Demonetisation: To Deify or Demonize?

03
CHAPTER

"Taka mati, mati taka (Money is mud, mud is money)."
– Ramakrishna Paramahamsa

"Among all forms of mistake, prophecy is the most gratuitous."
– George Eliot, Middlemarch

Demonetisation has been a radical, unprecedented step with short term costs and long term benefits. The liquidity squeeze was less severe than suggested by the headlines and has been easing since end-December 2016. A number of follow-up actions would minimize the costs and maximise the benefits of demonetisation. These include: fast, demand-driven, remonetisation; further tax reforms, including bringing land and real estate into the GST, reducing tax rates and stamp duties; and acting to allay anxieties about over-zealous tax administration. These actions would allow growth to return to trend in 2017-18, following a temporary decline in 2016-17.

I. Introduction

3.1 On November 8, 2016, the government announced a historic measure, with profound implications for the economy. The two largest denomination notes, Rs 500 and Rs 1000, were "demonetized" with immediate effect, ceasing to be legal tender except for a few specified purposes.[1] At one fell stroke, 86 percent of the cash in circulation was thereby rendered invalid.[2] These notes were to be deposited in the banks by December 30, 2016, while restrictions were placed on cash withdrawals. In other words, restrictions were placed on the convertibility of domestic money and bank deposits.[3]

3.2 The aim of the action was fourfold: to curb corruption; counterfeiting; the use of high denomination notes for terrorist activities; and especially the accumulation of "black money", generated by income that has not been declared to the tax authorities.

3.3 It followed a series of earlier efforts to curb such illicit activities, including the creation of the Special Investigative Team

[1] Strictly speaking, these notes were deprived of their legal tender status, except for specified activities (such as paying utility bills). Nevertheless, as "demonetisation" has entered the public lexicon as the term for the November 8 announcement, we shall use this term.

[2] Throughout this chapter, the terms "cash," "currency," "currency/cash with public" will be used interchangeably.

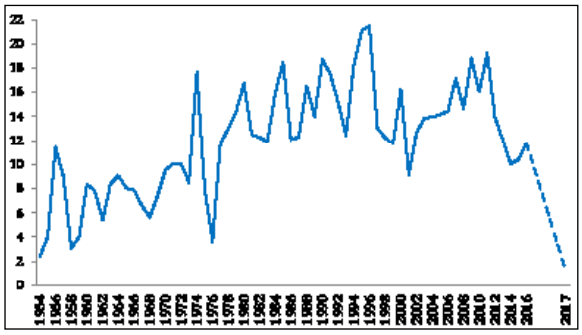
[3] Converting cash into deposits was rendered difficult but was only legally restricted on December 30, 2016 under the Specified Banknotes (Cessation of Liabilities) Ordinance.

(SIT) in the 2014 budget; the Black Money and Imposition of Tax Act 2015; Benami Transactions Act 2016; the information exchange agreement with Switzerland; changes in the tax treaties with Mauritius, Cyprus and Singapore; and the Income Disclosure Scheme. Demonetisation was aimed at signalling a regime change, emphasizing the government's determination to penalize illicit activities and the associated wealth. In effect, the tax on all illicit activities, as well as legal activities that were not disclosed to the tax authorities, was sought to be permanently and punitively increased.

3.4 India's demonetisation is unprecedented in international economic history, in that it combined secrecy and suddenness amidst normal economic and political conditions. All other sudden demonetisations have occurred in the context of hyperinflation, wars, political upheavals, or other extreme circumstances. But the Indian economy had been growing at the fastest clip in the world on the back of stable macroeconomics and an impressive set of reforms (Chapter 1). In such normal circumstances, demonetisations—such as the one announced recently in Europe—tend to be phased in gradually (See Appendix 1 for a list of cross-country episodes of both gradual and sudden demonetisations.)

3.5 India's action is not unprecedented in its own economic history: there were two previous instances of demonetisation, in 1946 and 1978, the latter not having any significant effect on cash as Figure 1 shows.[4] But the recent action had large, albeit temporary, currency consequences. Figure 1 shows annual percentage changes in currency since 1953. For 2016-17, this

Figure 1. Growth in average currency with public (%, yoy)



***Source: Survey* calculations**
***Note:* Years are financial years and only even number years have been labeled**

change is expected to be only 1.2 percent year-on-year, more than 2 percentage points lower than four previous troughs, which averaged about 3.3 percent.[5]

3.6 In the wake of the Global Financial Crisis (GFC), advanced economies have used monetary policy to stimulate growth, stretching its use to domains heretofore considered heretical such as negative interest rate policies and "helicopter drops" of money. In fact, India has given a whole new expression to unconventional monetary policy, with the difference that whereas advanced economies have focused on expanding the money supply, India's demonetisation has reduced it. This policy could be considered a "reverse helicopter drop", or perhaps more accurately a "helicopter hoover".

3.7 The public debate on demonetisation has raised three sets of questions. First, broader aspects of management, as reflected in the design and implementation of the initiative. Second, its economic impact in the short and medium run. And, third, its implications for the broader vision underlying the future conduct of economic policy. This *Survey* is not the forum to discuss

[4] In 1970, a Committee headed by former Chief Justice K.N. Wanchoo, in its interim report, recommended demonetisation of the 10, 100, and higher denomination notes to combat the scourge of black money. These denominations accounted for 86.6 percent of the then money stock.

[5] The average nominal GDP growth in those four previous troughs was 3.5 percent.

the first question, and the third is discussed in Chapter 1. This chapter focuses on the second question.

3.8 What are the background facts? What are the analytics? What are the long-term benefits and short-term costs? And what policy responses going forward would maximise benefits and minimizes costs? This section attempts to answer these questions. The Survey does not discuss the broader welfare and other non-economic dimensions (Rai, 2016). There have been reports of job losses, declines in farm incomes, and social disruption, especially in the informal, cash-intensive parts of the economy but a systematic analysis cannot be included here due to paucity of macro-economic data.

3.9 A cautionary word is in order. India's demonetisation is unprecedented, representing a structural break from the past. This means that forecasting its impact is hazardous. The discussion that follows, especially the attempts at quantification, must consequently be seen as tentative and far from definitive. History's verdict, when it arrives through the "foggy ruins of time," could surprise today's prognostications.

II. Background Facts

3.10 To dispel confusion and sharpen understanding of the issues, key distinctions must be made at the outset. Cash can be understood along two dimensions: its function and its nature/origins. In terms of function, cash can be used as a medium of exchange (for transactions) or as a store of value like other forms of wealth such as gold and real estate. In terms of nature, cash can be illicit or not.

3.11 Function and nature are quite distinct (Table 1). For example, cash used as a store of value could be white (the savings that all households keep for an emergency), while cash used for transactions could be black (if it was earned through tax evasion and/or corruption). Moreover, categories are fluid. Cash held as black money can be converted to white through laundering and other means, or by declaring it to the authorities and paying the associated tax/penalty.

3.12 A few facts are relevant to, and have motivated, demonetisation.

3.13 First, India's currency to GDP ratio has evolved in two broad phases. It declined fairly steadily for the first decade and a half after Independence, falling from around 12 percent in 1952-53 to about 9 percent in 1967-68. Thereafter, the ratio appears to have responded to the growth of the economy. It began its upward trend in the late 1970s when growth increased, and then accelerated further during the growth boom of the 2000s. This ratio declined during the period of high inflation in the late 2000s and early 2010s but it rebounded after 2014-15 to 12 percent when inflation declined again. The value of high denomination notes (INR

Table 1. Dual Dimensions of Cash

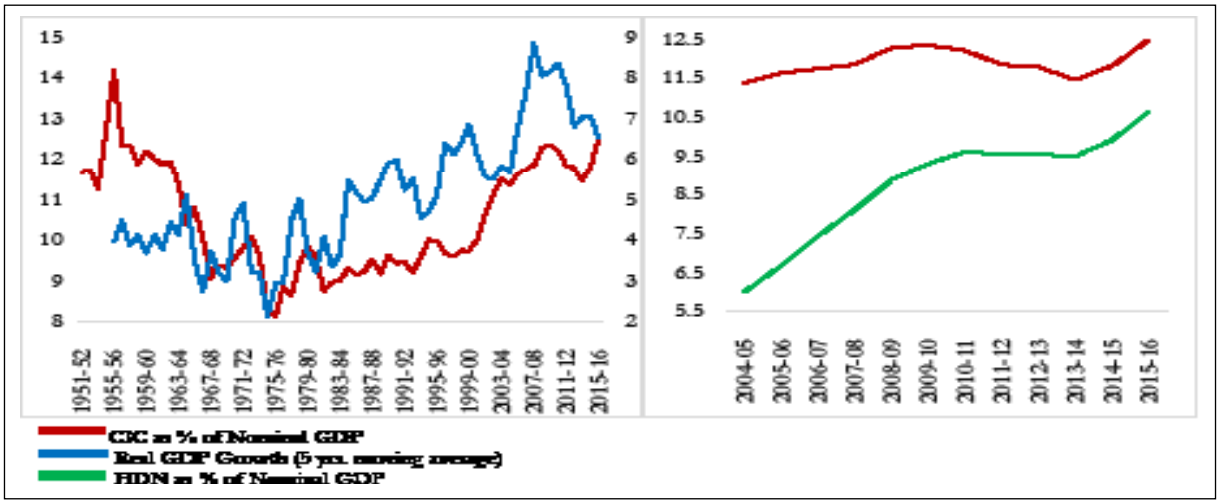
	Origin/nature	
	White	*Black*
Function		
Transactions	Company pays employee salary in cash; payment and receipt are declared to tax authorities	Small enterprise pays for input in cash; neither declares the transaction to tax authorities
Store of value	Household keeps savings in cash for emergencies	Businessman hoards undeclared cash, with a view to distributing it to his candidate during elections

500 and INR 1000) relative to GDP has also increased in line with rising living standards (green line in the second chart of Figure 2).

3.14 Second, India's economy is relatively cash-dependent, even taking account of the fact that it is a relatively poor country. Figure 1 plots the cash to GDP ratio against country per capita GDP, showing that on average the use of cash does indeed decline with development (yellow line). India's level is somewhat higher than other countries in its income group (central panel).

3.15 This might seem to suggest that some of the cash holdings were not being used

Figure 2. Currency in Circulation, High Denomination Notes and Real GDP Growth

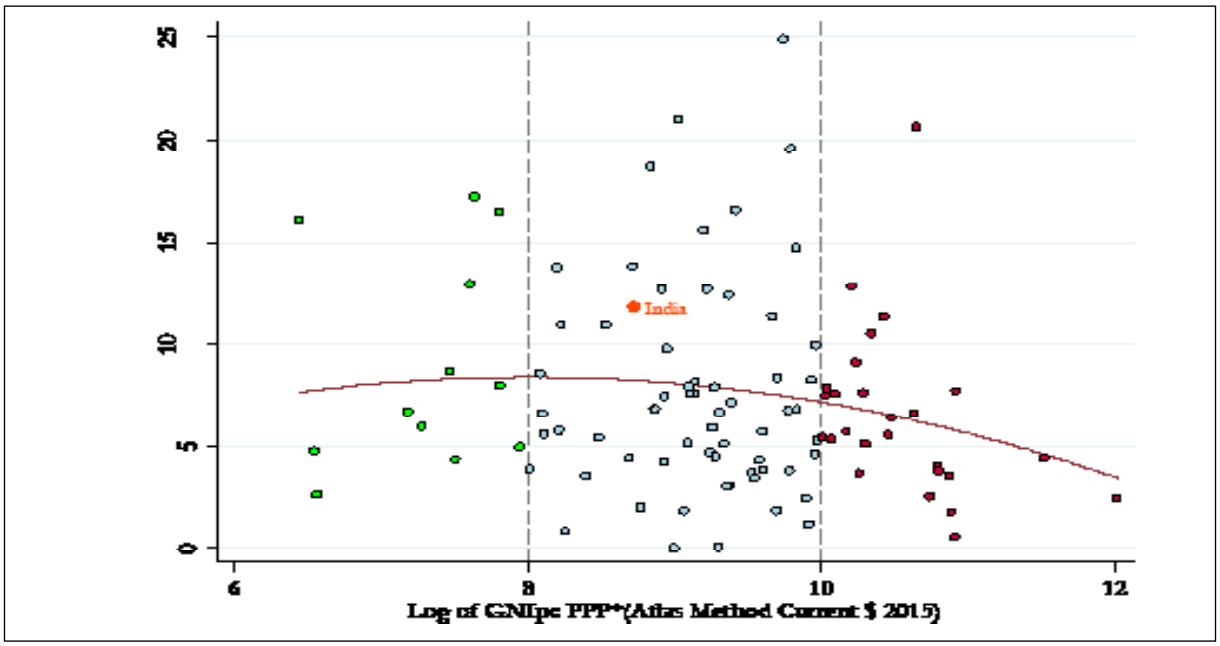


Source: **RBI**

Note: **CIC = Currency in Circulation**

HDN = High Denomination Notes (INR 500 and INR 1000)

