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Demonetisation through Segmented Markets: Some Theoretical Perspectives

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The decision to demonetise 86% of India's currency has been widely and substantially debated by notable scholars of political science and economics. This article wishes to add to that debate, by focusing on macroeconomic theory and how the policy decision affects the organised and unorganised sectors of the Indian economy—provided certain assumptions remain in place. The following analysis is based on the money-multiplier theory and the segmented markets model of economic and monetary policy analysis.

There has been a lot of commentary on the impacts of the recent demonetisation policy in the 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 have also 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 the essentiality of money and the segmented markets model, to this literature. 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 the sum of currency in circulation, demand deposits with commercial and co-operative 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 transactions achievable with money is much larger, than the one's achievable without money (Wallace 2001; Nosal and Rocheteau 2011: 47). From this perspective, the demonetisation decision of 8 November 2016 definitely reduced the economic well-being of the Indian people overnight. The overall effect also may not just be

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this one-time reduction in the achievable set of transactions/allocations, but also a reduction in the ones taking place in the 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, in the short-term, is bound to adversely affect both current and future consumption and investment decisions. This effect could be pronounced, as in the case of the Indian economy where a huge proportion of transactions is in cash— including, cash used for lending through informal channels like moneylenders as well as microfinance institutions.

There would be some benefits, as the set of allocations that are implemented by cash include ones that use counterfeit currency and those that finance terrorism. Once, these transactions cease, they will make a positive impact on the economy. We do have to note that draining cash is not the long-term solution for preventing counterfeiting or curtailing terrorism.

Currency Deposit Ratio and the Money Multiplier

Some people have argued that, based on the money-multiplier model, the money supply would increase because of demonetisation. Because as currency in circulation would go down and deposits would go up, for a given reserve ratio, the banks will have more money to lend. If the money-multiplier model is taken literally, then this analysis is correct.

However, the real question is how far can we trust this model? Some research suggests that there are significant reasons to suspect it (Carpenter and Demiralp 2012). The reason is pretty simple: if reserve requirements are not binding, that is, 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, when describing banking in England, McLeay et al (2014) argued that banks in the modern economy created money through loans, and that their ability to do so depended on the competitiveness of the entire banking industry, the availability of profitable investment opportunities, and not necessarily on the 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 markets or through borrowing from the central

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bank using something like the liquidity adjustment facility (LAF). This does not mean that banks can create unlimited loan deposits— the Reserve Bank of India (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 the Indian banking sector, then the money-multiplier model is not the correct means by which we understand how banks contribute to the money supply. Also, the increase in deposits because of demonetisation is deemed to be temporary. This combined with a 100% incremental cash reserve ratio (CRR) on new deposits and no change in the menu, of profitable investment opportunities, means that it is highly unlikely that banks would create new loans through the new deposits and therefore, 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, through the use of cash and electronic means 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 the segmented markets model—based on the work by Grossman and Weiss (1983), Rotemberg (1984) and Lucas (1990).

This article works with a simpler textbook version of it as presented in Chapter 12 of Williamson (2011). The segmented markets model is a flexible, prices and wages model which displays monetary non-neutralities during the short-run. It is a micro-founded model, where agents in the economy base their decisions on constrained optimisation.

The decisions and assumptions are as follows:

- Consumers optimise on two dimensions:

  —current consumption and leisure given the wage rate and goods prices. This gives rise to the standard upward sloping labour supply curve (N^s).

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—current and future consumption given the real interest rate, *r*. This gives rise to the savings curve in the market for financial capital and changes in the real interest rate affect ($N^s(r)$).

- Firms optimise to choose two variables:

  —current demand for labour taking wages as given. This gives rise to labour demand curve (N^d) for a given capital stock and total factor productivity.

  —current demand for capital given the interest rate and its marginal productivity.

- Output demand (Y^d) comes from equilibrium demand for current consumption, investment goods and government expenditure respectively and is affected by changes in real interest rate through consumption and investment expenditure.
- Output supply (Y^s) determined by total employment for a given real interest rate and the production function.
- Money demand (M^d) is a function of price level and output. Money supply (M^s) is fixed by the central bank.
- Government balances the budget.
- 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 and makes it attractive for firms to hold onto money. Since firms are the first ones to get access to money, they decide to hire more labour, after which, all the real effects follow. Segmented market models are characterised by a short-term liquidity effect as the real interest declines because of an increase in the money supply.

