

The Great Indian Demonetization*

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Abstract

On November 8, 2016 India demonetized 86 percent of its currency in circulation. The stated objectives of the move were to seize undeclared income, to destroy counterfeit currency, to speed up formalization of the economy, and to increase the tax base. I find that the evidence over the subsequent three years suggests that the move had limited success in achieving its stated objectives. Disaggregated data suggests that demonetization did have appreciable costs in terms of lost jobs and output. However, the output costs appear to have been temporary.

1 Introduction

On November 8, 2016 the Prime Minister of India, Mr. Narendra Modi, took the nation by surprise by announcing that the government was demonetizing all Rs. 500 and 1000 denominational bills with immediate effect. This amounted to the demonetization of 86 percent of the Indian currency in circulation. Holders of the demonetized currency were

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given till December 31 to exchange their demonetized bills for newly issued currency which would be in denominations of Rs. 500 and 2000.

Mr. Modi gave two main reasons for the move: First, it would allow the state to seize all the wealth in the economy that was accumulated through undeclared income. Hence, this was to be a decisive blow against corruption. Second, it would eliminate the scourge of the counterfeit currency that was circulating in the economy. This second motive, while laudable, seemed like targeting a small target since estimates from the Indian Statistical Institute suggested that counterfeit currency accounted for a bare 0.025 percent of the currency in circulation.¹

In subsequent days two other motives were added to the narrative. Third, it was intended to be a way of converting the country into a modern digitized economy which would be less reliant on cash. More digitized payments would bring a larger share of the informal Indian economy into the organized and formal sector. Fourth, by forcing people to convert their old cash into the new currency through the banking system, it was both bringing unaccounted money into the formal tax network and generating greater digital footprints to track individuals and firms who were hitherto hidden from the tax network.

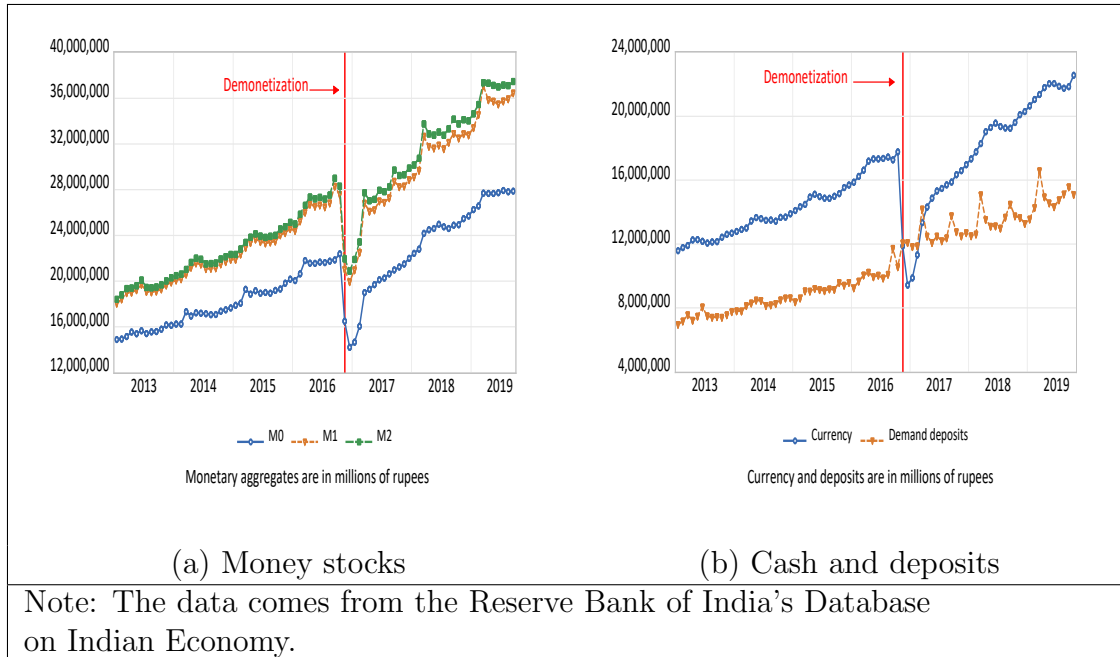
After an extended counting process, when the dust cleared the Reserve Bank of India (RBI) announced that over 99 percent of the demonetized currency had been returned to it through the commercial banks. Moreover, within a year of the demonetization, currency in circulation in the economy was also back to its pre-demonetization level.

Panel (a) of Figure 1 shows the time paths of three different measures of money: M0, M1 and M2. The units are in millions of rupees. M0 measures currency in circulation, plus deposits by bankers and others with the Reserve Bank of India (RBI). M1 includes currency, demand deposits with the banking system and other deposits with the RBI. M2 adds savings deposits of post office savings banks to M1. As can be seen from

¹See “Fake notes worth 400 crores in circulation,” Times of India, May 11, 2006.

the figure, by the end of March 2017, both M1 and M2 were just 2.1 and 2.9 percent below their October 2016 levels. M0, on the other hand, remained 15 percent below its pre-demonetization level. In fact, it wasn't till January 2018 that M0 recovered to its pre-demonetization level.

Figure 1: Demonetization and Money Stocks



There were two ways in which the public could exchange the demonetized cash. They could either swap the old currency for new currency subject to daily limits. Alternatively, they could deposit the old cash in their bank accounts. Panel (b) of Figure 1 shows the contrasting behavior of currency in circulation and bank deposits (which comprise of saving and checking deposits) during the episode. Currency in circulation fell by around 8.4 trillion rupees while bank deposits rose by a meagre 1.5 trillion rupees between October (the last month before demonetization) and 31 December 2016 (the last date for exchanging the old bills for new ones). Most of the demonetized currency was instead deposited in time deposits which rose by over 4 trillion rupees during this period.

The banks, in turn, parked the returned cash with the central bank first in the form of bankers deposits and subsequently in special purpose bonds issued by the RBI. Since most of the demonetized currency was eventually returned, the overall level of RBI liabilities barely changed during the entire episode.

While the move was initially hailed as courageous and transformative by some commentators, the mood rapidly gave ground to widespread concerns regarding: (a) the preparedness of the RBI to manage the process of remonetizing the economy; (b) the potential of demonetization to achieve the stated goals; (c) the costs of the move for the Indian economy. With two years having passed since the enactment of the policy, what does the evidence suggest about the efficacy of demonetization?

