regarded as a short-term financial emergency and therefore, trading in gold is highly imminent. With this reason, the total traded value of Bullion gold price data (daily) was obtained from the Multi Commodity Exchange (MCX) database as shown in Figure 8 (left column). The data-tip in Figure 8 (left column) shows the maximum volatility around the demonization and subsequently the traded value of gold-price keep in declining because there was lack of new currency notes and restriction imposed to buy-selling provide the PAN card if buying and selling amount exceed to the Rs. 2 Lakhs to tack the investment of unaccounted money in market which was in the line of objectives of policy implementation. The prices shoot-up in the month of February when there was relatively good amount to new currency notes were back into circulation. The very same trend is evident from 10 grams gold price data (monthly) obtained from the RBI as shown in Figure 8 (right column).



**Figure 8. Traded price value (left column) of precious metal Gold (Rupees in Lakhs), and price for 10 grams gold (right column).**

Source: RBI, <https://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics>

## CONCLUSION

One of several objectives to be achieved from November 08, 2016 India's demonetization policy, various digital payment gateways were studied, and a marginal growth was seen in payment via *Real-Time*

*Gross Settlement* (RTGS), *Prepaid Payment Instruments* (PPIs), *Cards* post-demonetization. Inflation was found to be decreased around that duration. Similarly, high volatility in gold-prices (INR/10 grams) was evident around the month of December 2016 which keeps on increasing monotonically from January 2017 until May 2017. The reason for this increase can be argued that once new currency notes were arrived sufficiently in circulation, the trade in gold might have regained back to the normal business level. The study presents a holistic perspective on the implications of demonstration on most prone areas.

## DECLARATION:

Some of the content was taken as it is, with changing any words because of gravity of content, from the annual reports of 2016-17 published by Reserve Bank of India. Partial help was sought for data analysis wherever required.

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