Impact of Suddenly Complete Demonetization in India: A Microeconomic Analysis

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Abstract

Majority of the impact studies of demonetisation in India have considered macroeconomic framework. This paper has tried to explain the impact of suddenly complete demonetisation in India considering the microeconomic framework. Explaining the choice problems of the representative agents of three categories of consumers this paper reveals that demonetisation reduces the welfare of the middle class and informal labour class people. However, utility of rich class people may remain unchanged. The analysis explains how demonetisation can trigger off the unemployment problem. Demonetisation results into an adverse selection problem where although the 'rich' are targeted but leads to a negative impact on the poor, thereby expanding the rich-poor inequality forcing the poor more downwards in terms of income and utility.

Keywords*: Demonetisation, Microeconomic Theory, India, Unemployment*

1. Introduction

Government of India all of a sudden demonetised ₹500 and ₹1000 notes with the newly printed ₹500 and ₹2000 notes on 8th of November, 2016. The announced goals of this sudden, full and direct demonetisation were to rid the economy of fake currency, terrorist funding and hit out at tax evaders holding illegitimately acquired assets in the form of high value currency notes. Being a developing nation, India mainly comprises of a widespread poor or shadow economy and working middle class. The esteemed top class corrupted people were meagre in number and even then it is most unlikely that they save their excess income in the form of cash. Aiyar (2016) stated that less than 2% of historical black hoards are held in cash and remaining have been converted into gold, real estate, financial investments or stored in the foreign banks. According to a report of the National Institute of Public Finance and Policy (NIPFP) (2015) black economy constitute three quarters of India's Gross Domestic Product (Reported in The Hindu, 4th Aug, 2014). Also reported that each year almost three percent of the black money departed from the country during 2004-1013. The overwhelming stock of black money has been laundered into white ages ago. Thus this 'cash wash' initiative may lead to utter failure in the short run.

Even if the government's intentions are laudable, the sudden disappearance of a substantial part of currency notes (around 86%) from the economy has caught the population by surprise and unleashed an unprecedented monetary turmoil. Unavailability of sufficient cash creates long queues in front of ATMs or Banks. People are tensed and harassed on the idea of devoid of cash and were unable to purchase their daily necessities. Restrictions on cash withdrawal and exchanges forced the poor or middle class to waste their time and energy in the long queues which if they had spent on their work could increase their productivity. Daily wage labourers could not find work as employers had no cash to pay them. Traders and retailers have been deprived overnight of funds to carry on their businesses, and the former can neither source goods after using up their existing stocks, nor can they pay for the transport of the goods to the market. Retailers cannot sell the goods since customers do not have enough money to buy them. The Kharif harvest was not fully marketed in many regions, and producers are unable to sell their crops owing to the shortage of the new money. Many are being offered drastically lower prices for their produce which runs the risk of damage in the coming days. Construction sector suffered a severe blow with a downturn in housing prices. Oil price, gold price and even the financial market too gets highly affected representing a dip in the crisis period. Cash wash even triggers fish-vegetable scare.

Demonetizationin 2016 was not the first time when India has experienced such a ruinous act. It happened twice, one prior to independence on 1946 and other on 1978. Owing to 1946's demonetization, the then ruling power banned ₹1000, ₹5000 and ₹10,000 notes from circulation on 12th January, 1946, just before India's independence. According to the Direct Tax Enquiry Committee, "Demonetization was not successful then, because only a very small proportion of total notes in circulation were demonetized in 1946 and its worth was ₹1,235.93 cores". Being the highest denomination notes ever printed in India by RBI, ₹1000, ₹5000 and ₹10,000 notes were rarely accessed by the common mass. However all three notes were again reintroduced in 1954.

However, next on 16th January, 1978, the then President of India promulgated the 'High Denomination Bank Notes Ordinance', demonetising the ₹1000, ₹5000 and ₹10,000 notes once again with the objective of eliminating "the possible use of such notes for financing illegal transactions" (RBI 1977-78: 77). The value of the banned currency was only ₹1.46 billion (1.7% of aggregate notes in circulation), so it received limited public attention and had little impact on the daily lives of people.