Figure 3. Cash-to-GDP Ratio Versus Per capita GNI in PPP Terms



Source: **World Development Indicators; International Financial Statistics**

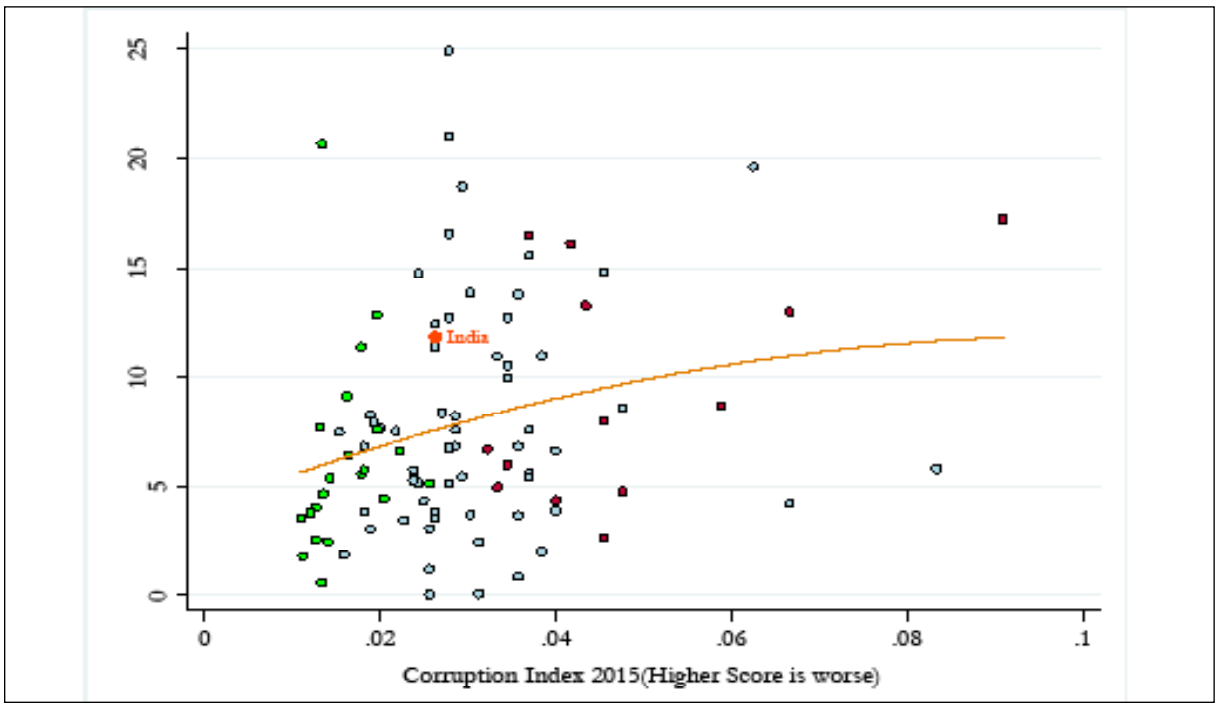
for legitimate transactions, but perhaps for other activities such as corruption.[6] This presumption is especially strong because across the globe there is a link between cash and nefarious activities: the higher the amount of cash in circulation, the greater the amount of corruption, as measured by Transparency International (Figure 4).

3.16 In this sense, attempts to reduce the cash in an economy could have important long-term benefits in terms of reducing levels of corruption. Yet India is "off the line", meaning that its cash in circulation is relatively high for its level of corruption. This suggests two possibilities. Perhaps India's level of corruption (or other related pathologies) is much worse than the index shows, so that the orange dot should really be placed to the right. Or cash is being used for other, presumably legitimate purposes.

3.17 But even if high levels of cash are needed this doesn't mean high denominations are needed. It is usually the case that high value notes are associated with corruption because they are easier to store and carry, compared to smaller denominations or other stores of value such as gold (Sands, 2016; Henry, 1980; Summers, 2016; Rogoff, 2016).

3.18 How high were India's high denomination notes in terms of their use for transactions relative to store of value? Figures 5-6 shed some light. In particular, it is useful to look at the size of the notes relative to nominal per capita income. The higher a note is relative to income, the less likely it is to be used purely for transactions purposes. In India's case, the denomination/ income ratio has fallen sharply over the past quarter century because incomes have been growing rapidly relative to the prevailing

Figure 4. Cash-to-GDP Ratio and Corruption



Source: **Transparency International, World Development Indicators**

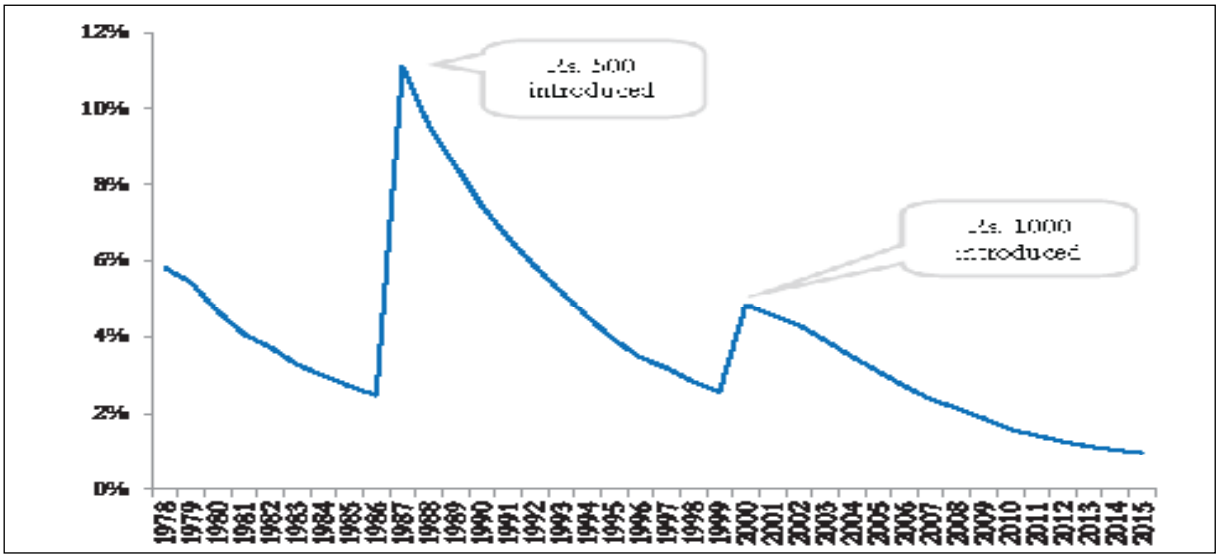
[6] It is worth underscoring that although income from corruption is by definition black money, most black money is earned through perfectly legal activities. In most cases, income becomes black solely because it has not been declared to the tax authorities. An NIPFP report (1985) authored by Shankar Acharya and Associates discusses these issues in greater detail.

highest denomination notes (Figure 5). This suggests that the high denomination notes have become increasingly useful for transactions over time.

3.19 This impression is confirmed by cross country data, which show that the Rs 1,000 note was in the middle of the pack compared to other currencies, especially those of its peer group of lower middle-income economies (Figure 6).

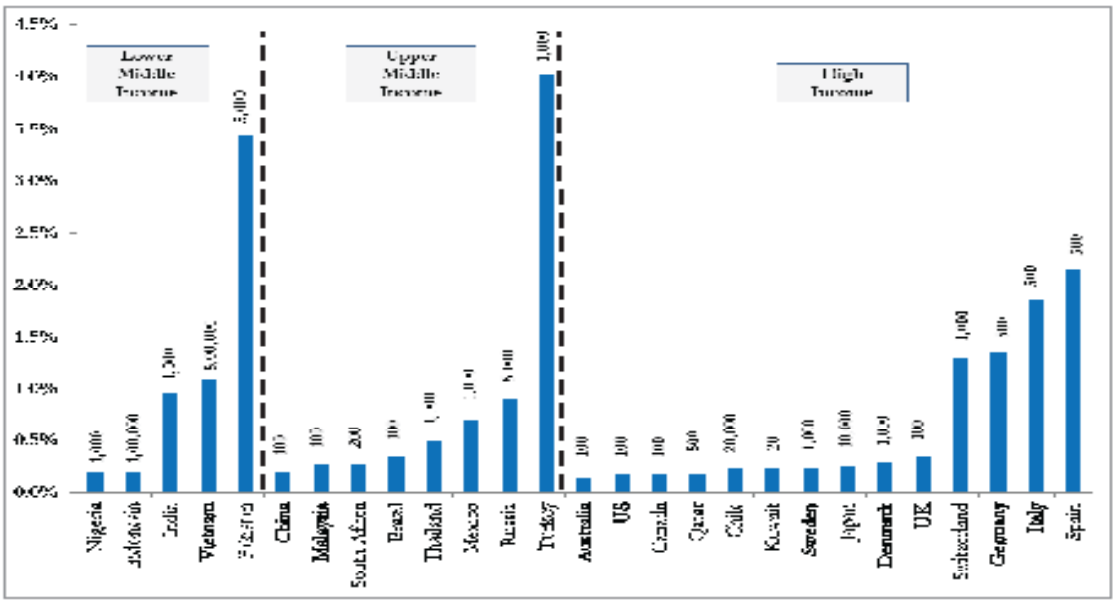
3.20 Perhaps the most conclusive evidence on the extent to which Rs 500 and Rs 1000 notes are used for transactions comes from data on "soil rates," that is the rate at which

Figure 5. Highest Denomination/Income Ratio (Percent of GDP per capita)



Source: **World Development Indicators; RBI**

Figure 6. Highest Denomination Notes (Percent of GDP per capita)[7]



Source: **Central Banks's Balance Sheets, World Development Indicators**

[7] As of 8th November, 2016.

notes are considered to be too damaged to use and have been returned to the central bank. RBI data show that in India low denomination notes have a soil rate of 33 percent per year. In contrast, the soil rate for the Rs 500 note is 22 percent, and the Rs 1000 just 11 percent. One way to estimate black money is to assume that all these notes should soil at the same rate, if they were really being used for transactions. This would yield an estimate of money that is not used for transactions at Rs. 7.3 lakh crores.

3.21 But this assumption would be extreme since the lower soil rates for the high denomination notes could arise if they are used in the same way, but just less frequently because there are fewer high value transactions.

3.22 There is a way, albeit not perfect, to differentiate between these two hypotheses, by comparing Indian data to soil rates in other countries. In principle, if a rupee-denomination note and a foreign-denomination note fulfill a similar transaction function, then their soil rates should be similar (all else equal). If the Indian soil rate is instead lower, this suggests that a fraction of the notes are not being used for transactions, but rather for storing black money.

3.23 Using relative soil rates for the US $50 and $20 notes and applying them to comparable Indian high denomination notes, yields an estimate of the amount not used for transactions, and hence potentially black, of about Rs. 3 lakh crore. This is substantial, as it represents about 2 percent of GDP.

III. Analytics

3.24 Understanding the benefits and costs of demonetisation requires spelling out the analytics of demonetisation, which are rich and complicated. Broadly, there will be a number of effects, which are sketched out schematically in Table 2 below.

3.25 Analytically, demonetisation should be seen as comprising the following:

- a money supply contraction but only of one type of "money"—cash;
- a tax on unaccounted private wealth maintained in the form of cash – black money; and
- a tax on savings outside the formal financial system.