The evidence points to demonetization having mostly failed to have achieved its stated objectives. The goal of eradicating black wealth and corruption by demonetizing currency was problematic to start with given the widespread acknowledgement of the fact that undeclared income is seldom held for long periods in terms of cash. Moreover, demonetizing currency, which attacks a stock does little to impede the fresh creation of undeclared income which is a flow problem. The second goal of destroying counterfeit currency was suspect to start with given the very low estimated counterfeit currency in circulation in India.

An examination of the growth in digitized payments, in the tax base and in tax revenues suggests that the move achieved little in terms of changing the pre-demonetization trends in these measures. Digitized payments were growing exponentially in India prior to 2016 and they have continued on the same non-linear trend. I also do not detect any systematic impact of demonetization on either the number of tax filers or tax revenues.²

On the cost side however, there appears to be strong evidence that demonetization reduced output and employment, especially in the informal sector. These losses though were likely temporary rather than being permanent.

On balance, demonetization appears to have failed the cost-benefit analysis of public

²It is important to stress that these conclusions on the time trends in digital transactions and taxes are tentative since we just have three years of data after the event.

policy initiatives: it had little success in achieving its stated goals while having imposed significant costs on the public.

In the next section, I place the demonetization initiative in context by describing the intellectual arguments for demonetization as well as the experience of two other demonetization exercises that were carried out in the past in India. Section 3 examines the preparedness of the central bank in dealing with the mechanics of demonetization. Section 4 presents the evidence in the context of the logic of the stated goals while Section 5 presents the evidence on the costs of demonetization. The last section concludes.

2 Intellectual and Historical Context

Demonetization as a tool for fighting crime, tax evasion and activities in the underground economy has been advocated in the past. One of the more well known contributions along these lines was made by Ken Rogoff in Rogoff [2016] and Rogoff [2017]. The argument rests on the premise that, in an international context, most underground economy activities are financed using large-denomination currency notes. Following World War II, Britain and other European countries fought back against illicit wartime speculative wealth gains by demonetizing high denomination bills. In 1969, the United States demonetized bills with denominations \$500 and higher; in 2017, the European Central Bank demonetized the 500-euro bill.

A unique aspect of the Indian measure was that it was carried out during a period of economic stability but with very little time given to the public to exchange their demonetized bills. This created the potential for a lot of disruption and inconvenience since the demonetized bills, especially the 500-rupee bill (worth about US\$14 at prevailing exchange rates), were heavily in use for daily transactions.

The demonetization of 2016 was not the first such episode in Indian monetary history either. There were two other episodes in the post-World War II era with

remarkably similar underlying justifications. The first was in 1946 while the second was in 1978.

Soon after the end of the World War II, on January 12, 1946 the Government of India demonetized all currency bills of denomination Rs. 500 and above. In the lead up to that decision, the finance member of the Governor General of India's Executive Council, Sir Archibald Rowlands cited the Bank of England's decision to demonetize currency after the war "as one more concrete example for the Indian Government to follow in its fight against black market money and tax evasions which have now assumed enormous proportions."³

There were of course officials who were sceptical of the effectiveness of measure. These included the then Governor and Deputy Governor of the RBI. When all the exchanges were done, it turned out that 94 percent of the demonetized currency was returned to the RBI. The scheme was generally regarded as a failure since not much was garnered in the form of unreturned currency but caused considerable hardship to the general public. Moreover, the higher denomination bills were all reintroduced by 1954.

The second such episode in modern Indian post WWII era was in 1978. On January 16, 1978 the government demonetized all currency bills of denominations Rs. 1000 and above. In contrast to the 2016 measure which demonetized 86 percent of the currency in circulation, the 1978 measure only affected approximately 1.5 percent of the currency. As a result the disruption for the general public was limited. This measure was also opposed by the RBI governor at the time, Dr. I.G. Patel. Amongst other reservations, in Patel [2002] he held that "such an exercise seldom produces striking results" and "the idea that black money or wealth is held in the form of notes tucked away in suit cases or pillow cases is naïve." The move was marginally more successfully than the 1946 experience in that 86 percent of the demonetized currency was exchanged for lower denomination bills.

³Facts and the background surrounding this episode can be found on page 706 of volume 1 of the fascinating history of the Reserve Bank of India in of India [1970]

The remarkable part about the previous two episodes was the similarity of the motivation for them as well as the concerns regarding their efficacy in achieving the stated objectives. Lastly, the two previous episodes were similar in that most of the demonetized currency was successfully converted by the public. This rendered the objective of taxing undeclared income unfulfilled for the most part.

3 The Preparedness of the RBI

Prime Minister Modi announced the demonetization of 500 and 1000 rupee currency bills on November 8. It was later revealed that the Board of the RBI had met earlier that evening to consider a letter from the Ministry of Finance of the Government of India received the previous day along with a memorandum from a Deputy Governor recommending the demonetizing. The key reasons for the proposal cited in the government letter were that (a) between 2011 and 2016 the supply of 500 and 1000 rupee bills had grown by 76 and 108 percent respectively, while the Indian economy had only grown by 30 percent during this period; and (b) cash typically facilitated “black money.” The Board was further told that the measure was also intended to encourage greater financial inclusion and incentivizing greater digitization of the economy.

The Board approved the proposal, but not before making a few trenchant comments. It noted that the measure may not have the desired effect on black money, because most people do not hold undeclared wealth in cash. It further worried about the negative effects on growth that were likely to occur in the short run.

Possibly the most damning observation was that the primary fact on which the government had based its proposal — that the supply of 500 and 1000 rupee bills had far outstripped the growth rate of the economy — was simply wrong. The Board pointed out the embarrassing fact that the government had compared GDP growth in real terms with growth of currency supply in nominal terms. In fact, nominal GDP growth had summed to over 80 percent between 2011 and 2016 and hence, was in line

with the growth of the currency bills to be demonetized.⁴

The minutes suggest that the Board was assured that demonetization had been under discussion between the Reserve Bank of India and the government for the preceding six months, during which these issues had been considered. The ex-Governor of the Reserve Bank of India, Raghuram Rajan, whose term as governor had ended on August 31, 2016, has gone on record confirming this. He said that the Reserve Bank of India had indeed been consulted about demonetization and had advised the government against it.⁵

The preparation of the Reserve Bank of India for this massive operation came into severe focus almost immediately, as automatic teller machines (ATMs) ran out of cash for long periods of time across the length and breadth of the country, including the major metropolitan cities. Moreover, when the ATMs had supplies of the new currency, most of it, at least initially, was in the form of 2000-rupee denomination bills which was not helpful for daily transactions whose average cash value tended to be much smaller. The process of remonetizing the economy with the new currency bills proved to be slow and severely disruptive for regular commercial transactions.