Here, I adapt the model to suit the current economic situation in India. Demonetisation means that a decrease in the money supply is not associated with open market operations by the RBI. Let us say there are two sets of consumers and firms as argued above1. 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 organised formal sector. The second set, of consumers and firms are unconnected and do not transact through formal credit markets or through an electronic payment systems

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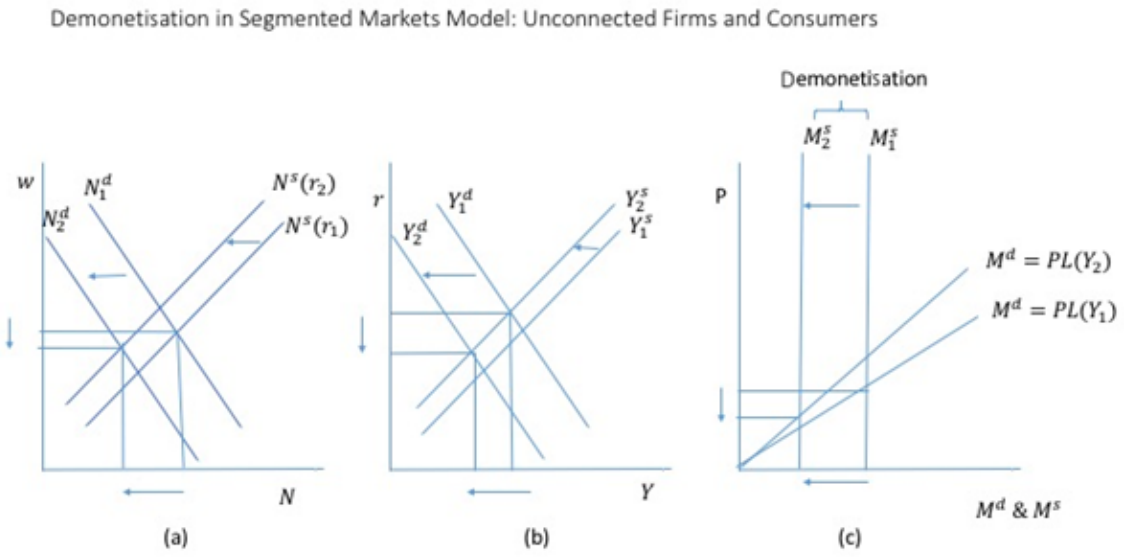
but, they settle their payments and debt through cash. This group represents firms and workers from the unorganised or informal sector. For simplicity we assume that there is not much spill-over between the connected and unconnected economic agents. So market segmentation works through the goods markets 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 begin with. The following diagram shows the effect.



Panel (a) shows the labour market; (b) the goods and services market and (c) the money markets:

- Demonetisation shows up as reduction in money supply in the economy. So the money supply curve shifts left (panel c). Because the unconnected consumers and firms have less cash now, output demand will go down (Y_1^d to Y_2^d). This is because consumption falls and any investment plans are stalled. Note that this shift could be dampened by credit arrangements that consumers have with their neighbourhood grocery stores.
- The left shift in the output demand curve (panel b) leads to a reduction in the real interest rate. In panel a, this affects the labour supply curve ($N^S(r_1)$ to $N^S(r_2)$) — reduction in real interest rate reduces the opportunity cost of current labour. Or simply put, people have to skip work to stand in line to exchange/deposit their old