Cross-country instances of sharp currency contractions suggest that for developing countries like Soviet Union, Ghana, Britain, Congo, Myanmar, Nigeria, etc., this drastic step of demonetization had suffered a huge set-back. But for countries like USA, Australia, it is a success. The main reason for so is that they are developed. Only a small fraction of the economy is poor or informal and rarely do they depend on cash transactions. Hence, they seldom care about any currency ban or currency replacement. But for developing nations, about 90% of the entire population is informal whose dependence on hard cash is really to be worried about.

Given the macro and micro-economic scenario of a developing country like India, any massive shock will very well disrupt the smooth running of the economy. Demonetisation

is such a major shock which not only shook the entire economy for a stipulated span but could also bring about necessary disruptions in the future. In recent literature a set of studies explains the impact of demonetisation considering macroeconomic framework (Basu, et.al, 2018, Chakrabarti and Datta, 2017, Dasgupta, 2016, Ghosh, 2017, Chakraborty and Bagli, 2019). They conclude that demonetisation reduces the GDP, terminating the jobs of a large section of workers in informal sector in India. No systematic theoretical study in literature explain the impact of demonetisation applying microeconomic framework. With this end in view this paper mainly focuses at studying the impact of demonetization on the micro-economic agents using a basic consumer choice problem.

Theoretical Analysis

In this section, using a simple consumer choice problem we want to judge the microeconomic impact of demonetization on individuals.

Assumptions

1. There are three types of consumers categorised as per the financial strength, who exhaust the entire economy.
   - **Rich** (the firm owners) who sell goods in exchange of both cash and cards or through bank accounts. Their source of income is the total profit earned from the sales. They are denoted by 'R'.
   - **Middle Class** (the wage earners) who work in the production units of the 'Rich'. They also have access to cash and bank accounts/ cards and receive their wages in both forms. They are denoted by 'M'.
   - **Poor** (the informal workers) who sell their goods and services in exchange of cash only and earn profit from the production they made. Thus they lack access to any e-transaction procedures. They are denoted by 'P'.

This assumption of 'Rich' and 'Middle class' being bank account holders is a reliable one as statistics in 2016 suggest that almost half of the Indian households don't have access to a bank; over 60% of the Indian economy works as informal sector all of these transactions is mainly reliant on cash. In 2016-17 cash to GDP ratioin India is 12% which is three times of the world average cash to GDP ratio (Ghandy, 2016). In a report RBI, Feb 2020, we find that 72% of India's consumer transactions take place in cash.Thus it is little surprising that at the eve of sudden complete demonetisation more than three fourth of the overall consumer transactions took place in cash.

2. All the three sectors rely on the production of the 'rich (R)'and the 'poor (P)' for consumption.

- *Total demand for goods produced by the 'Rich'* $= X_R^R + X_R^M + X_R^P$
  Total demand for services produced by the 'Poor' $= X_P^R + X_P^M + X_P^P$
  where X_i^j denotes the total demand of the i^{th} sector production by j^{th} sector.
- *Total supply of the goods produced by 'Rich'* $= Y_R$
  Total supply of the services produced by 'Poor' $= Y_P$
  where Y_i is the total production of sector i.
- Demand determines output. Therefore at equilibrium,

$$Y_R = X_R^R + X_R^M + X_R^P \quad \text{..... (1)}$$
$$Y_P = X_P^R + X_P^M + X_P^P \quad \text{..... (2)}$$

Here we are considering a representative individual from each category whose demand and supply are measured.