A further source of concern regarding the preparedness of the Reserve Bank of India for a policy measure of this scale came in the form of the multiple circulars that it issued after the initial notifications announcing the demonetization. The Reserve Bank of India issued 57 official circulars between November 9, and December 31, 2016, which kept revising the conditions under which the public could make deposits, withdrawals, and exchanges of the demonetized currency. For example, over-the-counter exchange of demonetized currency was initially limited to 4000 rupees per person per day. This daily limit was first raised to 4500 rupees, then reduced to 2000 rupees before being completely stopped starting November 24. On withdrawals from bank accounts,

⁴See Minutes of the Five Hundred and Sixty First Meeting of the Central Board of Directors of the Reserve Bank of India, Reserve Bank of India circulars, 2016.

⁵See “Demonetization Was ‘Not a Good Idea’: Rajan,” The Hindu Business Line, April 12, 2018, <https://timesofindia.indiatimes.com/business/india-business/demonetisation-was-not-a-good-idea-raghuram-rajan/articleshow/63731405.cms>.

initially daily over-the-counter cash withdrawals were capped at 10,000 rupees with a weekly limit of 20,000 rupees. This weekly limit was subsequently raised to 24,000 rupees, while the over-the-counter limit of 10,000 rupees was withdrawn. Withdrawals via ATMs were initially restricted to 2000 rupees per day per card, before being raised to 2500 and then 4000 rupees per day per card.

The rules governing deposits were also constantly being revised. For customers with updated identity documentations, known as Know-Your-Customer or KYC norms, initially there was no capping on the amount to be credited to the account. For non-KYC compliant account holders, a maximum value of 50,000 rupees of demonetized bills could be deposited. On November 16, 2016, the Reserve Bank of India announced that all cash deposits exceeding 50000 rupees in value needed to be supplemented with a copy of the taxpayer identification card number (known as PAN card), in case the account did not have that information.

The combination of slow stocking of ATMs with the new cash, the spate of revised notifications, the limited supply of new 500 rupee bills and the relative excess of new 2000 rupee bills which were less useful for transactions purposes suggested that the institution that had been tasked with implementing the policy was not adequately prepared. Rather, the policy was thrust upon the Reserve Bank of India, which then scrambled to implement it as best as it could.

4 Achieving the Stated Goals

Amongst the various stated policy goals, three of the early ones were (a) to seize the black wealth created through undeclared income that was stored in the form of cash holdings); (b) increase the tax base by forcing people to exchange demonetized bills through the banking sector; (c) to convert the economy into a more digitized one that was less dependent on cash.

4.1 Seizing black wealth

There are two ways of seizing unaccounted income or black wealth. The first is by taxing it directly while the second is by bringing underground economy transactions into the tax net. We examine the effect of demonetization on both of these channels next.

4.1.1 Direct method: Taxing undeclared wealth

For the government to be able to directly seize black (unaccounted) wealth through demonetization, a necessary condition was that the share of demonetized currency that was returned to the RBI be significantly less than 100 percent. Given that over 99 percent of the old cash was returned, this direct method of capturing unaccounted wealth did not work. Nevertheless, in assessing whether the demonetization could have even been expected to achieve this goal, it useful to conduct a few back-of-the-envelope computations.

Black money has both a stock and a flow aspect. To assess the impact of demonetisation we need estimates for both. In a World Bank study, Schneider et al. [2010] estimate the parallel economy in India to be around 25 percent of GDP. This gives an estimate of the flow share of the underground economy.⁶ The wealth share of the underground economy is more difficult. Suisse [2014] estimates the wealth to GDP ratio in India to be around 2. If wealth creation is similar for both declared and undeclared income, this would suggest that black wealth in India is about 50 percent of GDP. It is likely larger since the saving rate out of undeclared income is probably greater than that out of declared income. Nevertheless, once can use these two estimates to form a

⁶The Schneider et al. [2010] estimate of the underground economy is an attempt to measure output that is deliberately not reported in order to avoid detection. It is different from the estimated informal economy share of Indian GDP of 45 percent. The estimated informal economy is part of India's official GDP estimates. The estimate for non-agricultural informal sector output is derived from enterprise surveys of unincorporated firms. Estimates of labor value added in the unincorporated sector derived from the enterprise surveys are combined with estimates of labor supply to the informal sector derived from household employment surveys to arrive at the estimate for non-agricultural informal sector output. Estimates for agricultural informal sector output are derived by combining land use statistics with data on cropping area by crop and cost of inputs.

rough estimate of the amount of black wealth and black income that demonetisation could have realistically been expected to mop up.

The demonetized money was about 10 percent of GDP. Even if the entire amount had been left un-exchanged it would have amounted to around 40 percent of the underground economy (or black income) and 20 percent of black wealth. Given the historical precedents we saw in Section 2 above, a working guess would have been 85-90 percent of the demonetised cash would be exchanged. Hence the maximum amount that this move could have been expected to garner was around 2-3 percent of the black wealth in India (or 4-6 percent of black income).

These estimates, which would have been easy to compute before enacting the policy, seem rather small given the extent of the disruption to the economy. Ex-post, the gains were close to zero since over 99 percent of the demonetized cash was exchanged by the public. At least on this dimension, the policy seems to have been poorly conceptualized.