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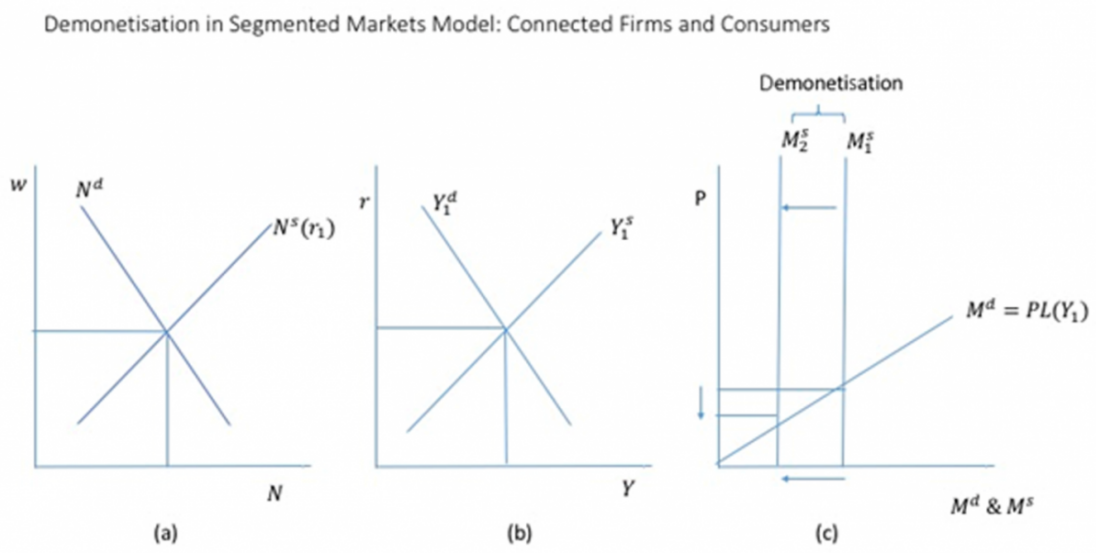
notes.

- The second effect is on the labour demand side. The unconnected firms do not have enough cash to pay wages and therefore, they reduce their labour demand or shut down. In all, employment declines and the output supply curve also moves to the left (Y_1^S to Y_2^S) reinforcing the decline caused by falling aggregate demand in panel b (Y_1^d to Y_2^d). Because output falls, eventually there will be a decline in the demand for money, arresting some decline in the aggregate price level caused by demonetisation. To summarise the unconnected economy experiences a significant decline in employment, output, real interest rate and aggregate price levels.

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



As you can see in the diagram, for the connected consumers and firms, not much happens. Demonetisation shows up as a decline in money supply but this decline is primarily in cash. These consumers and firms have access to electronic payment systems and the credit markets, which allows them to ride the shortage of cash with minor inconveniences. They also experience a decline in the price level, which means that there *could* be an increase in output demand, in the near future. As there is no change in real interest rate or because organised 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 labour market either.

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What is the total effect on the economy according to this model? It depends on the relative contribution to the gross domestic product (GDP) of the connected and unconnected sectors, respectively. The unconnected sector, representing the informal sector here, employs about 75% to 80% of the total labour employed in the economy (Ghani et al 2013), but it contributes roughly only 20% to the GDP (Enste and Schneider 2000). As has been shown and argued by literature on informality (LaPorta and 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 (GDP adjusted for inflation) 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 a larger section of the population. Second, some firms in the unconnected or informal sector that shut down may not actually revive after the money supply with the new currency is restored (Shah 2016). Third, in the simple model above, we assumed that there is no relationship between the connected and unconnected economy, which is obviously not true. A lot of raw material suppliers to the formally connected firms are from the informal sector. If the latter suffers, because of drained out cash, then there would be an effect on the total output supply for the overall economy. Some of this effect could be permanent, as not all the firms that shut down would ever 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 a temporary shortage in cash, there will be a fall in their consumption demand.

Some of this negative effect, on the consumption of goods and services produced in informal sector by the formal sector, may be dampened by the adoption of electronic 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 the connected or formal economy, the above analysis suggests that the Indian economy will be depressed for at least a few quarters. As the money supply is restored, the economy will not bounce back until all the adjustments, post the surprise demonetisation decision forced onto consumers and firms, pans out. I doubt anything would change in terms of future flows to the black economy as

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they depend on factors like the complexity of the tax system, labour market regulations and trust in the ability of the government to provide public goods among others.[2]

Notes

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

[2] See Enste and Scheider 2000 and LaPorta and Schleifer 2014 on causes and determinants of informality.

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