Table 2. Impact of Demonetisation

Sector	Impact	
	Effect through end-December	**Likely longer-term effect**
Money/interest rates	Cash declined sharply	Cash will recover but settle at a lower level
	Bank deposits increased sharply	Deposits will decline, but probably settle at a slightly higher level
	RBI's balance sheet largely unchanged: return of currency reduced the central bank's cash liabilities but increased its deposit liabilities to commercial banks	RBI's balance sheet will shrink, after the deadline for redeeming outstanding notes
	Interest rates on deposits, loans, and government securities declined; implicit rate on cash increased	Loan rates could fall further, if much of the deposit increase proves durable
Financial System Savings	Increased	Increase, to the extent that the cash-deposit ratio falls permanently
Corruption (underlying illicit activities)		Could decline, if incentives for compliance improve

Unaccounted income/ black money (underlying activity may or may not be illicit)	*Stock* of black money fell, as some holders came into the tax net	Formalization should reduce the *flow* of unaccounted income
Private Wealth	Private sector wealth declined, since some high denomination notes were not returned and real estate prices fell	Wealth could fall further, if real estate prices continue to decline
Public Sector Wealth	No effect.	Government/RBI's wealth will increase when unreturned cash is extinguished, reducing liabilities
Formalization/ digitilisation	Digital transactions amongst new users (RuPay/ AEPS) increased sharply; existing users' transactions increased in line with historical trend	Some return to cash as supply normalises, but the now-launched digital revolution will continue
Real estate	Prices declined, as wealth fell while cash shortages impeded transactions	Prices could fall further as investing undeclared income in real estate becomes more difficult; but tax component could rise, especially if GST imposed on real estate
Broader economy	Job losses, decline in farm incomes, social disruption, especially in cash-intensive sectors	Should gradually stabilize as the economy is remonetized
GDP	Growth slowed, as demonetisation reduced demand (cash, private wealth), supply (reduced liquidity and working capital, and disrupted supply chains), and increased uncertainty	Could be beneficial in the long run if formalization increases and corruption falls
	Cash-intensive sectors (agriculture, real estate, jewellery) were affected more Recorded GDP will understate impact on informal sector because informal manufacturing is estimated using formal sector indicators (Index of Industrial Production). But over time as the economy becomes more formalized the underestimation will decline. Recorded GDP will also be overstated because banking sector value added is based (*inter alia*) on deposits which have surged temporarily	Informal output could decline but recorded GDP would increase as the economy becomes more formalized
Tax collection	Income taxes rose because of increased disclosure Payments to local bodies and discoms increased because demonetised notes remained legal tender for tax payments/ clearances of arrears	Indirect and corporate taxes could decline, to the extent growth slows Over long run, taxes should increase as formalization expands and compliance improves
Uncertainty/ Credibility	Uncertainty increased, as firms and households were unsure of the economic impact and implications for future policy Investment decisions and durable goods purchases postponed	Credibility will be strengthened if demonetisation is accompanied by complementary measures. Early and full remonetisation essential. Tax arbitrariness and harassment could attenuate credibility

3.26 The money supply contraction effects are discussed later as these are likely to be transitional in nature, focusing first on the benefits.

IV. Benefits

a. Tax on black money

3.27 Perhaps the most important way to view demonetisation is as a tax administration measure, one designed to tax holdings of black money. Of course, demonetisation of large denomination notes is not exactly the same as demonetisation of black money. Some cash holdings were perfectly "white", the fruit of income upon which taxes had either been paid or had not been applicable in the first place (agricultural income, for example).

3.28 Accordingly, the scheme included a screening mechanism, aimed separating "white" income from "black". Cash holdings arising from income that had been declared could readily be deposited at banks and ultimately exchanged for new notes. But those with black money faced three difficult choices. They could:

- declare their unaccounted wealth and pay taxes at a penalty rate;
- continue to hide it, not converting their old notes and thereby suffering a tax rate of 100 percent; or
- launder their black money, paying a cost for converting the money into white.

3.29 Anecdotal evidence suggests there was, indeed, active laundering. One laundering mechanism seems to have been to "re-time" the accrual of income, by constructing receipts that made it seem as if the black money had just been earned in the period immediately before November 8th, 2016. Such schemes might have allowed black money to have been deposited in bank accounts -- but only if the income was reported and taxes paid on it. In this way, demonetisation would have brought black money into the tax net.

3.30 Other schemes would have required black money holders to pay a percentage to private intermediaries as a price for converting it into white. For example, some holders reportedly paid individuals to queue up at banks to exchange or deposit money for them. It was also widely reported that Jan Dhan accounts witnessed a surge in deposits during the 50-day window between November 8 and December 30 – though the amount of this increase was relatively small, around Rs 42,000 crore.[8]

3.31 In all these cases, black money holders still suffered a substantial loss, in taxes or "conversion fees". Moreover, bank accounts are still being screened for suspicious transactions, which means that those who engaged in laundering run the risk of punitive taxes and prosecution, in addition to the fees or taxes already paid.

3.32 Meanwhile, some amount of unreturned high denomination notes. The December 30, 2016 Ordinance has declared the unreturned notes as no longer constituting legal tender. When the grace period expires, the RBI could declare that these unreturned notes are no longer valid in any way, either as legal tender or as assets that can be exchanged for new currency. When this occurs, the associated liability will be extinguished, and the RBI's net worth will increase. In this sense, demonetisation has effected a transfer of wealth from holders of illicit black money to the public sector, which can then be redeployed in various

[8] Figure refers to increase between November 10 and December 23, 2016. See http://www.hindustantimes.com/india-news/jan-dhan-accounts-deposits-double-to-rs-87-000-crore-i-t-dissects-data/story-Nf4iM7X8bynNglVo8okVaN.html

productive ways – to retire government debt, recapitalize banks, or even redistribute back to the private sector.

3.33 More to the point, the amount of unreturned high denomination notes is not the proper measure of the amount of black money that has been "taxed" away from holders of illicit wealth. In addition, one needs to add the taxes collected on money declared under disclosure scheme (Pradhan Mantri Garib Kalyan Yojana, PMGKY), as well as the "taxes" paid to intermediaries who laundered money.

b. Tax compliance

3.34 Demonetisation can also be interpreted as a regime shift on the part of the government. It is a demonstration of the state's resolve to crack down on black money, showing that tax evasion will no longer be tolerated or accepted as an inevitable part of life. Since this action has commanded support amongst the population, demonetisation shows that black money will no longer be tolerated by the wider public, either.

3.35 These two sanctions – financial penalty and social condemnation – could have a powerful and long-lasting effect on behavior, especially if they were combined with other incentive-compatible measures, described in Section X. In this case, evaders might decide in the years to come that it would be better to pay a moderate regular tax, rather than risk having to pay a sudden penal tax. Corruption and compliance could be permanently affected.

3.36 Demonetisation could also aid tax administration in another way, by shifting transactions out of the cash economy and into the formal payments system. With large denominations eliminated, households and firms have begun to shift from cash to electronic payment technologies.

3.37 As a result, the tax-GDP ratio, as well as the size of the formal economy, could be permanently higher.

c. Tax on informal savings

3.38 Beyond reducing tax evasion, demonetisation could have other far-reaching effects. For example, it will channel savings into the formal financial system. Without doubt, much of the cash that has been deposited in the banking system will be taken out again, as the cash withdrawal limits are eased and the note supply improves. But some of the new deposits will surely remain in the banks, where they will provide a base for banks to provide more loans, at lower interest rates.

3.39 In the longer-term, if demonetisation is successful, it will reduce the equilibrium cash-GDP and cash-deposits ratio in the economy. This will increase financial savings which could have a positive impact on long run growth.

V. Early evidence for potential long-term benefits

3.40 By definition, it is too early to quantify the direction and magnitude of long term changes. It will take several years to see the impact of demonetisation on illicit transactions, on black money, and on financial savings. But there are some signs pointing to change.

a. Digitalisation

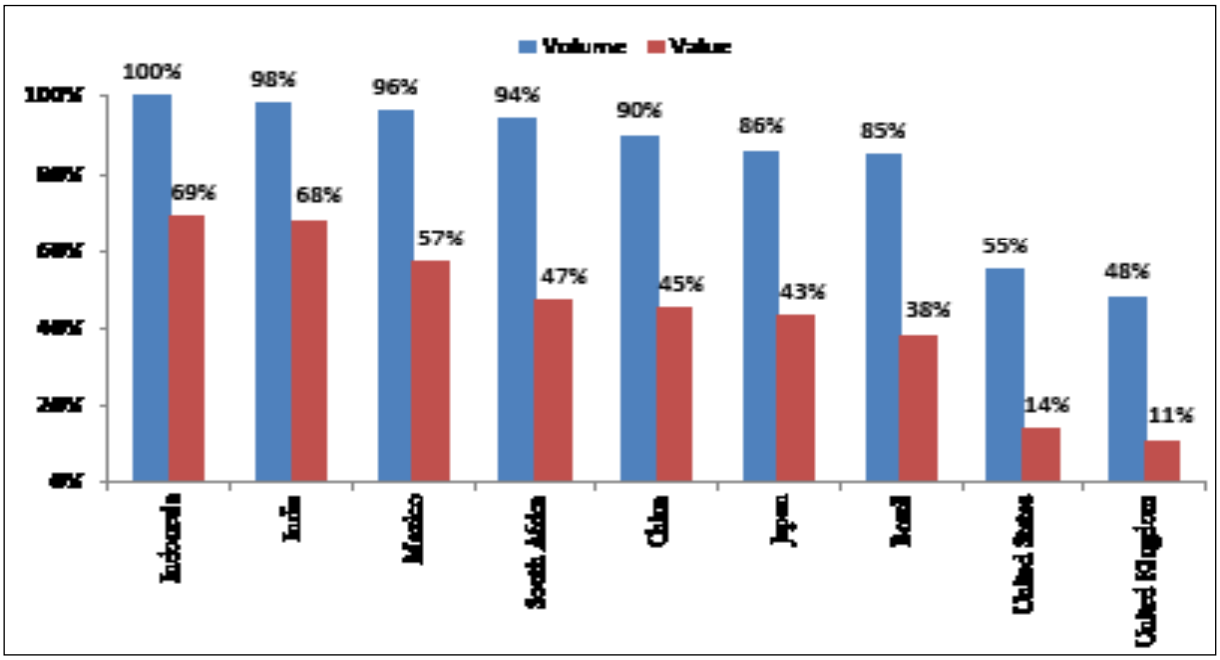
3.41 One intermediate objective of demonetisation is to create a less-cash or cash-lite economy, as this is key to channeling more saving channeled through the formal financial system and improving tax compliance. Currently, India is far away from this objective: the Watal Committee has recently estimated that cash accounts for

about 78 percent of all consumer payments.[9] According to Pricewaterhouse Coopers (2015) India has a very high predominance of consumer transactions carried out in cash relative to other countries (accounting for 68 percent of total transactions by value and 98 percent by volume; Figure 7). And there are many reasons for this situation. Cash has many advantages: it is convenient, accepted everywhere, and its use is costless for ordinary people, though not of course for society at large. Cash transactions are also anonymous, helping to preserve privacy, which is a virtue as long as the transactions are not illicit or designed to evade taxation.

3.42 In contrast, digital transactions face significant impediments. They require special equipment, cellphones for customers and Point-Of-Sale (POS) machines for merchants, which will only work if there is internet connectivity. They are also costly to users, since e-payment firms need to recoup their costs by imposing charges on customers, merchants, or both. At the same time, these disadvantages are counterbalanced by two cardinal virtues. Digital transactions help bring people into the modern "wired" era. And they bring people into the formal economy, thereby increasing financial saving, reducing tax evasion, and leveling the playing field between tax-compliant and tax-evading firms (and individuals).

3.43 Digitalisation can broadly impact three sections of society: the poor, who are largely outside the digital economy; the less affluent, who are becoming part of the digital economy having acquired Jan Dhan accounts and RuPay cards; and the affluent, who are fully digitally integrated via credit cards. One simple measure that illustrates the size of these three categories is cell phone ownership. There are approximately 350 million people without cellphones (the digitally excluded); 350 million with regular "feature" phones, and 250 million with smartphones.