4.1.2 Indirect method: The tax base effect

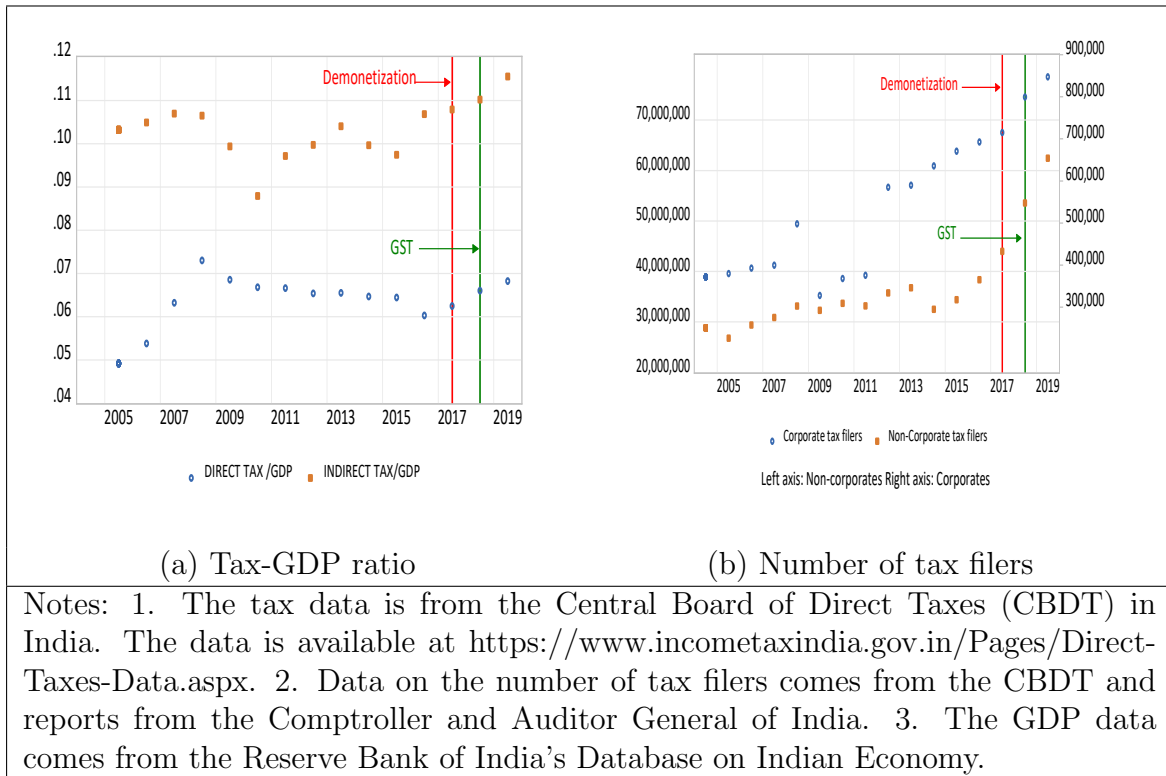
There is a second indirect way in which demonetization could seize unaccounted wealth. This is through its effect on the tax base. To see this note that there were two ways of exchanging old bills: (a) over-the-counter exchanges of old bills for new ones; and (b) depositing old bills in one's bank account and withdraw new cash at a later date. The RBI imposed severe restrictions on option (a) by limiting the maximum amounts that could be exchanged over-the-counter at banks. In as much as the public returned the old bills through option (b), depositors would be traceable. Hence, the government could potentially identify individuals/entities whose deposits were higher than the norm. The government could then examine the tax and income footprints of these depositors more closely to identify tax evaders and confiscate some of their unaccounted wealth.

We investigate this indirect effect of demonetization by examining the time-series behavior of two different indicators. The first is the evolution of the tax-GDP ratio in India before and after demonetization while the second examines the evolution of the

number of tax filers before and after demonetization.

Before proceeding further, it is important to note two caveats. First, India enacted a key tax reform in July 2017 when it introduced a Generalized Sales Tax (GST). GST replaced a complicated web of disparate indirect tax schemes that varied across states both in magnitude and extent. The GST reform was in the works for over a decade before getting passed by an act of Parliament and implemented in 2017. As a result of this, assessing the impact of demonetization on tax revenues accruing to the government is problematic since the two measures occurred in such close proximity. Second, we only have three years of tax data after demonetization. This makes it difficult to draw any definitive econometric conclusions.

Figure 2: Demonetization and Tax Revenues



Panel (a) of Figure 2 depicts the path of the Tax-GDP ratio in India from 2005. The figure plots the direct and indirect tax ratios separately. Direct taxes are primarily

composed of personal income taxes and corporate taxes. Indirect taxes are comprised of sales taxes, customs duties and excise duties.⁷ The graphs have drawn vertical lines to mark the fiscal years in which demonetization and GST were introduced. Demonetization occurred in fiscal year 2016-2017 while GST happened in fiscal year 2017-18.

There are a couple of features that are noteworthy. First, direct taxes typically account for just about a third of overall tax revenues in India. This is due to the very small number of individual and other non-corporate taxpayers in India (around 44 million in 2017, which is less than 10 percent of the labor force). The abysmal state of direct taxes has been a long running public finance concern in India. It partly reflects the low income of most of the work force, but is also symptomatic of widespread tax evasion.

Second, there does appear to be a mild increase in both the direct and indirect tax to GDP ratios in 2017 relative to 2016 (the fiscal year before demonetization). However, the figure also shows that both the direct and indirect tax ratios in 2018 were not very different from their past trends. Thus, the direct tax ratio in India has been stable between 6 and 7 percent since 2010. Its levels in 2018 and 2019 were 6.7 and 6.9 percent, respectively. Interestingly, these levels for the direct tax ratio are below the levels it reached in 2008-2009. The indirect tax to GDP ratio has been on a gradually rising path except for declines in 2014 and 2015. Neither demonetization nor GST appear to have pushed the indirect tax to GDP ratio off its recent trend path.

Based on this limited evidence of three years of post-demonetization tax revenue, it is hard to argue that demonetization induced a sharp increase in the collection of tax revenues. Clearly, a conclusive assessment of the impact of demonetization on tax revenues would require a few more years of data as well as decoupling the effects of GST from demonetization.

The tax revenue data does not distinguish between the tax rate and the number

⁷It is important to note that the tax data is annual. Since the Indian fiscal year goes from April 1 to March 31, the years in the figures refer to the fiscal year. Thus, 2015 refers to the fiscal year 2014-15 that ended on March 31, 2015.

of tax filers. The conjectured effect of demonetization was that it would bring more individuals and firms into the tax net by forcing them to exchange their demonetized cash through the formal banking system. Figure 2 examines this hypothesis by plotting the evolution of the number of tax filers in India, broken up by non-corporate and corporate filers.

The primary insight from Panel (b) of Figure 2 is that both total and corporate tax filers have been steadily rising since 2014. There doesn't appear to be any sharp increase in the number of tax filers in 2017 which was the year of demonetization. In fact, the figures suggest that there was a sharper increase in the number of tax filers in 2018, which was the year when GST was introduced, followed by a further increase in 2019. Of course, this could also be the consequence of a delayed response of some tax filers to demonetization.

The more general picture that emerges from Figure 2 is that there has been some improvement in public finances in India since 2016 but it is difficult to attribute this to demonetization since they appear to be consistent with a prior trend. Hence, the indirect effect of demonetization on seizing undeclared income seems muted, at best.⁸

4.2 Creating a more digitized India

The effect of demonetization on the second goal of converting India into a more digitized economy is trickier to evaluate. The desire for more digitization originates in the fact that the 80 percent of workers, 45 percent of GDP and a majority of firms in India operate in the informal, unregistered sector. These entities are mostly unregulated and untaxed. Despite the scale of the economy (1.25 billion people and a labor force of 600 million), the total number of registered tax payers in India are a measly 40 million.

