Demonetisation: Some Theoretical Perspectives

Waknis, Parag

University of Massachusetts Dartmouth

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Parag Waknis[1]

There has been a lot of commentary on impacts of the recent demonetisation in formal as well as informal media like the blogosphere as people try to make sense of this huge deliberate monetary shock to the Indian economy. There also have been articles based on detailed analysis as well as opinion pieces by economists like Basu (2016), Chanda (2016), Chandrashekhar (2016), Dasgupta (2016), Rai (2016) among others. In what follows, I contribute some theoretical perspectives based on essentiality of money, and segmented markets model to this literature, with the later incorporating the formal-informal structural duality of the Indian economy.

For the purpose of this article, demonetisation is understood as deeming either some or all of the currency denominations ineligible to be used in transactions. Money supply is understood as M2 which is sum of currency in circulation, demand deposits with commercial and cooperative banks, interbank deposits, and post office savings deposits.

Money and the possible set of allocations:
It is generally accepted that money facilitates more trades and improves welfare than what is possible without it. Monetary theorists would call this as money being 'essential' because the total set of allocations achievable with money is much bigger than the one achievable without money (Wallace 2001, Nosal and Rocheteau, 2011, pp. 47). From this perspective, demonetisation of November 8, 2016 definitely reduced economic wellbeing of Indian people overnight. The effect also may not be just this one-time reduction in the achievable set of transactions but also the ones in immediate future. While current markets in goods and services facilitate current consumption and investment, credit markets allow economic agents to smooth production and consumption over time. A pervasive reduction in liquidity therefore, however short term, is bound to adversely affect both current and future consumption and investment decisions. This effect could be pronounced in case of the Indian economy where a huge proportion of transactions are in cash including cash used for lending through informal channels like money lenders as well as microfinance.

There would be some benefits as the set of allocations that are implemented by cash in India include the ones that use counterfeit currency and the cash used to finance terrorism. These transactions will cease making a positive impact on the economy. However, draining cash is not the long term solution for counterfeiting or curtailing terrorism.

Currency Deposit Ratio and Money Multiplier:
Some people have argued based on the money multiplier model that money supply would increase because of demonetisation. Because currency in circulation would go down and deposits would go up, for

given reserve ratios, banks will have more money to lend. If the money multiplier model is taken literally then this analysis is correct. The real question is how far could we trust this model? Some research suggests that there are significant reasons to suspect it (See for example Carpenter & Demiralp 2012). If reserve requirements are not binding i.e. if banks are already holding excess reserves then a further increase in deposits would not lead to an increase in money supply. Secondly, the money multiplier model may not accurately describe how banks create money. For example, describing banking in England, McLeay et al (2014) argue that banks in the modern economy create money through loans and their ability to do so depends on competitiveness of the banking industry, the availability of profitable investment opportunities, and not necessarily on availability of deposits. Any shortfall in terms of maintaining reserves with the central bank is met through active borrowing and lending in the call money market or borrowing from the central bank using something like liquidity adjustment facility (LAF). This does not mean that banks can create unlimited loan deposits- the RBI can and does control it by changing the repo/reverse repo rate through the LAF. If the money creation process described by McLeay et al (2014) is applicable to Indian banking sector as well, then money multiplier model is not the correct way to understand how banks contribute to money supply. Also, the increase in deposits because of demonetisation is to be deemed temporary. This combined with a 100% incremental CRR on new deposits and no change in the menu of profitable investment opportunities, it is highly unlikely that banks would create new loans/deposits and increase the money supply.

Segmented Markets and Demonetisation:
So far we have looked at an analysis using just aggregates without worrying about how the response of people to demonetisation would affect those aggregates. Which model could we use to conduct such analysis? Clearly, from the use of cash versus electronic payments to settle payments and debt, we have two sets of firms and consumers in the Indian economy- one which predominantly uses cash and the second that depends on electronic payments and formal credit markets. Therefore, to understand the effects of demonetisation on the Indian economy from this point of view, the best suited model is that of segmented markets based on the work by Grossman & Weiss (1983), Rotemberg (1984), and Lucas (1990). In what follows, I have used a simpler textbook version (Williamson, 2011) of the segmented model based on the above work . Segmented markets model is a flexible prices and wages model but still displays monetary non-neutralities for short run. It is a micro-founded model where agents in the economy base their decisions on constrained optimization. The decisions and assumptions are as follows:

1. Consumers optimize on two dimensions:
    a. Current consumption and Leisure given the wage rate and goods prices. This gives rise to the standard upward sloping labor supply curve (N^s)
    b. Current and future consumption given the real interest rate, r. This gives rise to savings curve in market for financial capital and changes in the real interest rate affect ($N^s(r)$)

2. Firms optimize to choose two variables:
    a. Current demand for labor taking wages as given. This gives rise to labor demand curve (N^d) for a given capital stock and total factor productivity.
    b. Current demand for capital given the interest rate and its marginal productivity.