3. *Total Employment (N) in the economy is the sum of total number of middle class individuals employed in the firms (N_M) and total number of poor self-employed (N_P) individuals. Thus we have* $N=N_M + N_P$…… *(3)*
4. *Gross real Domestic Product (GDP)* $= N_P Y_P + N_R Y_R$
5. Goods produced by both the sectors are normal and allows some degree of substitution.
6. Goods market and labour market are perfectly competitive. Thus prices of both types of commodities *(P_R, P_P)* and wages *(W)* received by the workers are fixed across sectors. Even, $P_R > P_P$i.e firm product is relatively costly.
7. (a) 'Rich' have utility function defined as,

$$U_R = f_R(X_R^R, X_P^R) \quad \text{.....(4)}$$

Since, rich class mostly carry out their transactions using credit/ debit cards or through e-transaction portals, hence their demand for the services produced by the self-employed poor is sufficiently less. Thus even with a decline in the cash in hand, they are most likely to shift their consumption pattern to a substitutable product which they themselves produce.

(b) 'Middle Class' have Quasilinear Preferences. The utility functions are defined as,

$$U_M = f_M(X_R^M) + X_P^M \quad \text{.....(5)}$$

This is because; unavailability of enough amounts of cash holdings reduces the demand for the produce of the poor by the middle class (i.e X_P^M falls) and that currency is being piled up in the banks thereby increasing their bank balance. But with the assumption of partly substitutability of goods, people won't reallocate their income in purchase of the commodities produced by the rich. They will rather prefer to save in the hope of earning future returns and higher consumption of future services instead of spending the amount on luxurious commodities produced by the firms which may not be required to them in the shorter span. Moreover, unlike the richer class, they are less probable to purchase the substitutable costlier products manufactured by the richer class, through cards.

(c) Since 'poor' have income in the form of notes and coins only, so a cash crunch is expected to affect their demand for both types of commodities. Thus we are assuming general form of the utility function in case of 'poor'.

$$U_P = f_P(X_R^P, X_P^P) \quad \text{.....(6)}$$

Also, the preference pattern of the three sectors may or may not coincide.

8. All the three sectors have excess capacity. Any individual can switch to any of the above categories if he has enough financial capacity to carry forward his transactions.

RICH (Assuming one representative individual)

The production function is denoted by,

$$Y_R = F_R (N_M, \overline{K_R}) \quad \text{.....(7)}$$

$$\Pi_R = P_R Y_R - W N_M \quad \text{..... (8)}$$

where F_R is the functional form and $\overline{K_R}$ is the amount of capital used in the production process. Since it is a short run phenomenon, thus capital used is fixed and so for simplicity we ignore any cost to capital incurred by the firm in this shorter period. Also we consider that all the middle class workers are employed in this representative firm. Although it is a restrictive assumption but to analyse this demonetization effect in a simpler framework and for lesser number of parameters to analyse, we consider so. We hope that this does not hinder our generalised inference on this issue.

Now, this Π_R is the total income of the rich in both form, cash (C_R) and deposits (D_R). Thus,

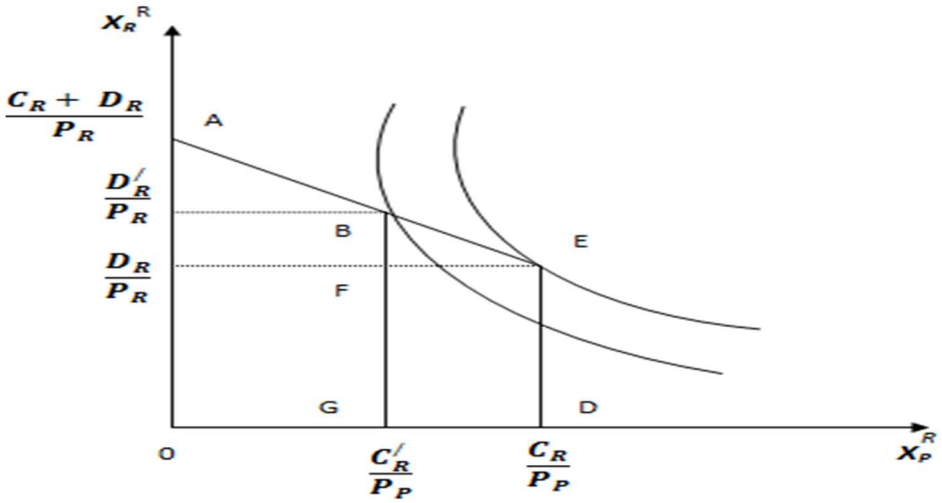
$$\Pi_R = C_R + D_R \quad \text{..... (9)}$$