⁸Another popular method of evaluating the response of taxes is tax buoyancy. Tax buoyancy measures the elasticity of taxes with respect to nominal GDP. An increase in tax buoyancy could thus indicate either an increase in the average tax rate or an increase in the number of people paying taxes. The conjectured effect of demonetization on bringing people into the tax net would typically operate through the second channel. The tax buoyancy numbers in India are so volatile that it is impossible to detect any trend or trend break from it. The tax buoyancy results are available from the author upon request.

This scale of informality in India creates multiple constraints for the economy. First, the small base for direct taxes creates an over-dependence on indirect taxation for government revenues. This often results in cascading distortions and efficiency losses. Second, the wide-spread informal organization of production impedes the penetration of banks and formal finance which, amongst other factors, tends to cause a preponderance of small-scale, low productivity establishments and firms. In as much as demonetization induces greater digitization of the economy, it would also reduce these constraints.

Clearly, the greater the proportion of transactions that are done through electronic payments such as bank-to-bank money transfers, debit cards and credit cards (for both business-to-business and business-to-customer transactions) the greater the digital footprints in the economy. How successful has demonetization been in increasing the speed of digitization of the economy?

If demonetization induced the Indian public to switch out of cash transactions then one should observe a rise in the velocity of money. Velocity of money is defined as the ratio of nominal GDP to the stock of money. It captures the speed with which money circulates in the economy in order to buy the flow of goods being produced. Naturally, the estimated value of velocity depends on the measure of money that one uses. The narrower the measure of money, the larger the measured velocity will be. Our interest though is not in the level of velocity but rather its movements around and after the time of demonetization.

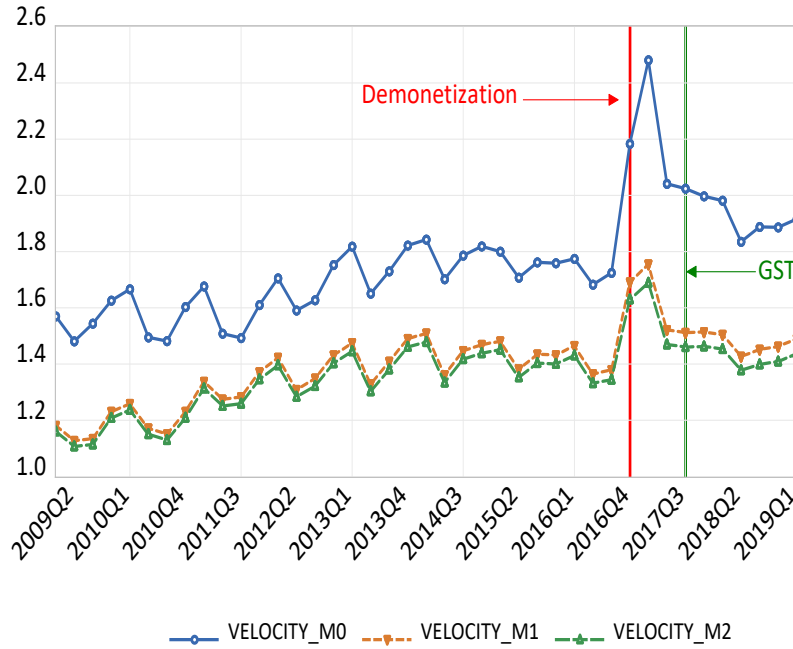
Figure 3 shows the measured velocity for three different monetary aggregates ranging from the M0 which is the narrowest to M2 which is the broadest.⁹¹⁰ Two features of the figure are worth noting. First, the biggest increase in velocity around the demonetization period was for M0, which is the narrowest measure of money. Velocity of M1 rose as well but less than for M0. Movements in the velocity of the broader

⁹As defined earlier, M0 denotes currency in circulation, plus deposits by bankers and others with the Reserve Bank of India. M1 is currency plus demand deposits with the banking system, while M2 is M1 plus savings deposits of post office savings banks.

¹⁰I should note that the velocity of money associated with broader measures of money than M2 showed almost no change in response to demonetization.

measures of money were extremely muted by contrast. Second, in three quarters time all the velocity measures returned to their near term trend levels. It would appear that initially there was some substitution from cash into other payment methods for transactions in response to the monetary shock. Once things normalized however, the public returned to their usual usage of cash for transactions purposes.

Figure 3: Demonetization and the Velocity of Money



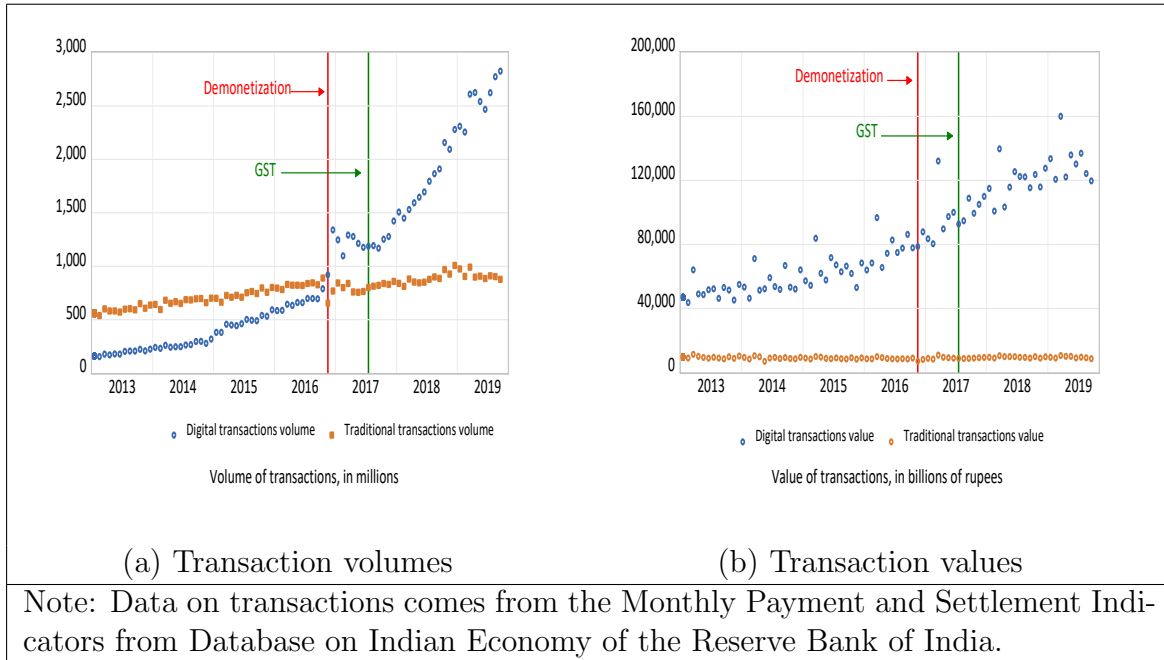
Note: Velocity is calculated as the ratio of nominal GDP to the relevant monetary aggregate. The source for data on GDP and monetary aggregates is the Reserve Bank of India's Database on Indian Economy.