Figure 7. Consumer Transactions Carried Out in Cash (%, 2015)



Source: **PricewaterhouseCoopers 2015**

[9] http://www.finmin.nic.in/reports/watal_report271216.pdf

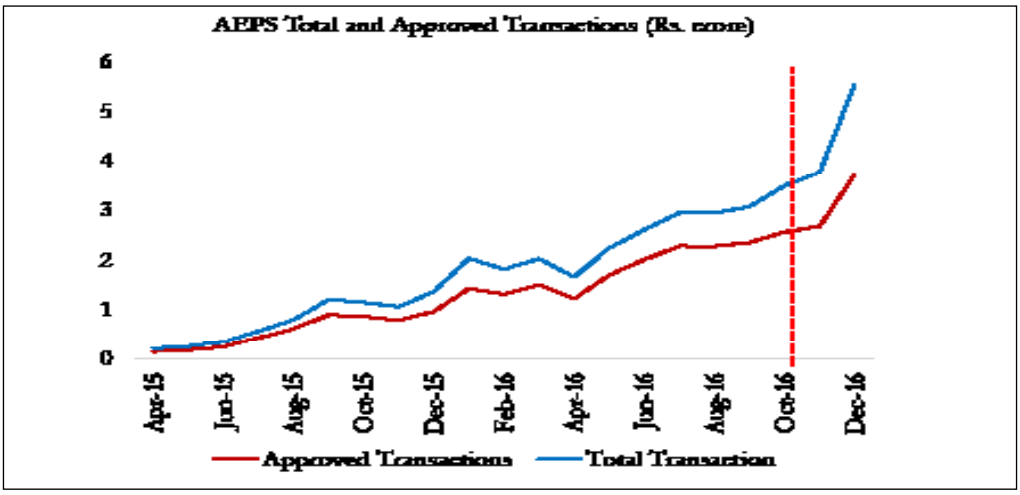
3.44 In the wake of the demonetisation, the government has taken a number of steps to facilitate and incentivize the move to a digital economy. These include:

- Launch of the BHIM (Bharat Interface For Money) app for smartphones. This is based on the new Unified Payments Interface (UPI) which has created inter-operability of digital transactions. As of January 10, there had been 10 million downloads, and over 1 million transactions had been conducted. The 250 million digital-haves can use their smartphone to make simple and quick payments.[10]
- Launch of BHIM USSD 2.0, a product that allows the 350 million feature phone users to take advantage of the UPI.
- Launch of Aadhaar Merchant Pay, aimed at the 350 million who do not have phones. This enables anyone with just an Aadhaar number and a bank account to make a merchant payment using his biometric identification. Aadhar Merchant Pay will soon be integrated into BHIM and the necessary POS devices will soon be rolled out.
- Reductions in fees (Merchant Discount Rate) paid on digital transactions and transactions that use the UPI. There have also been relaxations of limits on the use of payment wallets. Tax benefits have also been provided for to incentivize digital transactions.
- Encouraging the adoption of POS devices beyond the current 1.5 million, through tariff reductions.

3.45 So far, facilities such as RuPay and payment wallets still make up only a tiny proportion of digital transactions, much less overall financial transaction. For example, RBI survey data indicates that during December 2016 digital wallets accounted for just Rs 95 billion in transactions and UPI only Rs 7 billion, compared to Rs 314 billion for debit (excluding RuPay and ATM transactions) and Rs 270 billion for credit cards. Still, they are growing rapidly.

3.46 The impact on the digitally excluded category can be gleaned via transactions in the Aadhaar-Enabled Payments System (AEPS). We find that total AEPS transactions have been steadily rising before November 8, 2016 but have accelerated thereafter (Figure 8a).

Figure 8a. Digital Transactions (Rs crores) of Digitally Excluded



Source: **NPCI**
Note: **AEPS – Aadhaar Enabled Payment System**

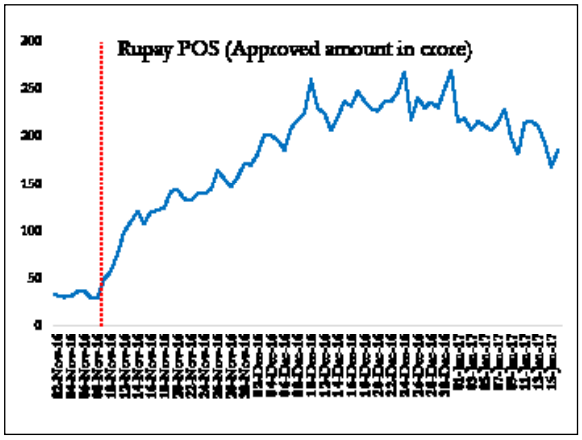
[10] It has used standard interoperable UPI QR codes for merchants.

3.47 The impact on the middle category of digitally connected can be gleaned via Rupay transactions. Here data from the National Payments Corporation of India (NPCI) show that RuPay-based electronic transactions increased by about Rs. 13,000 crore in case of POS transactions and about Rs. 2,000 crore in e-commerce, an increase of over 300-400 percent (Figure 8b).

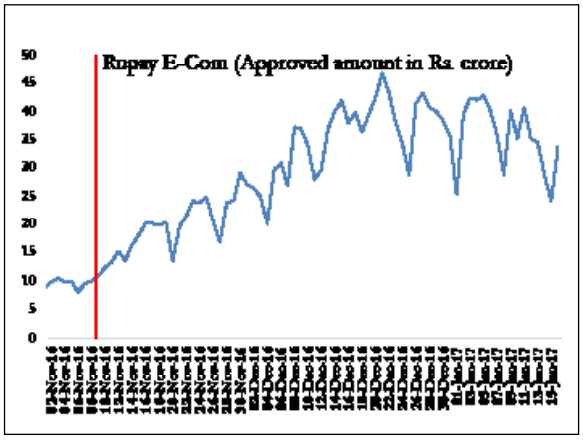
3.48 The impact on the digital-haves can be discerned from credit card and debit card transactions excluding for RuPay cards and ATMs that were affected by cash shortages (Figure 8c). There appears to have been a sharp increase of about 21 percent after November 8, 2016 and it remains to be seen whether this will be sustained even as remonetisation accelerates. Unique Payment Interface (UPI) transactions have also soared but from negligible initial levels.

3.49 As people have started to use such e-payment systems, they have discovered that it is more convenient to conduct financial activities electronically. And they are finding that such transactions are feasible in many more places, because demonetisation is creating network effects: as first movers embrace e-payments, others find it worthwhile joining them; and as more households participate, more firms are

Figure 8b. Daily Digital Transactions (Rs crore) of Less Affluent Consumers

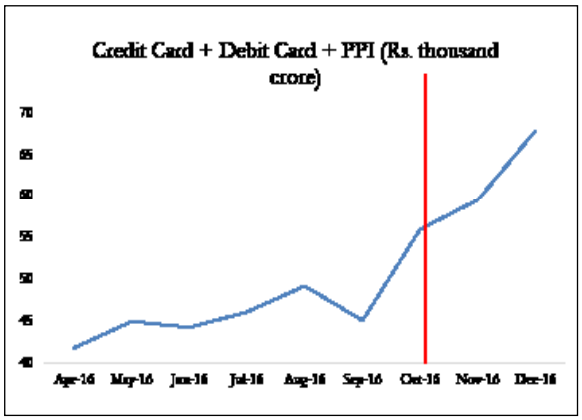


Source: **NPCI**



Source: **NPCI**

Figure 8c. Monthly Digital Transactions – Affluent Consumers

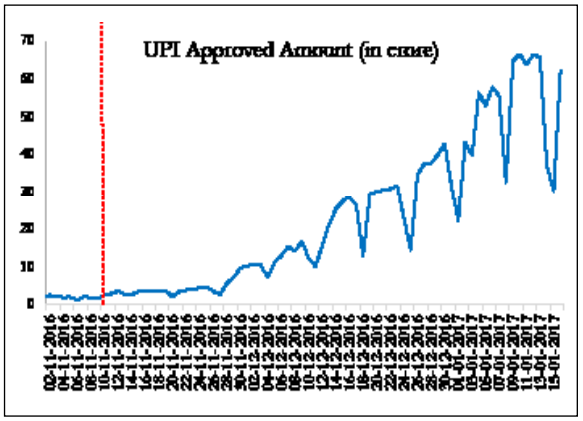


Source: **NPCI**

Note: **PPI – Prepaid Payment Instruments**

Debit card transactions exclude ATM and RuPay transactions

Figure 8d. Daily Digital Transactions Using Unified Payments Interface



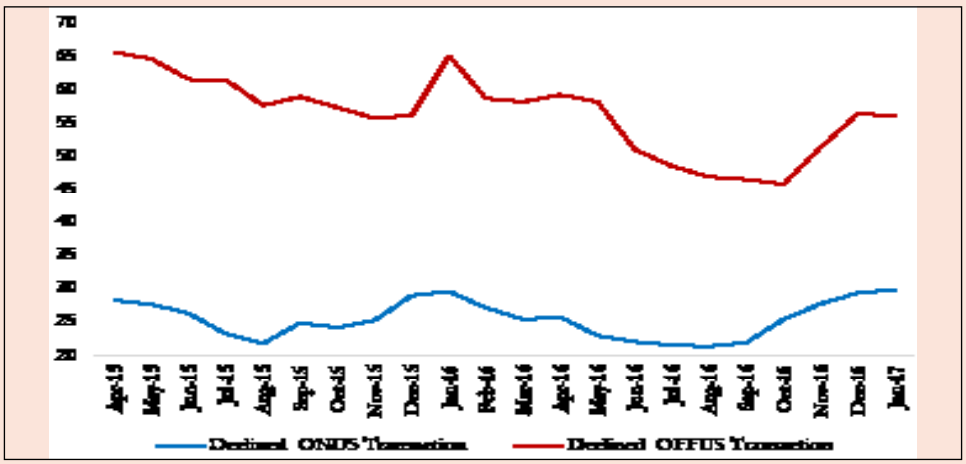
Source: **NPCI**

Box 1. Preventing Banks from Thwarting Inter-Operability

The success of digitalization will depend considerably on the inter-operability of the payments system. The Unified Payments Interface (UPI) created by the NPCI is the technology platform that will be the basis for ensuring inter-operability. But to ensure this, individual banks should facilitate not thwart inter-operability.

One way of quantifying the degree of inter-operability is to contrast the decline rate of transactions that involve the same issuing and remitting bank (On-US transactions), on the one hand, and transactions that involve different banks (Off-US). Based on detailed data provided by NPCI, the decline rates were calculated for Aadhar-enabled payments (Figure 9) as of mid- Jan 2016.

Figure 9. Decline Rates for Aadhar Enabled Payments



Source: **RBI**

The figure above shows that the decline rate for Off-US transactions was nearly 56 percent, almost double that for On-US transactions.

One plausible hypothesis for this differential is that the larger banks are declining transactions involving smaller remitting banks while ensuring that transactions involving themselves are honored. There could be valid reasons for this. But such problems will need to be addressed, since payments banks, telecommunications companies, and small banks are in the vanguard of financial inclusion. So their access to the UPI platform will be critical for advancing digitalization, especially for the poor.

participating as well. That said, the security features of these e-payment systems will need to inspire trust, to ensure this trend continues.

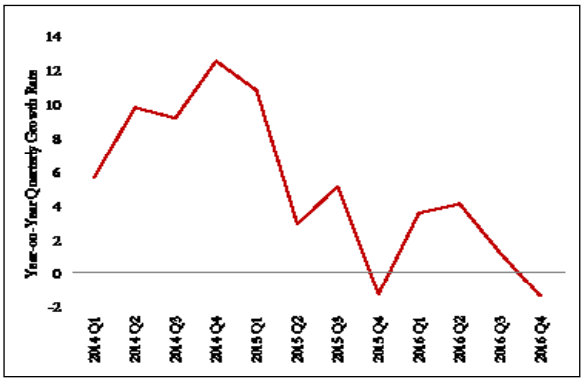
b. Real estate

3.50 Demonetisation could have particularly profound impact on the real estate sector. In the past, much of the black money accumulated was ultimately used to evade taxes on property sales. To the extent that black money is reduced and financial transactions increasingly take place through electronic means, this type of tax evasion will also diminish. While too early to assess whether there will be permanent effects, Figure 10 shows that the weighted average price of real estate in eight major cities, which was already on a declining trend fell further after November 8, 2016. An equilibrium reduction in real estate prices is desirable as it will lead to affordable housing for the middle class, and facilitate labour mobility across India currently impeded by high and unaffordable rents.

VI. Short-Term Impact

3.51 Notwithstanding its long-term potential, demonetisation will impose short-term costs on the economy. Assessing the extent of these costs remains difficult, as sectoral data has only recently begun to

Figure 10. Real Estate Prices



Source: **Knight Frank and Survey calculations.**

filter in. Moreover, the overall economy is so large and diverse that extrapolating from a few indicators is an exceptionally hazardous venture. And above all demonetisation represents a large structural shock so that underlying behavioral parameters of the past will be imperfect indicators of future behavior and hence outcomes. Nevertheless, an analytical framework to assess the situation remains indispensable.