The budget constraint is defined as,

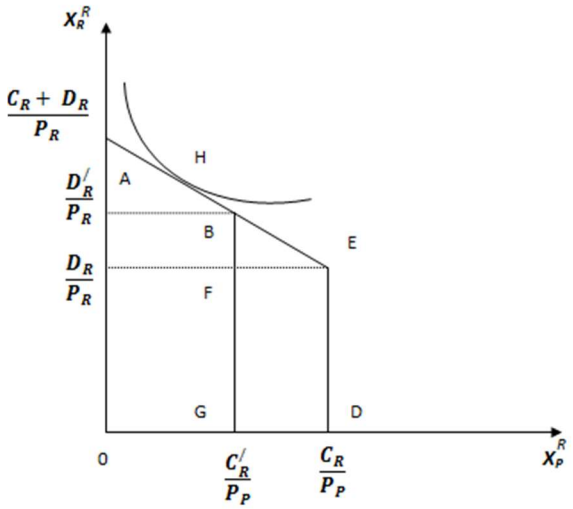
$$P_R X_R^R + P_P X_P^R \leq C_R + D_R, \text{ if } X_R^R > \frac{D_R}{P_R} \quad \text{..... (10)}$$

$$P_P X_P^R \leq C_R, \text{ if } X_R^R \leq \frac{D_R}{P_R} \quad \text{..... (11)}$$

Due to demonetization and lack of availability of enough cash, there is a reallocation of income from cash holdings to bank deposits. Therefore, C_R falls and replenishes the deposits D_R by the same amount such that $\Delta D_R = - \Delta C_R$ keeping the total income constant. Even if after the cash in hand falls, there is enough money to meet the earlier demand for services, then the choice bundle before the shock will still remain optimum. This part of the budget constraint is denoted by *(10)* followed by *(11)* which denotes the variation in the consumer's choices with the changes in the form of currency.



Case 1



Case 2

Fig 1: Consumer Choice problem of 'Rich'

Plotting the utility function *(4)* and the budget line *(10-11)*, we find that the optimum choice point will lie either on the kink (case 1) or on the *AE* line (case 2) depending on the form of the utility function and currency-deposit allocation. Hence, choosing among any point upon AE and E depends on the stability condition.

❖ **Case 1:**

If the tangency point of the utility function with the budget line is at the kink, then the optimum is denoted by $E = (\frac{C_R}{P_P}, \frac{D_R}{P_R}) = (X_P{}^{R*}, X_R{}^{R*})$.

With the reduction in currency level, there is a leftward shift of the budget line from ABED to ABFG. Note that since the total fall in the currency at hand replenishes the bank deposits by the same amount for the 'Rich', thus, ΔDR = - ΔCR. So, vertical intercept will not change at any given P_R. Therefore, corresponding to E, the new optimal choice point may be

$$B = (\frac{C_R^/}{P_P}, \frac{D_R^/}{P_R}) = (X_P{}^{R**}, X_R{}^{R**})$$

where $C_R^/ < C_R$ and $D_R^/ > D_R$. Also,

$$\Delta X_P{}^R = \frac{\Delta C_R}{P_P} < 0 \text{ (Since currency reserves falls)}$$

$$\Delta X_R{}^R = \frac{\Delta C_R + \Delta D_R}{P_R} - \frac{P_P \Delta X_P}{P_R} = \frac{-\Delta D_R + \Delta D_R}{P_R} - \frac{P_P}{P_R}\frac{\Delta C_R}{P_P} = -\frac{\Delta C_R}{P_R} > 0 \text{ (from(10))}$$

Thus, $X_R{}^R$ increases whereas $X_P{}^R$ falls.