An alternative approach to measure the effect of demonetization on digitization is to directly examine the time paths of digital transactions in the economy. Figure 4 examines the effect of demonetization on the digitization of the Indian economy by plotting the evolution of digital and traditional transactions, both in terms of volumes and value. Traditional transactions are transactions that involve either paper clearing or card transactions at ATMs while all other transactions are classified as digital.¹¹

¹¹Card transactions at ATMs are considered as cash-based transactions and consequently collected under

Panel (a) of Figure 4 shows the volume of both digital and traditional transactions while Panel (b) shows the corresponding transaction values.

Figure 4: Demonetization and Digitization



A few features of the transactions data are noteworthy. First, the volume of digital transactions had been steadily growing in India and had almost caught up with the volume of traditional transactions.¹² In fact, the volume of digital transactions had almost caught up with the traditional transactions by October 2016. The demonetization of November 2016 caused the volume of digital transactions volume to shoot up on impact while simultaneously causing a drop in the volume of traditional transactions. These patterns reversed themselves somewhat in subsequent months so that the *traditional transactions* volume returned to its pre-demonetization level. The volume of digital transactions did fall back somewhat from its levels during the demonetization months but, nevertheless, stayed well above its pre-demonetization level. Indeed, traditional transactions.

¹²This statement is subject to the caveat that we do not have independent data on the volume and value of cash transactions in the economy, except for the indirect evidence through the velocity of money that we presented in Figure 3 above.

digital transactions have consistently exceeded traditional transactions both in levels and growth rates since 2017.

Second, the value of digital transactions have been larger and have also been growing faster than traditional transactions for the past decade. However, demonetization does not appear to have affected the trends or levels of either digital or traditional transactions. In fact, the introduction of the GST reform also appears to have had no effect on the transactions values.

Since the volume of digital transactions has risen discretely post demonetization while the value of digital transactions has stayed on its trend path, it appears that demonetization may have induced the public to start using digital payment methods for smaller value transactions relative to the pre-demonetization period.

Two recent papers investigate the effect of demonetization on digitization more formally. Crouzet et al. [2019] examines the evidence to assess whether a large temporary shock to the availability of cash could induce a permanent adoption of electronic payment systems, i.e., induce digitization. Using data from a digital wallet firm called Paytm, the paper shows that the demonetization shock did induce a permanent increase in digitization. However, this adoption effect was crucially dependent on exposure to the demonetization shock. They identify areas further away from currency chest banks as areas that were most exposed to the shock.¹³ The paper shows that areas that were more exposed to the shock adopted digital payment methods more aggressively. Moreover, areas that adopted more aggressively were also areas that were more likely to have had higher adoption rates prior to the shock and were also likely to be closer to financial hubs. They interpret these findings as evidence of network effects in adoption of new technologies.

In a related paper, Aggarwal et al. [2019] uses a difference-in-difference approach to confirm the Crouzet et al. [2019] result that areas more exposed to the shock saw a larger increase in digital payments. They then show that adoption of digital payment

¹³The RBI distributes currency throughout the country using around 4000 currency chests. These currency chests are managed by individual bank branches.

methods was more muted in districts with more informal workers and rural households. They find that the positive digitization effects were concentrated in districts with fewer rural households and greater shares of salaried workers. Aggarwal et al. [2019] interpret this as suggesting that digitization was more likely to occur in response to a negative currency shock in areas that had the requisite infrastructure for digital payments already in place.

Relative to the data used by Crouzet et al. [2019], Aggarwal et al. [2019] differ along two margins. First, they not only use the location information about the currency chest but also use information about the currency disbursements made by the currency chests. Second, they use proprietary zip code level data on digital payments using debit and credit cards issued by a national vendor called RuPay.

The results of Aggarwal et al. [2019] and Crouzet et al. [2019], despite their somewhat different data and methods, point to a common finding. Specifically, the likelihood of demonetization having the desired positive effect on digitization and formalization of the economy depended crucially on the extent of formalization and digitization of the economy already. Put differently, areas that were informal and not very integrated with the formal financial network were unlikely to adopt digitization in response to a shock like demonetization.

5 Economic Costs of Demonetization

Demonetization clearly upended the daily life of Indians in a significant way. Starting from the immediate constraints faced by individuals and households of conducting daily transactions with a severely diminished supply of cash to the hurdles faced by informal firms trying to pay their suppliers and workers without the standard access to cash, anecdotal evidence abounds on the scale of the disruption. Indeed, newspaper accounts and industry reports at the time highlighted sharp job losses in small and medium manufacturing enterprises as well as huge increase in the demand for jobs under one

of India's biggest rural job guarantee schemes called Mahatma Gandhi National Rural Employment Guarantee Program (MNREGA).¹⁴

Estimating the effects of demonetization is difficult simply because the event is still relatively recent. Hence, the time series aggregate data is just not long enough to allow any credible econometric analysis of the economic consequences.