3.52 We first quantify the cash impact, which then serves as the basis for estimating the GDP impact.

a. Impact on cash/money

3.53 To estimate the impact on GDP, it is first necessary to establish the impact of demonetisation on the supply of cash. Even to estimate the impact that has already occurred is not easy because the effective level of cash in circulation during November 9-December 30, 2016 depended on the extent to which:

a) old notes were still being used for transactions;

b) the new Rs 2000 notes were actually liquid, in the sense that individuals and firms could actually use them for transactions;

c) cash, old or new, was not returned.

3.54 To calculate the effective cash in circulation, we need further assumptions on (a)-(b) above.

- On (a), it was assumed that 75 percent of outstanding Rs 500 and Rs 1000 rupee denominations continued to serve de facto as legal tender.
- On (b), it was assumed that only 75 percent of the Rs 2000 notes were liquid in November, improving to 85 percent in December and 100 percent from January onwards, as new Rs 500 notes came increasingly into circulation.[11]

3.55 Projecting beyond end-December is much more straightforward, since the old notes are no longer circulating. Instead, the critical variable is the pace at which new notes and their denominations can be supplied ("remonetisation").

3.56 All these assumptions and inputs lead to estimates of effective currency in circulation between November 8, 2016 and the end of April, 2017. These estimates are expressed in absolute terms as well as a percentage of likely transactions demand. The latter is based on underlying nominal GDP growth as well as an assumed increase in the extent of digitalization and equilibrium reduction in the cash-deposits ratio, which will reduce the transactions demand for cash going forward. Since the transactions demand is an estimate, we show the confidence bands around our central estimates (Figure 11b).

3.57 The resulting figures for effective currency in circulation are markedly different from market perception based headline numbers (Figure 11a).

3.58 These headline numbers suggest that the currency decline after November 8, 2016 amounted to 62 percent by end-November,

[11] Based on the nature of replenishments, Rs 2000 notes accounted for about 14 per cent, 35 per cent and 47 per cent of the value of all cash in circulation between November and January, 2016, tapering down to about 39% by end-March, 2016.

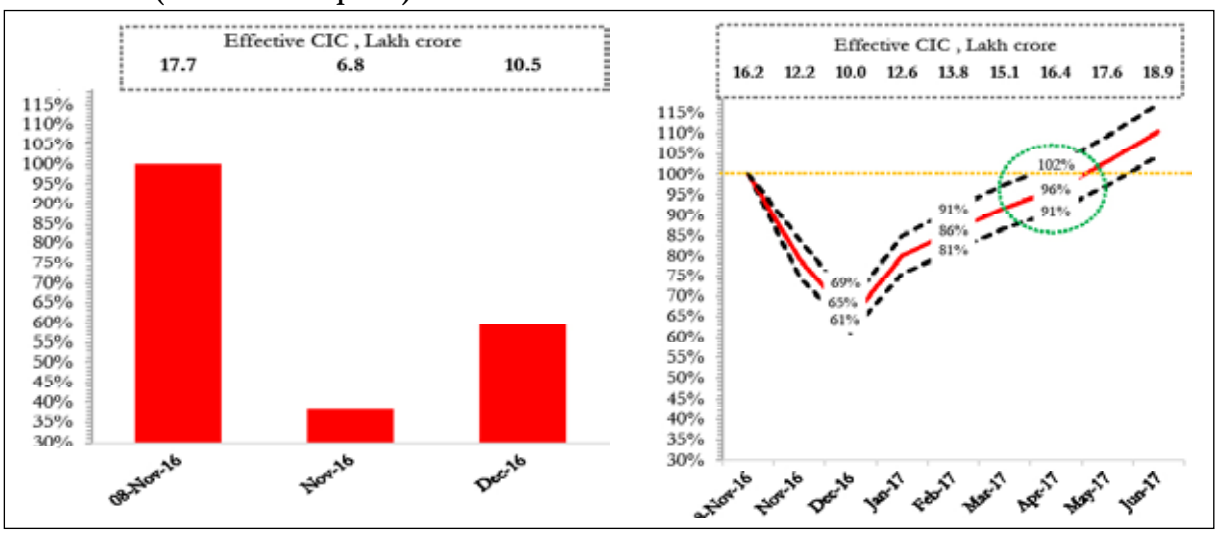
2016 narrowing to 41 percent by end-December, 2016. Our comparable numbers are 25 percent and 35 percent, respectively (Figures 11a and 11b). In other words, the true extent of the cash reduction was much smaller than commonly perceived, and the true peak of the monetary – as opposed to the psychological – shock occurred in December, rather than November.

3.59 The effective numbers also show that the shortfall is now narrowing rapidly. At end-December 2016, effective currency was only about 65 percent of estimated demand, but this is likely to rise to about 86 percent of transactions demand by end-February.

3.60 These estimates in turn yield numbers for growth in two transactions demand-related monetary aggregates that can help estimate the impact on GDP growth--cash in circulation and money (cash plus demand deposits). It is assumed that the increase in demand deposits for each month is equivalent

Figures 11a: Effective Currency in Circulation (Market Perception)*

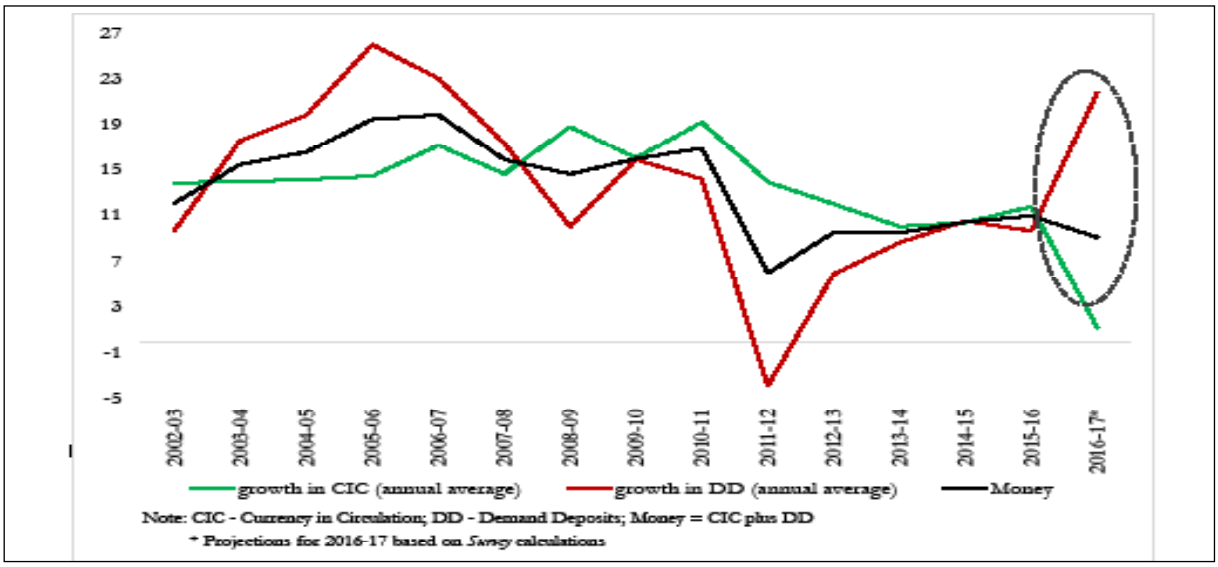
11b: Effective Currency in Circulation as a Proportion of Estimated Transactions Demand*



Source: ***Survey*** **calculations**

***End of the month unless otherwise specified.**

Figure 12. Growth in Average Currency with Public and Demand Deposits (%)



Source: ***Survey*** **calculations**

to old currency notes deposited with banks netted out for new cash replenishment and any loan repayments. Effective cash and money are estimated in year-on-year terms, as follows:

- *Second half of 2016-17 (average)*: -12.5 percent (cash) and +3.5 percent (cash plus demand deposits)
- *2016/17 (average)*: + 1.2 percent and + 9.1 percent.

VII. Impact on GDP

3.61 It is first important to understand the analytics of the demonetisation shock in the short run. Demonetisation is potentially:

- an aggregate demand shock, because it reduces the supply of money and affects private wealth (especially of those holding unaccounted money and owning real estate);
- an aggregate supply shock to the extent that cash is a necessary input for economic activity (for example, if agricultural producers require cash to pay labour);
- and an uncertainty shock because economic agents face imponderables related to the impact and duration of the liquidity shock as well as further policy responses (causing consumers to defer or reduce discretionary consumption and firms to reconsider investment plans).

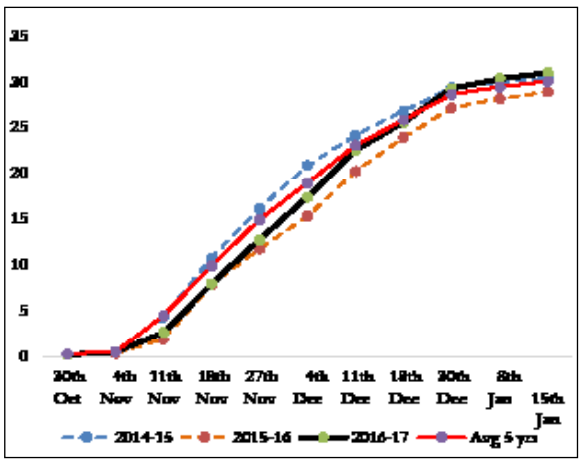
3.62 Anecdotal and other survey data abound on the impact of demonetisation. But we are interested in a macro-assessment and hence focus on five broad indicators:

- Agricultural (rabi) sowing;
- Indirect tax revenue, as a broad gauge of production and sales;
- Auto sales generally, as a measure of discretionary consumer spending, and two-wheelers in particular as it is the best available indicator of rural and demand of the less affluent;
- Real estate prices; and
- Real credit growth

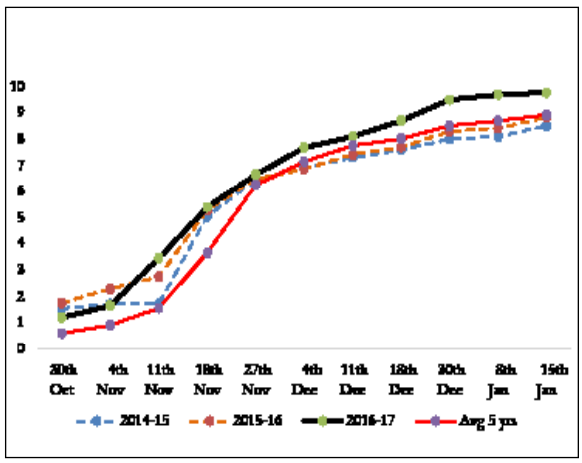
3.63 Contrary to early fears, as of January 15, 2016 aggregate sowing of the two major rabi crops—wheat and pulses (gram)--exceeded last year's planting by 7 percent and 15 percent, respectively (Figure 13). Whether this will lead to a commensurate increase in production will depend on the extent to which farmers' access to inputs—seeds, fertiliser, credit, and labour—was impeded by demonetisation.