3. Output demand (Y^d) comes from equilibrium demand for current consumption and investment goods and government expenditure and is affected by changes in real interest rate through consumption and investment expenditure.

4. Output supply (Y^s) is determined by total employment for a given real interest rate and the production function.

5. Money demand (M^d) is a function of price level and output. Money supply (M^s) is fixed by the central bank.

6. Government balances the budget.

7. Competitive Equilibrium: All markets clear.

In the standard version of the segmented markets model, it is assumed that only firms and some consumers have access to formal financial markets. If the central bank conducts an open market operation to increase money supply, the interest rate declines to make it attractive for firms to hold the money. As firms are the ones to get access to money first they decide to hire more labor and then all the real effects follow. Segmented market models are characterized by a short term liquidity effect as the real interest declines because of increase in money supply.

The model can be adapted to suit the current economic situation in India in the following way. Demonetization means decrease in money supply not associated with open market operations by the RBI. Let us say there are two sets of consumers and firms as argued above[2]. One set is of firms and consumers that are connected with the formal financial markets and settle payments and debt through electronic transfers. This will represent firms and workers in the organized formal sector. The second set of consumers and firms are unconnected and do not transact through formal credit markets or electronic payment systems and settle their payments and debt through cash. This group represents firms and workers from the unorganized or informal sector. For simplicity we assume that there is not much spillover between the connected and unconnected economic agents. So market segmentation works through goods markets and access to formal financial markets.

What would be the effect of demonetisation in such a setting that closely represents the structure of Indian economy? Let us work with graphs to figure it out. We will start with the set of unconnected consumers and firms. Assume that the economy is in equilibrium to start with. The following diagram shows the effect.

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[2] The terminology of "connected" and "unconnected" consumers is from Williamson (2009).

Demonetization in Segmented Markets Model: Unconnected Firms and Consumers
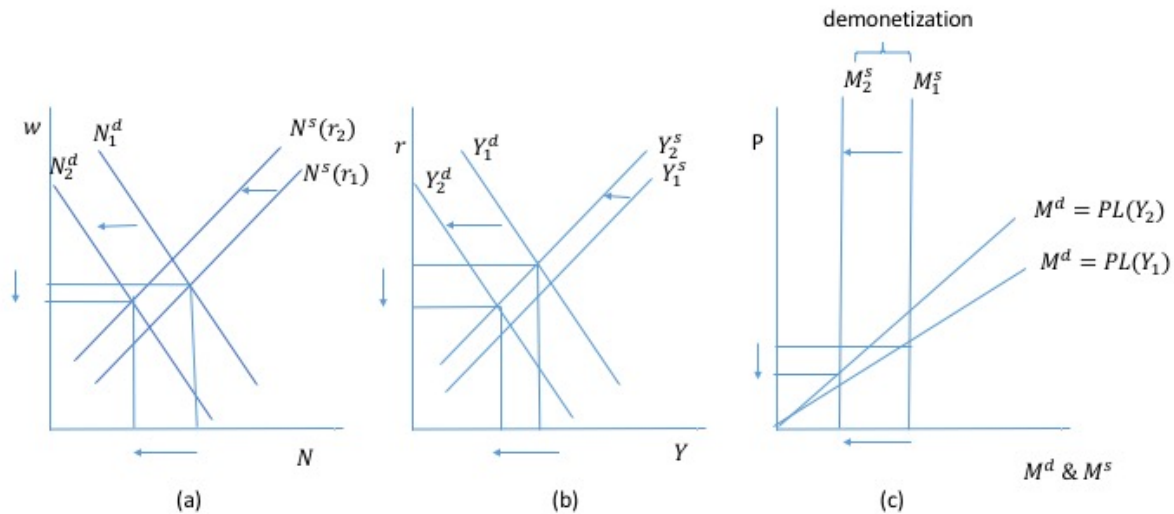
Panel (a) shows the labor market, (b) the goods and services market and (c) the money market. Demonetisation shows up as reduction in money supply in the economy. So the money supply curve shifts left in panel (c). Because the unconnected consumers and firms have less cash now, output demand will go down. This is because consumption falls and any investment plans are stalled. Note that this shift could be dampened by credit arrangements that consumers have for example, credit with the neighborhood grocery stores. The left shift in the output demand curve leads to a reduction in the real interest rate. In panel (a), this affects the labor supply curve. Reduction in real interest rate reduces the opportunity cost of current labor. Or simply put people have to skip work to stand in line to change currency notes. The second effect is on the labor demand side. The unconnected firms do not have enough cash to pay wages and therefore they reduce their labor demand or shut down. In all, employment declines and output supply curve also moves to the left reinforcing the decline caused by falling aggregate demand. Because output falls, eventually there will be a decline in the demand for money arresting some decline in aggregate price level caused by demonetisation. To summarize the unconnected economy experiences a significant decline in employment, output, real interest rate and aggregate price level.