Moreover,

$$U(X_P{}^{R*}, X_R{}^{R*}) > U(X_P{}^{R**}, X_R{}^{R**})$$

Thus utility of a representative 'Rich' individual falls as they shift their choices from a cheaper product provided by the poor to a costlier one manufactured in the firms thereby the new chosen indifference curve lie below the earlier one.

❖ **Case 2:**

If the tangency point of the utility function with the budget line on the *AE* line, then the optimum is denoted by $H = (X_P{}^{R*}, X_R{}^{R*})$.This optimal choice point can only be

attained when the proportion of consumption of the firm's commodity is much larger than the product produced by the poorer class.

With the reduction in currency level, there is a leftward shift of the budget line from *ABED* to *ABFG* and but that does not affect their demand for services as even after loss of currency they have enough cash to consume the initial choice bundle. Therefore they remain at

$$H = (X_P^{R*}, X_R^{R*}) = (X_P^{R**}, X_R^{R**})$$

Thus, X_R^R and X_P^R do not change.
Moreover,

$$U(X_P^{R*}, X_R^{R*}) = U(X_P^{R**}, X_R^{R**})$$

Thus utility of a representative 'Rich' individual remains unaffected.

Generalising the result for all 'Rich' individuals some satisfying case 1 whereas others satisfying case 2,

$$U(X_P^{R*}, X_R^{R*}) \geq U(X_P^{R**}, X_R^{R**})$$

they either remain unaffected or are worse off but to a smaller extent. However in the net, the demand for services falls, as it declines for some and remains unaffected for others.

MIDDLE CLASS (Assuming one representative individual)

The source of income of the middle class is the wage which they receive in both form, cash (C_M) and deposits (D_M). Thus,

$$W = C_M + D_M \quad \text{.....(12)}$$

The budget constraint is defined as,

$$P_R X_R^M + P_P X_P^M \leq C_M + D_M, \text{ if } X_R^M > \frac{D_M}{P_R} \text{.....(13)}$$

$$P_P X_P^M \leq C_M, \text{ if } X_R^M \leq \frac{D_M}{P_R} \text{.....(14)}$$

By the similar argument as in case of 'Rich' the budget constraint is so defined and C_M falls which replenishes the deposits D_M by the same amount such that $\Delta D_M = -\Delta C_M$ keeping the total income constant.

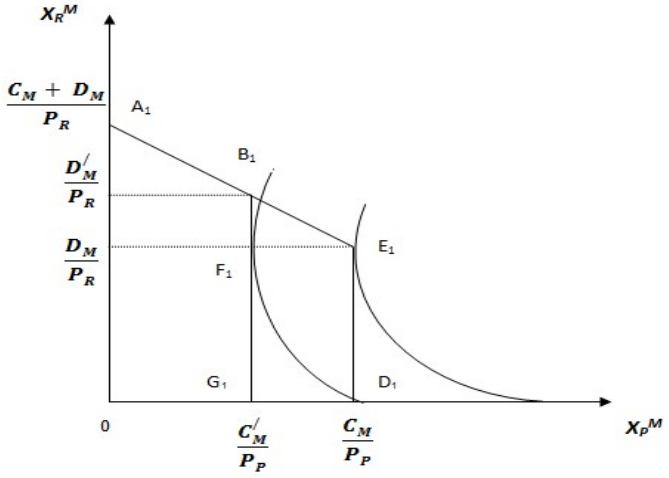


Fig 2: Consumer Choice problem of 'Middle Class'

Plotting the utility function *(5)* and the budget line *(13-14)*, we find that the optimum choice point will lie either on the kink or on the vertical line depending on the form of the utility function. If the tangency point of the Quasilinear utility function with the budget line is at the kink, then the optimum is denoted by

$$E_1 = (\frac{C_M}{P_P}, \frac{D_M}{P_R}) = (X_P^{M*}, X_R^{M*}).$$

Due to lack of enough currency, there is a leftward shift of the budget line from $A_1B_1E_1D_1$ to $A_1B_1F_1G_1$. As per our assumption of preferences, X_R^M remains unaffected with changes in the income allocation and hence X_R^{M*} remains unaltered. Hence corresponding to E_1, new optimal choice point can lie anywhere on the line F_1 to $\frac{D_M}{P_M}$. One such point may be