Figure 13. Rabi Sowing for Wheat and Gram (in mn ha)

Wheat



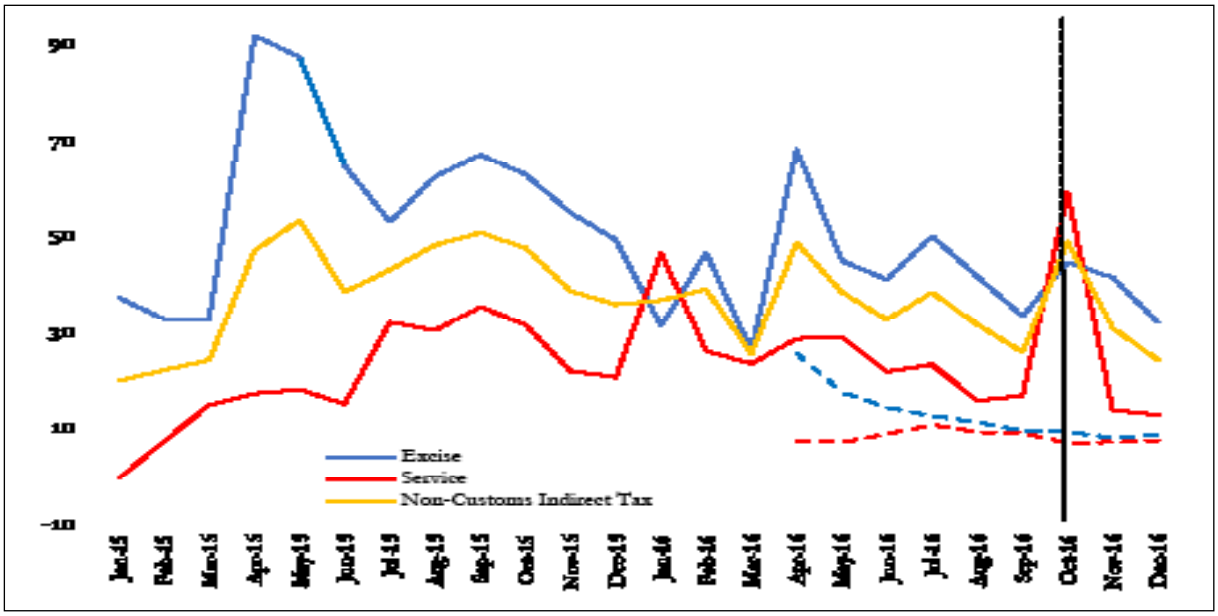
Gram



Source: **Ministry of Agriculture**

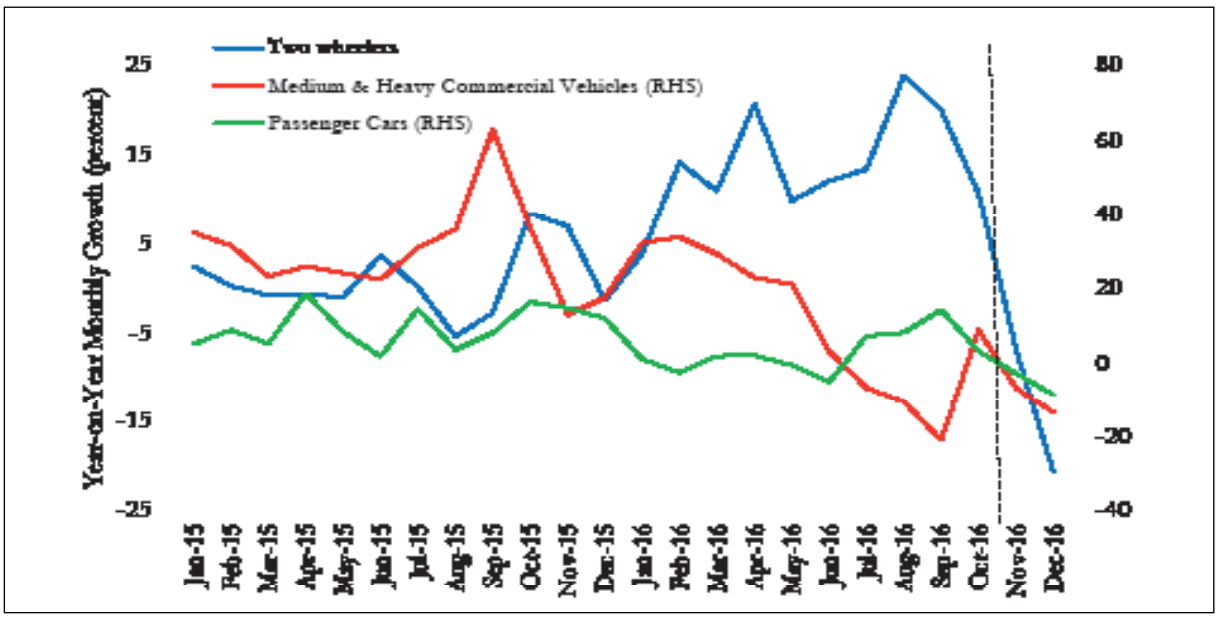
3.64 The high frequency indicators present a mixed picture (Figures 13-16). Agricultural sowing, passenger car sales, and overall excise taxes bear little imprint of demonetisation; and sales of two-wheelers show a marked decline after demonetisation; credit numbers were already looking weak before demonetisation, and those pre-existing trends were further reinforced after November 8. Indirect tax performance stripped of the effects of additional policy changes in 2016-17 (depicted as the dotted lines "ARM" in Figure 14) looks less robust than the headline number, but growth rates remain strong. It would be reasonable to conclude that real GDP and

Figure 14. Growth in Indirect Taxes (YoY monthly & cumulative, %)



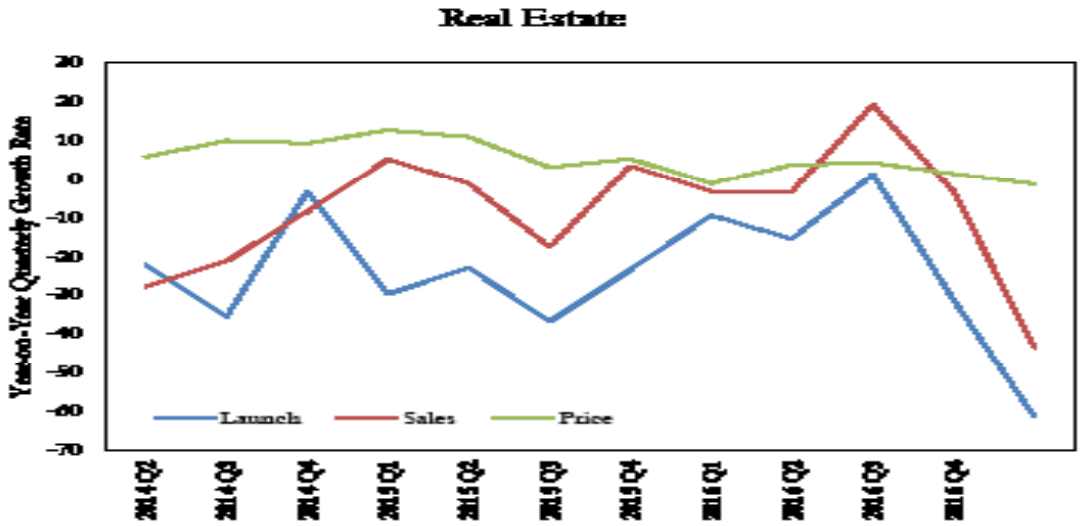
"ARM" refers to additional revenue measures (such as tax increases).
Source: **Department of Revenue and *Survey* calculations**

Figure 15. Growth in Automobile Sales (YoY, %)



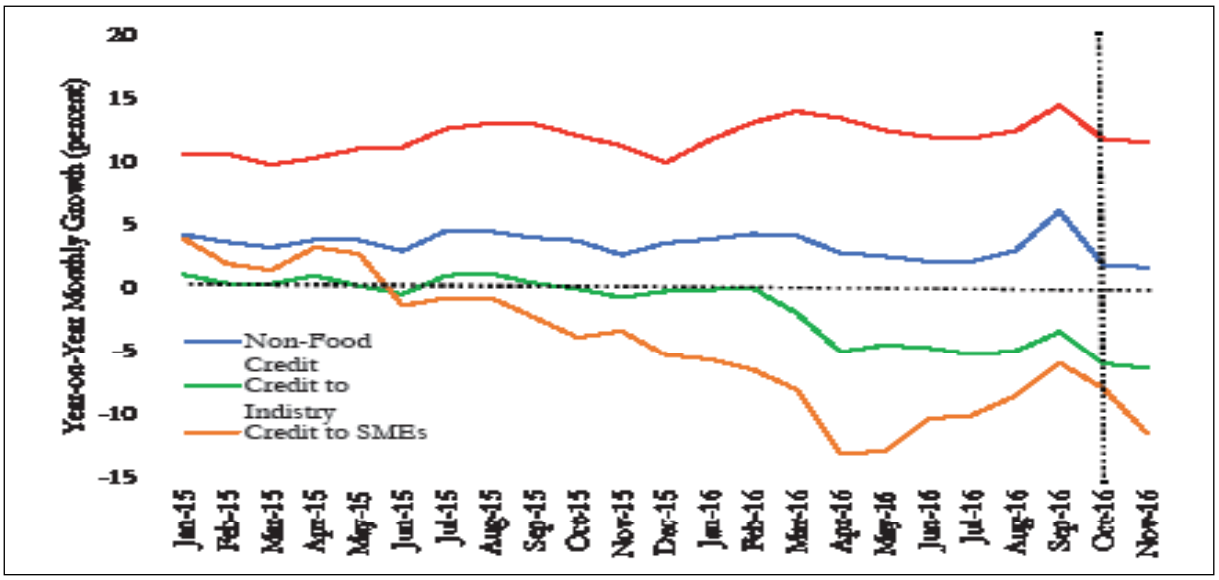
Source: **Society of Indian Automobile Manufactures**

Figure 16. Real Estate Prices (YoY Quarterly, %)[12]



Source: **Knight Frank data and Survey calculations**

Figure 17. Real Credit Growth (YoY, %)



Source: **RBI**

Note: **Deflated by CPI New Series 2012 prices.**

economic activity has been affected adversely, but temporarily, by demonetisation. The question is: how much? The short answer is between ¼ and ½ percentage points relative to the baseline of about 7 percent. Over the medium run, the implementation of GST, follow-up to demonetization and other structural reform measures should take the trend rate of growth of the economy to the 8-10 percent range that India needs. The next section elaborates.

a. Framework

3.65 The next step is assessing the impact of the cash crunch on economic activity.

[12] The quarterly data on real estate prices as collected by Knight Frank is as per calendar year viz. Q4 implies October-December

The standard way to do this is by employing the standard "quantity theory of money". Under this equation:

MV = PY, where

- M refers to the money supply
- V is velocity, the rate at which money turns over (the value of final sales [GDP] per rupee note)
- P, the price level
- Y, real GDP

3.66 In words, this equation says that if the money supply is reduced, either the remaining stock of money will need to be used more intensively, or else nominal GDP will fall. Some of this fall in nominal GDP would take the form of a reduction in prices. But there would also be some impact on real activity.

b. Operationalising the Model: *Estimate cash and non-cash proportions of economy and assume that demonetisation does not affect cashless part of the economy*

3.67 To operationalise this equation and use it to make forecasts, two conceptual issues need to be settled. The first issue is how to define the money supply. Normally, economists prefer broad measures that encompass both cash and bank deposits, because these are very close substitutes. A key aspect of the November 8 measure, however, is that the convertibility between cash and bank deposits was impeded. Cash could not be easily deposited into bank accounts, while withdrawals were subject to strict limits. As a result, cash and bank deposits need to be considered separately.

3.68 A similar distinction needs to be made between the informal and formal economies. Clearly, the cash crunch must have affected the informal economy, which depends heavily on bank notes for its transactions and has been estimated to account for nearly half of the overall economy (Sen, 2016). This may even be an underestimate if consumer payment transactions were in any way indicative of the extent of cash-dependence of the economy in production.

3.69 Equally clearly the cash crunch would have had little direct impact on the formal economy, which depends instead on the banking system, where liquidity has actually improved. So once again, it makes sense to think about things separately, assuming that the cash shortfall affects the informal economy, but has had no impact on the formal economy.

3.70 Of course, this is not literally true, for there are important second-round effects. As workers in the informal economy have been laid off, they have bought fewer products (such as fast-moving consumer goods or two-wheelers) from the formal economy.[13] Conversely, some participants in the informal economy have shifted into the formal payments systems (such as kirana shops installing POS terminals). Also, in the cash-intensive economy, the liquidity shortage has led at least transiently to a greater recourse to informal credit (such as kirana shops allowing regular customers to pay at a later date).

3.71 The indirect demand and digitalisation/credit effects go in opposite directions, with the former amplifying the effect of the cash shortage and the latter reducing it. Two scenarios are identified and assumptions are made in each about the initial level of the cash-intensive part of the economy and the extent to which it will change between November 8 and end-March 2017.

[13] More broadly, the informal and formal economies are inextricably entwined, so that problems in one inevitably affect the other. For example, many firms that operate in the formal economy depend on suppliers from the informal economy.

3.72 The framework itself cannot shed any light on how nominal GDP growth estimates can be decomposed into their real and price components. However, if demonetisation is predominantly an aggregate demand shock, we should expect some reduction in prices as well. Accordingly, we project prices till the end of March under two scenarios, one in which demonetisation reduces inflation and one in which it does not.