What about the connected economy? The following graph shows the effect on the connected consumers and firms.

Demonetization in Segmented Markets Model: Connected Firms and Consumers

(a)   (b)   (c)
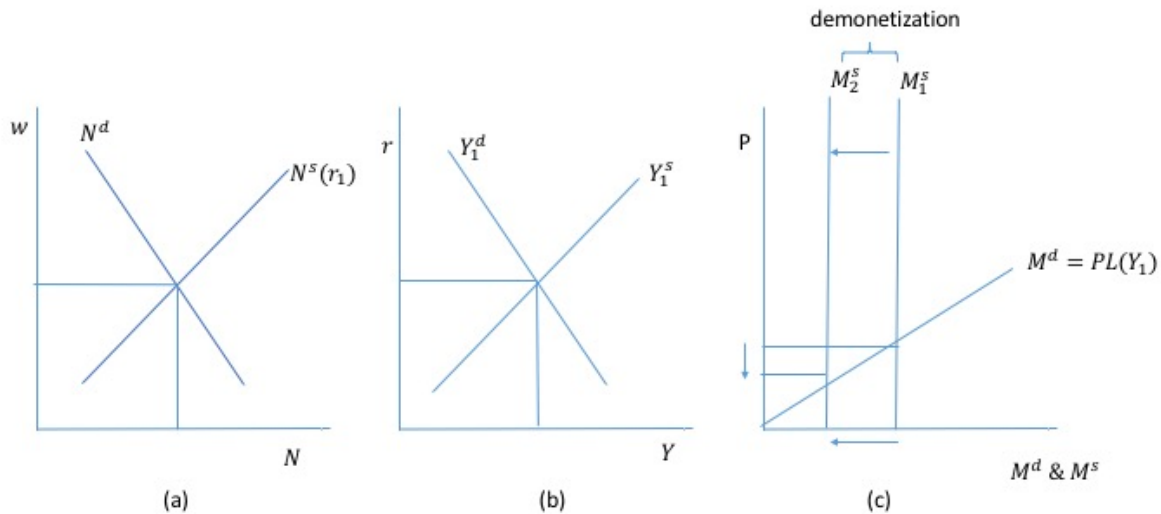
As you can see in the diagram for the connected consumers and firms, not much happens. Demonetisation shows up as decline in money supply but this decline is primarily in cash. These consumers and firms have access to electronic payment systems and credit markets which allows them to ride the shortage of cash with minor inconveniences. They also experience decline in price level and there could be an increase in output demand. As there is no change in real interest rate or because organized firms do not have any issues paying wages- wages and salaries get credited to employee bank accounts- there is not much change in the formal labor market either.

What is the total effect on the economy according to this model? It depends on relative contribution to the GDP of the connected and unconnected sectors. The unconnected sector representing the informal sector here employs about 75 to 80% of the total labor (Ghani et al 2104) but contributes only roughly 20% to the GDP (Enste & Schneider 2000). As has been shown and argued by literature on informality (See LaPorta & Shleifer, 2008, 2014), informal firms are significantly less productive than their formal counterparts. Therefore, the model seems to suggest that the impact on output or real GDP might not be as dramatic as suggested by the diagram on unconnected firms. However, there are several factors that would revise the estimated damage upwards compared to the benchmark scenario.

One, the human impact in terms of reduced consumption, employment and wages would be experienced by larger section of population. Second, some of the firms in unconnected or informal sector that shut down may not actually revive after money supply with new currency is restored (Shah 2016). Third, in the simple model above, we assumed that there is no relation between the connected and unconnected economy which is obviously not true. A lot of raw material suppliers to the formal connected firms are from the informal sector. If they suffer because of drained out cash, it would affect output supply for the overall economy. Some of this effect could be permanent as not all the firms that shut down would be revived.

Fourth, some of the output from the informal sector (agricultural produce, textiles, and some fast moving consumer goods) is consumed by the connected consumers as well. If they cannot buy these goods and services because of temporary shortage in cash, there will be some fall in their consumption demand.

Some of this negative effect on consumption of goods and services produced in informal sector by the formal sector may be dampened by adoption of payment systems like 'paytm'. Lastly, both formal and informal firms depend on informal credit markets to finance their short term expenditure. Typically, such lending is primarily cash based and therefore will have adverse impact on the running of formal firms as well.

Thus, despite the mitigating factors contributed by connected or formal economy, the above analysis suggests that Indian economy would be depressed for at least a few quarters. As the money supply is restored, the economy will not bounce back until all the adjustments the surprise demonetisation forced on consumers and firms pan out. I doubt anything would change in terms of future flows to the black economy as they depend on factors like complexity of tax system, labor market regulations, and trust in the ability of the government to provide public goods among others (See Enste & Scheider (2000) and LaPorta & Schleifer (2014) on causes and determinants of informality).

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