$$F_1 = (\frac{C_M^/}{P_P}, \frac{D_M}{P_R}) = (X_P^{M**}, X_R^{M*})$$

where $C_M^/ < C_M$ and $D_M^/ > D_M$. Also,

$$\Delta X_P^M = \frac{\Delta C_M}{P_P} < 0$$

$$\Delta X_R^M = \frac{\Delta C_M + \Delta D_M}{P_R} = \frac{-\Delta D_M + \Delta D_M}{P_R} = 0$$

Thus, X_R^M remains unchanged whereas X_P^M falls.
Moreover,

$$U(X_P^{M*}, X_R^{M*}) > U(X_P^{M**}, X_R^{M*})$$

Thus the utility of a representative 'Middle Class' individual, falls. Generalising the result, all 'Middle Classes' are worse off.

POOR (Assuming one representative individual)

The production function is denoted by,

$$Y_P = F_P(1, \overline{K_P}) \quad \text{.....(15)}$$

$$\Pi_P = P_P Y_P = P_P (X_P^R + X_P^M + X_P^P) \text{ (from (2))} \quad \text{.....(16)}$$

where F_P is the functional form and $\overline{K_P}$ is the fixed amount of capital used in the productionprocess. Also we consider that the poor individual is self-employed and there is no cost to capital in this shorter span of time. Here, this Π_P is the total income of the poor in the form of cash only.

The budget constraint is defined as,

$$P_R X_R^P + P_P X_P^P \leq \Pi_P \quad \text{.....(17)}$$

Maximizing utility subject to budget constraint gives the first order condition as,

$$\frac{MU_{PR}}{MU_{PP}} = \frac{P_R}{P_P}$$

Where $MU_{Pi} = \frac{\partial U_P}{\partial X_i^P}$, $i = R, P$ are the respective marginal utilities.

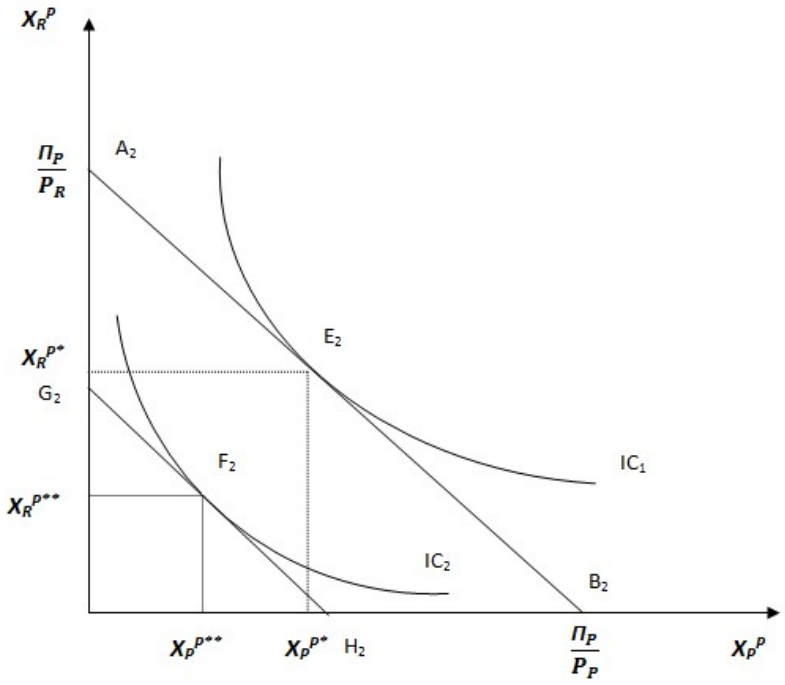


Fig 3: Consumer Choice problem of 'Poor'