3.73 Based on all of the above and given the uncertainty, a range is provided and not a point estimate. For nominal GDP, the impact would be lower growth between ¼ percentage points and 1 percentage point relative to the baseline of 11¼ per cent. For real GDP the impact would be between ¼ percentage points and ½ percentage points relative to the baseline of 7 per cent. Over the medium run, the implementation of GST, follow-up to demonetization and other structural reform measures should take the trend rate of growth of the economy to the 8-10 percent range that India needs. How to interpret and not interpret these estimates is highlighted in Box 2.

3.74 A final and important point to make is that the adverse impact of demonetisation on GDP growth will be transitional. Once the cash supply is replenished, which should largely be achieved by end-March 2017, the economy should revert to normal, perhaps even with a bounce reflecting reversion to the mean. Therefore real GDP growth in 2017-18 is projected to be in the 6¾-7½ percent range.

3.75 A few concluding observations on the impact of demonetization on economic activity. It is clear that recorded GDP growth in the second half of FY2017 will understate the overall impact because the most affected parts of the economy—informal and cash-based—are either not captured in the national income accounts or to the extent they are, their measurement is based on formal sector indicators. For example, informal manufacturing is proxied by the Index of Industrial Production, which includes mostly

Box 2. Clarifying in Advance Possible Misinterpretations in GDP-Demonetization Effects

The GDP growth estimates of the CSO and the Survey, and especially the demonetization impact, could potentially give rise to a number of misinterpretations which must be anticipated and clarified.

For example, many commentators will be tempted to compare this year's real GDP growth estimate with last year's outturn of 7.6 percent. But this would be inappropriate, because many other factors have influenced this year's performance, quite apart from demonetisation. For example, international oil prices have stopped falling, providing less of an updraft to the economy. So growth would have inevitably differed, even without demonetisation.

Consequently, a better benchmark would be an estimate of what real GDP growth would have been in the absence of demonetization. A reasonable counterfactual to use would be the CSO's advance estimate of real GDP growth of 7.1 percent, which is close to the Survey's counterfactual, as well.

An even better counterfactual for comparison would be the level of nominal rather than real GDP growth. After all, demonetization is mostly a nominal demand shock, so its effect in the first instance will be on nominal magnitudes. Moreover, as noted in the Mid-Year Economic Analysis (2015), the large wedge between CPI and WPI inflation has created difficulties in measuring the GDP deflator, which is used to convert nominal magnitudes into real GDP. While the wedge has converged to zero this year as per December 2016 data, nominal magnitudes remain a better basis for identifying the demonetization effect.

Therefore, the most appropriate gauge of demonetization would be to compare actual nominal GDP growth -- or the Survey's estimate of it -- with the counterfactual nominal GDP growth without demonetization. According to the CSO this counterfactual is 11.9 percent, while the Survey's estimate is around 11¼ percent.

Finally, commentators will be tempted to compare the *Survey's* real GDP growth with those of other institutions such as the World Bank and the International Monetary Fund. But their baseline growth for 2016-17 (pre-demonetisation) was much higher than the CSO's Advance Estimates and the *Survey's*. Therefore, the more appropriate comparision would be based on the changes in the forecasts rather than their levels.

large establishments. So, on the production or supply side, the effect on economic activity will be underestimated. The impact on the informal sector will, however, be captured insofar as lower incomes affect demand for formal sector output, for example, two-wheelers.

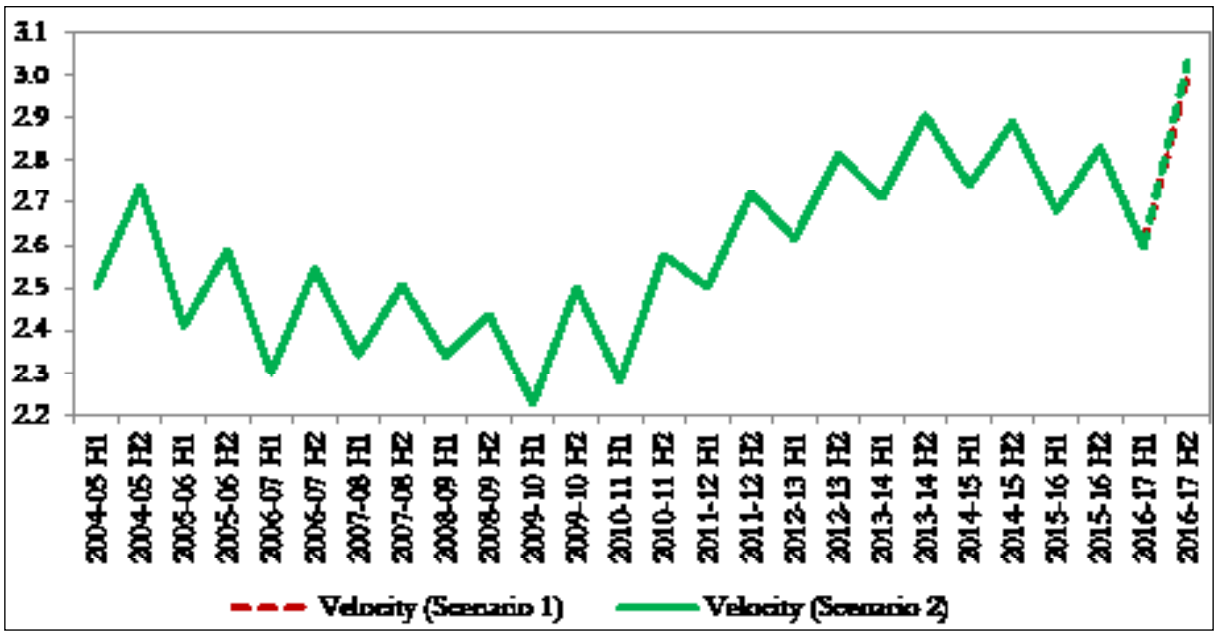
3.76 Finally, demonetization will afford an interesting natural experiment on the substitutability between cash and other forms of money. Demonetization has driven a sharp and dramatic wedge in the supply of these two: if cash and other forms are substitutable, the impact will be relatively muted; if, on the other hand, cash is not substitutable the impact will be greater.

c. Validation exercise: *Cash and demand deposits are perfect substitutes versus cash as the binding constraint*

3.77 A validation exercise is conducted, focusing on the growth estimates for the second half.[14] The implied velocity both for money (cash and demand deposits) and cash is calculated to see how they compare with historical behavior. This exercise is carried out for two scenarios. In the first, the money velocity is computed (shown in Figure 18). The underlying assumption here is that cash and demand deposits are perfect substitutes, so that it did not matter that cash was reduced as long as other forms of money replaced it, as indeed happened. This is one extreme assumption. Here the implied velocity for each scenario is found to be slightly higher than historical trends.

3.78 In another scenario (shown in Figure 19), the implied velocity for cash is examined. Here the assumption is that during the period of demonetisation, cash was the binding constraint for transactions. Under this assumption, the implied cash velocity would be very different from that observed historically.

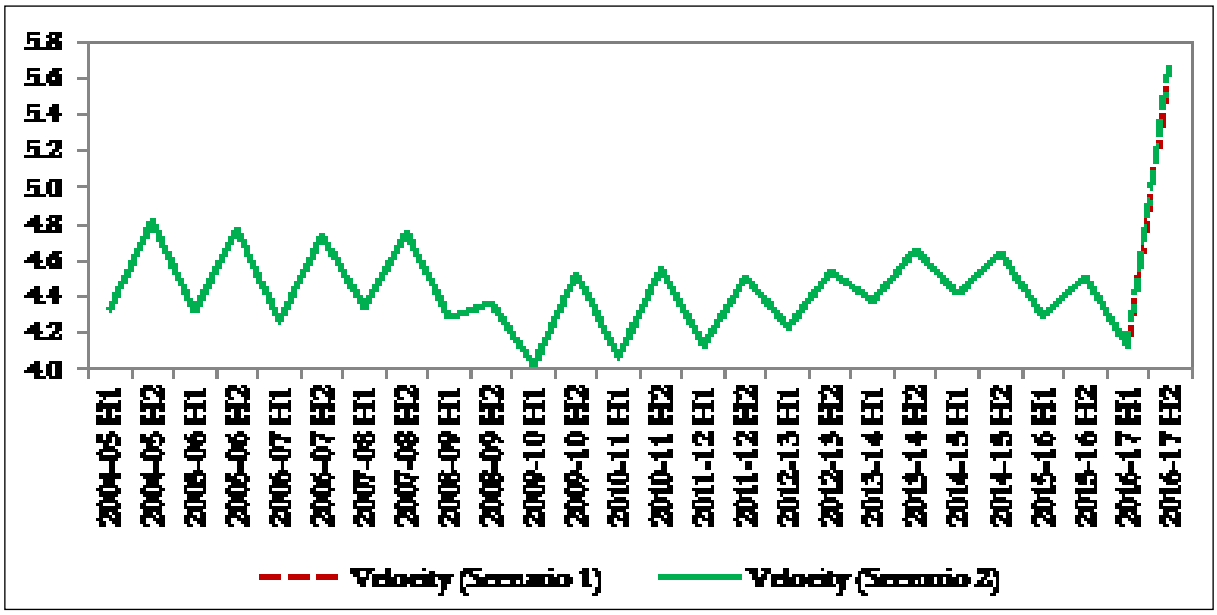
Figure 18. Half-yearly Money Velocity (Cash and Non-cash)



Source: **Survey calculations**

[14] Another possibility would have been to carry out this exercise for the whole year. Since demonetisation will only affect the second half and since monetary aggregates in the July-September quarter showed unusual movements, the analysis was conducted for the period November 2016-March 2017.

Figure 19. Half-yearly Money Velocity (Cash only)



Source: **Survey calculations**

3.79 The reality, of course, is expected to lie somewhere in between. The plausibility of these estimates then depends on the degree of substitutability between cash and non-cash during demonetisation. The more substitutable they are, the more plausible are the growth estimates; the less substitutable they are, the greater will be the adverse impact on GDP.

d. Supply-side effects

3.80 These estimates are based entirely on the liquidity impact of demonetisation rather than the wealth, aggregate supply, or uncertainty effects. These latter effects are impossible to predict in quantitative terms, but some qualitative assessment is possible. It is likely, for example, that uncertainty caused consumers to postpone purchases and firms to put off investments in the third quarter. But as the economy is remonetised and conditions normalise, the uncertainty should dissipate and spending might well rebound toward the end of the fiscal year. Similarly, there was clearly a wealth shock in the initial months, as cash assets were turned into the banks (from where they were difficult to withdraw), but as restrictions are lifted this effect should disappear as well. Indeed, to the extent that some of this wealth has been transferred to those with higher propensity to spend, including the government, demand could eventually increase.

3.81 This relatively benign outcome would materialise, however, if and only if remonetisation is effected expeditiously (and Figure 11b shows that around 90 percent of transactions demand can be met before the end of current financial year), and decisive policy actions taken to clear away the uncertainty and dispel fears of an over-zealous tax administration. Only then could the effects of demonetisation prove non-permanent in nature.

3.82 Demonetisation could also affect supplies of certain agricultural products, especially milk (where procurement has been low), sugar (where cane availability and drought in the Southern states will restrict production), and potatoes and onions (where sowings have been low). Vigilance is essential

to prevent other agricultural products becoming in 2017-18 what pulses was in 2015-16 in terms of supply deficiencies and consequential higher inflation.

VIII. Redistribution to the Government

3.83 Demonetisation will also redistribute resources. For example, to the extent that black money holders have laundered their money by employing people to stand in queues there could be a positive wealth effect because cash would go from agents with a low propensity to spend to those with a greater propensity to spend. But perhaps the most important redistributive effect is that it will shift resources from the private sector to the government. The impact on the overall economy will then depend on how the government responds.

3.84 Demonetisation will affect the fiscal accounts in the following ways.

3.85 Wealth gain: The RBI/government may receive some gains from the unreturned cash.

3.86 Short-term flow impact: The net impact is difficult to discern, as there are many cross-cutting effects. Income taxes could go up as black money was deposited in bank accounts (as discussed in Section IV above). There are also reports of increases in tax payments at state government levels and accelerated payments to discoms. Against this are three negative effects:

- Costs of printing new notes over and above normal replacement.
- The costs of sterilizing the surge in liquidity into the banking system via issuance of Market Stabilization Scheme bonds.
- If nominal GDP growth declines, corporate and indirect tax revenues of the centre could decline but so far there is no clear evidence.