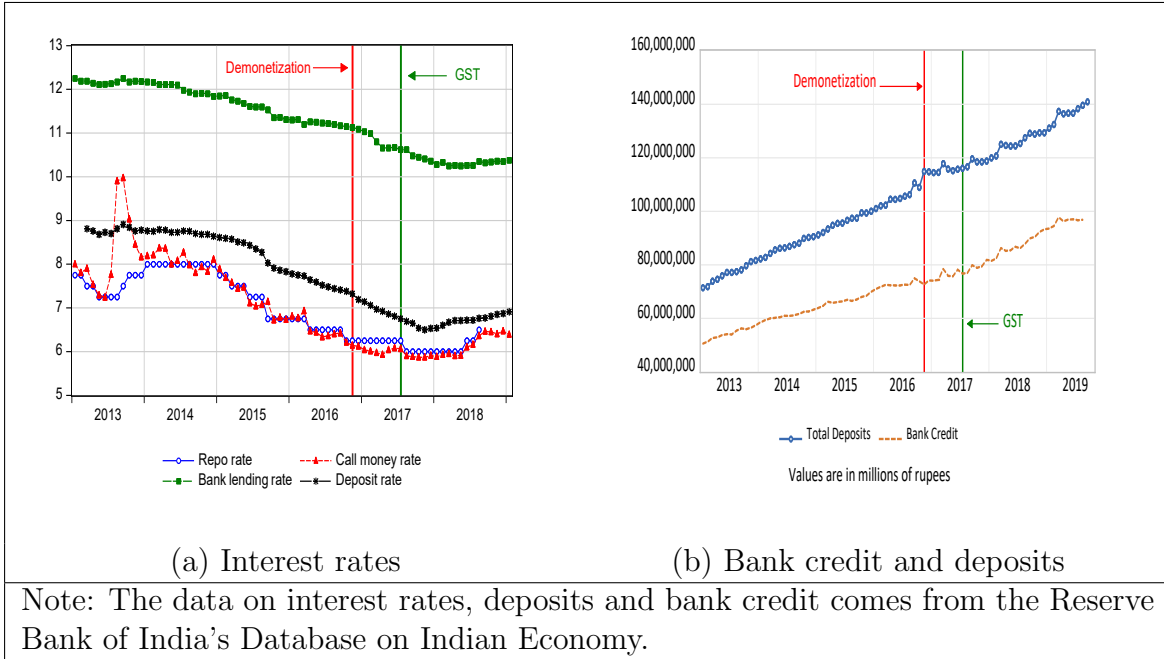
Figure 5 shows the path of four different interest rates in India since 2013 as well as the path of bank credit and bank deposits. The interest rates shown in the figure are the repo rate which is the policy rate of the Reserve Bank of India, the call money rate which is the rate at which short term funds are borrowed in the overnight money market, the bank lending rate and the bank term deposit rates. All the interest rates other than the repo rate are weighted averages.

Since banks were flush with deposits during the months immediately after the shock, one might have expected credit conditions to have become significantly easier. However, none of the interest rates showed any sharp movement off their long run trends around the demonetization date nor did bank credit pick up in any significant way. In fact, bank credit fell marginally on impact. This is somewhat surprising given that total bank deposits rose by almost 6 trillion rupees on impact of the shock.

The unemployment rate is another variable that one might look at for clues regarding the effects of demonetization. Unfortunately, there are no official statistics on unemployment in India currently. However, a private data firm called the Center for Monitoring the Indian Economy (CMIE) has started collecting high frequency labor force data since 2006 to fill this gap. The CMIE labor force survey is a longitudinal survey that samples around 160,000 households in three waves every year. Since the surveys are conducted nationally year round, they publish monthly, quarterly and annual labor force statistics. Figure 6 shows the monthly unemployment rate as reported by the CMIE since 2006.

¹⁴For a sample of newspaper articles describing these job losses in the informal sector, see "As rural hands return, NREGA demand spikes over 60 per cent," Indian Express, January 9, 2017, and "Manufacturing sector suffers from considerable job loss post note ban," Indian Express, January 17, 2017.

Figure 5: Interest Rates and Bank Credit Conditions

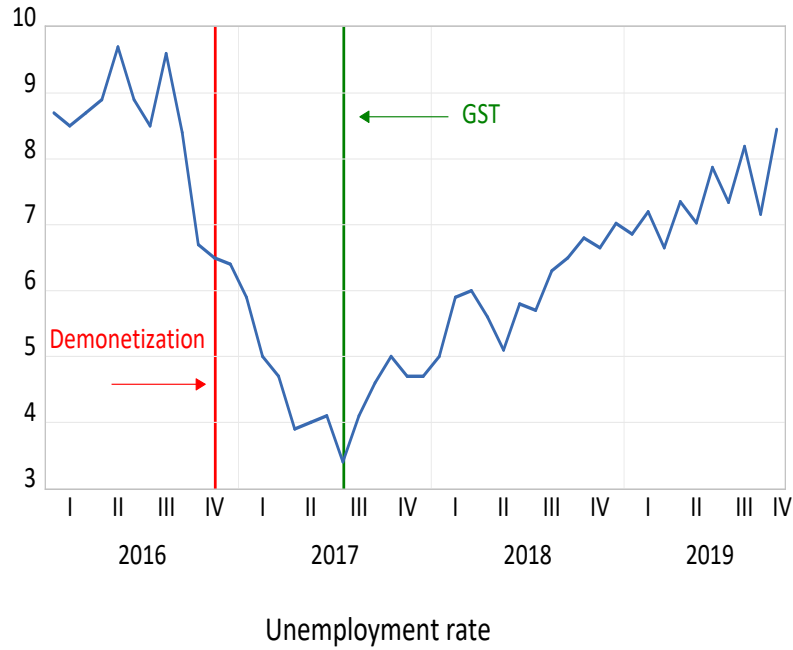


The figure reveals two interesting features. First, the unemployment rate in India was declining throughout 2016. There is hardly any noticeable effect of demonetization on this declining trend. Second, the unemployment rate begins to rise steeply in India after the introduction of the GST reform.

While Figure 6 might suggest that demonetization had a very tepid effect on unemployment in India, Vyas [2017] presents evidence suggesting that underneath the declining unemployment rate trend though is a steep decline in the labor force that coincides with the demonetization quarter. Using the CMIE monthly and quarterly labor force statistics, Vyas [2017] documents two facts. First, relative to the three month period immediately preceding demonetization (July – October 2016), the number of employed individuals declined by 3.5 million during the period November 2016 – February 2017.

Second, the CMIE survey also found a dramatic 15 million decline in the size of the labor force between these two periods. Most of this decrease in the labor force

Figure 6: Demonetization and Unemployment



Note: The source for unemployment statistics is the Center for Monitoring the Indian Economy (CMIE).

was accounted for by a fall in the number of individuals who identified themselves as unemployed. In other words, Vyas [2017] suggests that the period of demonetization coincided with a sharp increase in the number of discouraged workers who simply exited the labor force completely.

Researchers have attempted to get around the limitations of the time-series evidence by exploiting the cross-sectional heterogeneity in India. Two recent papers that take this cross-sectional approach to identifying the effects of demonetization are Chodorow-Reich et al. [2018] and Karmakar and Narayanan [2019]. Both papers attempt to measure the costs of demonetization by identifying some exogenous cross-sectional variation in exposure to the shock in order to draw causal inference.