3.87 Overall, the total cost will be clear at the end of the full year.

IX. Markers of Success

3.88 Demonetisation can have long term benefits. These may not necessarily become manifest in the next six months but evidence should start trickling in over a one-year horizon and beyond. And it is not difficult to identify the future markers of success.

3.89 First, changes in the use of digital payment methods across the three categories of digital access identified earlier, namely, smart phone users, regular phone users and the phoneless, respectively. The early signs are encouraging.

3.90 Second, the cash-GDP ratio, which should decline as more saving is channeled through the formal financial system and black money falls. On one estimate of black money, the cash-GDP ratio could decline permanently by about 2 percentage points.

3.91 Perhaps the most important marker of success will be taxes. The number of new income tax payers as well as the magnitude of reported and taxable income should go up over time. The situation as of 2013-14 is given in Table 3 below. Over time, each of these numbers should rise significantly. That will be the surest sign of success.

Table 3. Distribution of Individual Income Tax Payer for FY 2013-14

Range of Gross Income	Number of Taxpayers (in lakhs)	Total Income (Rs lakh crore)
Rs 0-2.5 lakh	137.2	2.6
Rs 2.5-5 lakh	138.5	4.8
Rs 5-10 lakh	65.1	4.4
Rs 10 lakh +	24.4	6.7
Taxpayers who filed tax returns	365.1	18.4
Taxpayers who paid tax but didn't file returns	172.9	-
Grand Total	**538. 0**	**-**

3.92 To the extent that demonetisation has also raised the costs of non-compliance with indirect taxes, we should also expect to see an increase in registration under the service and excise taxes and under the states' VATs. These should drift up steadily in the future.

X. Maximising long-term benefits, minimising short-term costs

3.93 Moving forward, the emphasis must be on maximising demonetisation's benefits while minimising its costs.

3.94 On the latter, the most important effort must be to replenish the cash shortage as quickly as possible. The faster remonetisation takes place, the shorter and less severe will be the overall impact of demonetisation.

3.95 One point bears emphasis. Supply of currency should follow actual demand and not be dictated by official estimates of "desirable demand". In other words, the RBI should re-establish internal convertibility, guaranteeing to give the public the amount of currency that the latter wants. The early elimination of withdrawal limits will help build confidence. By the same token, there should be no penalties on cash withdrawals, which would only encourage cash hoarding.

3.96 Internal convertibility is a bedrock of every single financial system in the world, for some very practical reasons. Unless people have confidence that money deposited in bank accounts is freely convertible into cash, and vice versa, they will be reluctant to deposit their cash in the first place. Instead, they will hoard it, starving the formal financial system of resources and the informal economy of the currency it needs for transactions. And this would affect the poor most, not just because they are more likely to work in the informal economy, but because the affluent will likely corner the limited currency available. Gradually, of course, the proportion of low denomination notes should certainly rise at the expense of higher ones. But there should not be any restrictions on aggregate supply.

3.97 Meanwhile, the government windfall arising from unreturned notes should be deployed toward capital-type expenditures rather than current ones. And since the windfall will be one-off its use should be one-off and not lead to entitlements that create permanently higher expenditures.

3.98 In the medium term, the impetus provided to digitalization must continue. A few principles must guide this effort going forward. Digitalisation is not a panacea, nor is cash all bad. Public policy must balance benefits and costs of both forms of payments. Second, the transition to digitalisation must be gradual; take full account of the digitally-deprived; respect rather than dictate choice; and be inclusive rather than controlled.

3.99 To the extent that digitalisation must be incentivised-- and the incentives favouring cash neutralized--the cost must be borne by the public sector (government/RBI) and not the consumer or financial intermediaries. Incentivisation should be strictly time-bound because as volumes increase digitalisation should become privately profitable. To increase trust in digital payments, cyber-security systems must be strengthened considerably. One key need is to ensure inter-operability of the payment system, which will be at the heart of increasing digitalisation going forward, building upon the newly created UPI.

3.100 Above all, ensuring that demonetisation indeed proves a catalyst for long-run changes in behavior will require measures to complement demonetisation with other non-punitive, incentive-compatible measures that reduce the incentives for tax evasion. Demonetisation was a potentially

powerful stick which now needs carrots as complements. A five-pronged strategy could be adopted:

- a GST with broad coverage to include activities that are sources of black money creation—land and other immovable property—should be implemented;
- individual income tax rates and real estate stamp duties could be reduced;
- the income tax net could be widened gradually and, consistent with constitutional arrangements, could progressively encompass all high incomes. (After all, black money does not make fine sectoral distinctions);
- the timetable for reducing the corporate tax rate could be accelerated; and
- tax administration could be improved to reduce discretion and improve accountability.

3.101 Finally, it is imperative that the effort to collect taxes on newly disclosed (and undisclosed) wealth does not lead to tax harassment by officials at all rungs of the hierarchy. There must be a shift to greater use of data, smarter evidence-based scrutiny and audit, greater reliance on on-line assessments with correspondingly less interaction between tax payers and tax officials. At a time when the GST will be providing so much more data on individual transactions, greater information sharing between the direct and indirect tax departments at the centre, along with coordination with the states, could lead to greater compliance through non-punitive means, not just in relation to indirect but also direct tax collections. Big Data and the digital age, and the promise they offer, should also be embraced by the tax administration.

References

1. Acharya, Shankar N. (1986), "Aspects of the black economy in India", National Institute of Public Finance and Policy
2. Government of India (2016), "Committee on Digital Payments", Ministry of Finance
3. Henry, James S. (1980), "The Cash Connection: How to Make the Mob Miserable", The Washington Monthly.
4. PricewaterhouseCoopers India (2015), "Disrupting cash: Accelerating electronic payments in India"
5. Rai, Suyash (2016), "A flawed policy: The real problem with demonetisation is not just in implementation", scroll.in
6. Rogoff, Kenneth S. (2016), *The Curse of Cash*, Princeton University Press
7. Sands, Peter (2016), " Making it Harder for the Bad Guys: The Case for Eliminating High Denomination Notes", Harvard Kennedy School M-RCBG Associate Working Paper No. 52
8. Sen, Pronab (2016), "Demonetisation is a hollow move", Op-ed: Mint
9. Summers, Larry (Feb 16, 2016), "It's time to kill the $100 bill", Op-ed: Washington Post

Appendix 1. Cross-Country Instances of Demonetisation

Major Instances of Sudden Demonetisation/sharp currency contractions/changes since 1982[15]

Country	Year	Measures	Rationale	Effects
Ghana	1982	Demonetisation of 50 cedi notes in 1982; no exchange facility for long; freeze on bank deposits	Excess liquidity and inflation	Loss of confidence in the banking system
Myanmar	1985	50 and 100-kyat notes demonetized; limited exchange facility; 75-kyat notes were introduced	Need to fight black marketing	Public protests
Myanmar	1987	25, 35, and 75-kyat notes demonetised with hardly any exchange facility; new denominations were introduced.		Hurry to buy and stock goods pushed inflation up
Brazil	1990	Collor Plan: monetary contraction by freezing all deposits above certain limit; de-indexation of the economy; price and wage freezes. Deposits upto a ceiling denominated in the old currency (cruzado novo) were converted to the new currency (cruzeiro) at parity.	Fight hyperinflation	Contraction of output; price moderation only very gradual due to uncontrolled re-injection of liquidity
Brazil	1993	Real Plan: New currency introduced, the cruzeiro real, worth 1000 cruzeiros, with both old and new currencies circulating	Fight hyperinflation	Economy stabilized gradually
Soviet Union	1991	50- and 100-ruble notes were withdrawn suddenly in January for exchange to new rubles; exchange to be completed in three days and in very small amounts per person.	Fight organized crime and address money overhang	Loss of public confidence, hyperinflation, cash drying up, job losses
Russia	1993	Similar to the 1991 step; Russia also negotiated with neighbours to establish a new ruble zone, but only Belarus signed agreement.	Need to complete exchange of old bank notes and control inflation	Did not strengthen ruble; problems for neighbouring currencies
Iraq	1993	25 dinar notes replaced by new locally printed, low-quality notes; limited time to exchange notes; residents in the north could not exchange notes; their holdings of old dinars in effect became their new currency.	Southern Iraq, being unable to cope with UN sanctions and print money abroad, printed it locally to finance fiscal deficits.	Uncontrolled printing caused inflation to soar
North Korea	2009	Old notes demonetized/revalued with strict limits on exchange, which was raised later; In February 2010, some curbs on the free market were eased.	To crack down black currency market and fight inflation	Activities halted for a week; public panic; won depreciated in black market; protests.
Cyprus	2013	On acceptance of the European-IMF bailout package, Cyprus imposed a one-time bank deposit levy on uninsured deposits.	Weakened banking system after Greece defaulted on its debts	Banking system gradually regained its footing
Greece	2015	June 2015: announced that banks would remain closed for a while; and capital controls were imposed.	Fiscal and banking crisis.	Banks reopened in July 2015 but capital controls remained.
Venezuela	2016	Announced in December 2016 that 100 boliver notes would be recalled.	To fight inflation and profiteering	Public unrest

[15] There have been other instances of sudden demonetisation mentioned, for example in the K.N. Wanchoo Committee Report, that have occurred historically, including Belgium, the Netherlands, Greece, France, Romania and Ceylon.

Major instances of Pre-announced/Gradual Demonetisation/Sharp Currency Contractions/Changes

Country	Year	Measures	Rationale	Effects
Singapore	1967	In June 1967, the currency union of Malaysia, Singapore and Brunei ended and each issued its own currency; As per Interchangeability Agreement 1967, the three currencies were interchangeable at par.	Two years after Singapore's independence from Malaysia in 1965, the monetary union broke down.	Interchangeability is still maintained with Brunei dollar.
Australia	1988& 2015	After thorough research during 1970s-80s on higher-quality reprographic technology, counterfeit-resistant polymer banknotes were released in 1988; February 2015 announcement-- next generation of notes would include a 'tactile' feature to assist the vision-impaired.	Prevent counterfeiting	The first country to have a full series of circulating polymer bank notes.
Euro	1999	The agreement for a single currency by 1999 was reached in 1992; After careful planning, and announcement of design, euro was introduced in non-physical form in January 1999; Old currencies remained legal tender till January 2002 when new notes were issued; Old currencies were exchangeable till end-June 2002 and even beyond.	Create a common currency for the European Union	Transition was generally smooth.
Singapore	1999& 2014	The Portrait notes, the fourth series of currency notes, were launched in September 1999 with sophisticated security features. Discontinued issuance of S$10,000 note and instructed banks to stop re-circulating it since October 2014; but still remained legal tender	2014 move: Mitigate higher money-laundering risks associated with large-value cash transactions	
Canada	2011	Unveiled polymer bank notes in June 2011; disseminated information; issued new $100 notes in November 2011 and $50 notes in March 2012.	Improve public confidence in currency; deter counterfeiting	
Denmark	2012	From 2009 to 2011, introduced a new banknote series with a number of advanced features; in 2012, the Faroese banknote series was upgraded.	Fight counterfeiting threats	
Sweden	2013-2016	50-krona and 1,000-krona banknotes without foil strips were made invalid after December 2013; new 20, 50, 200 and 1,000 krona notes were issued in October 2015; Use of old versions limited till June 2016; in October 2016, new 100 and 500 krona banknotes and some coins were issued; payments using the earlier versions will be till June 2017.	Decisions were part of the preparations for the replacement of the banknote and coin series which was scheduled to begin in 2015.	

Zimbabwe	2015	Zimbabwean dollar (ZD) was demonetised. The plan was to have complete switch to US dollar by September 2015 and to adopt multiple currencies.	Following hyperinflation, ZD was effectively abandoned in 2009 and use of foreign currencies was legalised;	Consumer prices stabilised.
Pakistan	2015	In June 2015, it was announced that old design notes of Rs 10, 50, 100 & 1000 would be non-legal tender from 1st December 2016; banks would exchange old notes with new ones till end- November 2016; State Bank of Pakistan-Banking Services Corporation field offices would continue to accept the old notes till end-December 2021	Fight corruption, black money and terrorism	No credible information available to confirm status.
Euro area	2016	New €50 banknotes were unveiled in July 2016; will start circulating from April 2017 European Central Bank further announced: issuance of the €500 will be stopped by end-2018, when the €100 and €200 banknotes of the Europa series will be introduced.	Make Euro more secure and safe with state-of-the-art security features: Decision on €500 took into account concerns that this banknote could facilitate illicit activities	