Chodorow-Reich et al. [2018] use the variation in remonetization at the currency chests around the districts of India after the demonetization notification as exogenous

and random variation. They then measure the cost of demonetization by regressing the cross-section outcome variables that vary across districts on the remonetization of the currency chests and other controls. They use a slew of different outcome variables that include night lights data, labor force statistics, digitization rates, and others. Based on their estimated cross-sectional responses, they estimate that demonetization induced at least a 2 percentage points decline in GDP in the quarter of demonetization relative to the counterfactual of no-demonetization. They also find that, like the results on digitization described above, the output costs of demonetization dissipate over the subsequent months implying that the effects were transitory.

A potential problem with the identification in Chodorow-Reich et al. [2018] is the assumption that the remonetization at the different currency chests were exogenous. The validity of the causal inference rests crucially on this identifying assumption. While the paper presents evidence that the rate of distribution of new cash across districts seemed mostly unrelated to variations in the pre-demonetization levels of different variables, one might nevertheless worry that the distribution of the new cash around the different currency chests may not have been completely random. Indeed, the 2017 RBI annual report (see of India [2017]) itself suggests that the distribution of new currency followed a prior plan. Moreover, it would be realistic to expect that the RBI responded to incoming status reports in choosing the allocations of the freshly minted currency during the 52 days between November 9 and December 31 when the currency exchange was permitted.

The work by Karmakar and Narayanan [2019] tries to get around this by using an alternative identification scheme. They look at a panel data set on Indian households with information on their asset holdings as well as host of other indicators such as income, consumption, and others. Their identification scheme is to contrast the response of households who did not have bank accounts on the date of demonetization versus those that did have them. The assumptions underlying this is twofold. First, having a bank account before the demonetization shock was clearly exogenous to demoneti-

zation. Second, the real effects of the shock would likely go through the transactions value of cash. Since access to the new currency was much easier if one had a bank account, the two assumptions jointly imply that those with bank accounts would have smaller disruptions than those without.

The principal findings of Karmakar and Narayanan [2019] are that in December 2016 (the month immediately following the demonetization shock), the 17 percent of households that didn't have bank accounts experienced 2 to 7 percent lower consumption than the control group of households with bank accounts, with the size of the effect varying by the initial asset levels of the household. Moreover, they also found that households without bank accounts tried to find alternative sources of borrowing from various sources at higher rates relative to households that had bank accounts.

6 Conclusion

The demonetization of 86 percent of the outstanding currency in circulation on November 8, 2016 by the Government of India was arguably one of the largest monetary shocks to ever hit the Indian economy. At the end of the exercise, over 99 percent of the demonetized currency was successfully returned by the public in exchange for either new currency bills or claims to new currency. During the transition however, it caused almost two months of acute disruption of basic economic activity in a country heavily dependent on cash transactions.

The effect of demonetization in terms of its stated goals were limited, at best. Because almost all the demonetized currency was returned to the central bank, it failed in its goal of taxing undeclared income and black (undeclared) wealth. Moreover, available estimates of the circulation of counterfeit currency at the time of demonetization suggested that it was minuscule to start with. Relative to past trends, demonetization does not appear to have had any significant effect on the tax base. There does, however, appear to have been a positive, albeit muted, permanent increase in the degree of

digitization of the economy. These conclusions though should be viewed as tentative given that we only have three years of data post-demonetization.

The costs of demonetization are difficult to estimate. However, there are clues. As an example, the large increase in bank deposits during the demonetization period caused a surplus of loanable funds. However, there was almost no impact of this either on the amount of bank loans or in the average lending rate. This probably suggests that the economic disruption induced by demonetization may have caused a deterioration in the perceived creditworthiness of the average borrower.

Existing research on estimating the costs using disaggregated data suggests that it could have lowered output by as much as 2 percentage points during the demonetization quarter. Almost all work in this area also suggests that the costs were temporary and lasted at most two quarters. This is not a surprise since the monetary shock was temporary and the remonetization of the economy was complete in less than two quarters. Available labor market statistics suggest that up to 3.5 million jobs may have been lost during the three months following demonetization while 15 million people may have exited the labor force.

It is surprising, however, that the aggregate statistics do not reveal much effect of the demonetization shock. Perhaps the most striking is the official aggregate GDP statistic for fiscal year 2016-17. On January 31, 2019, India's Central Statistical Organization released a revised GDP series which estimates real GDP growth in the fiscal year 2016-17 to have been 8.2 percent, the highest since 2011-12. This implies that India's annual GDP growth *increased* by 20 basis points in the year of demonetization relative to the previous year.

It is possible that growth in the non-demonetization quarters, particularly the period April-September 2016 saw very rapid economic growth that was partially undone by the negative effects of demonetization during the rest of the year. On the face of it however, the dissonance between the available cost estimates of demonetization from the disaggregated studies and the estimated increase in aggregate GDP growth

from the official statistics for that year represents a puzzle which requires a closer examination.¹⁵

Demonetization probably had some ancillary effects as well. For example, fighting elections in India requires cash and there was a major election in the most populous Indian state, Uttar Pradesh, scheduled for February 2017. Demonetization almost surely would have affected the parties that were fighting the Uttar Pradesh election, though the extent of it would likely vary across national parties and regional parties. Little research exists on the political economy dimension of demonetization, and it would certainly be a worthwhile area of future research.

Another issue of importance is the distributional impact of demonetization. Demonetization was packaged as a measure against relatively wealthy individuals who had accumulated undeclared wealth. However, anecdotal accounts suggest that it may instead have disproportionately affected the relatively poorer households working in the informal sector. As more disaggregated household survey data becomes available over the next few years, this would be an interesting issue to study.

More generally, the Indian experience suggests that demonetization is likely to have a better chance of achieving the goals of fighting crime and tax evasion if larger denomination bills are de-notified. In India the 500 rupee bills were heavily used for daily transactions. Arguably, the disruptive effects of demonetization would have been more limited if the government had demonetized just the 1000 rupee bills. Governments contemplating such moves in the future may be better advised to demonetize bills large denominational bills rather than those that are heavily used for daily transactions.

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¹⁵Intriguingly, the older data prior to the data revision showed a 1.1 percentage point reduction in the annual growth rate in 2016-17 relative to the previous fiscal year, which was more in line with the disaggregated data. For a description of the revision, see “Revised GDP Data Shows Year of Demonetization Was Best For Narendra Modi Government,” Times of India, February 1, 2019, <https://timesofindia.indiatimes.com/business/india-business/revised-gdp-data-shows-year-of-demonetisation-was-best-for-narendra-modi-government/articleshow/67782001.cms>.

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