Solving the optimization exercise and plotting the utility function *(6)* and the budget line *(17)*, we find that the optimum choice point will be the tangency point denoted by

$$E_2 = (X_P^{P*}, X_R^{P*})$$

Due to demonetization and lack of availability of enough cash, people's consumption of services which 'poor' produce, declines. As a result, the demand for such services (i.e X_P^R, X_P^M) falls, considering case 1 for rich. However, even if we consider the no change case, still a loss in demand of the middle class matters. Moreover,

$$Y_P = X_P^R + X_P^M + X_P^P \quad \text{.....from (2)}$$

Taking total differential on both sides,

$$dY_P = dX_P^R + dX_P^M < 0$$

(Considering that there is no change in the demand of the poor on his self-production *i.e* X_P^P remains fixed initially)

So, his income will change by $d\Pi_P = P_P dY_P < 0$. Thus in turn his production gets reduced and hence his net income falls. Therefore, there is a leftward shift of the entire budget line from A_2B_2 to G_2H_2. The new choice bundle will lie anywhere on the line F_2G_2 where the budget line is a tangent to the new lower indifference curve. Thus the point is defined as $F_2 = (X_P^{P**}, X_R^{P**})$ where $X_P^{P**} < X_P^{P*}$ and $X_R^{P**} < X_R^{P*}$. Thus, both X_R^P and X_P^P falls.

Moreover,

$$U(X_P^{P*}, X_R^{P*}) > U(X_P^{P**}, X_R^{P**})$$

Thus utility of a representative 'Poor' individual falls. Generalising the result, all 'Poor' are worse off. Also, 'poor' are worsen more as compared to 'middle class' and 'rich' as their income also gets reduced.

Implications

- Utility of all the middle class and poor individuals in the economy falls due to suddenly almost complete cash crunch initiative however utility of the rich may remain unaffected.
- Demand and supply of services by all the three categories falls due to demonetisation.
- Demand for the commodities produced by the firm falls due to reduced consumption demand of the poor. However, demand of the middle class for this commodity remains unaffected and that of rich increases.
- Now, considering the demand-supply condition of the firms, we find,

$$Y_R = X_R^R + X_R^M + X_R^P$$

Taking total differential on both sides, we get,

$$dY_R = dX_R^R + dX_R^M + dX_R^P$$
$$or,\ dY_R = dX_R^R + 0 + dX_R^P < 0$$

There is reduction in total supply of firms which is due to reduced consumption demand of the poor. Since majority of the people in India comprises of the informal poor sector (almost 60%), hence reduced demand of the poor offset the increased demand of the rich on their own product.

- Since, the firms are profit maximizers, so this reduced revenue $(P_R Y_R)$ made them to reduce their cost (WN_M) as well keeping the net profit intact. Since wages are determined exogenously, therefore only option to reduce the cost of the firms is to reduce the number of labourers (N_M). Hence a sufficient amount of workers (mostly contractual middle class workers) lose their job.
- This jobless group of middle class will either remain unemployed or add themselves into the 'poor' category where they self-produce. It is always preferable to engage in some activities and make money out of it instead of remaining unemployed. Placing themselves in the topmost category is difficult with the lesser bank balance they have. If they are into the economically lower sector of the economy, then N_M will fall and N_P will rise, keeping total labour force of the economy intact.
- These job-seekers will start producing Y_P which in turn will increase the total supply of services ($N_P\ Y_P$). But reduced number of middle class will lessen the demand for these services. To maintain equilibrium, either all 'poor' individual (the new set) will reduce their production or some 'poor' will be thrown out making them unemployed. Since the earlier 'middle class' category who entered into the poor set posses some larger amount of wealth as compared to the originals, hence they are more fitter in this category. Hence through 'survival of the fittest' clause, natives are mostly thrown out disdaining their financial condition even more worsen.
- If the entire class of 'poor' reduces their production, then as a whole their income (Π_P) will be further reduced which in turn will reduce their demand (X_R^P) for firms' product. Since demand determine supply, hence again the revenue will fall generating a vicious cycle for the 'poor' with more unemployed 'middle class'. Therefore, poor will get worsen and worsen with each successive day widening the income inequality between 'rich' and the 'poor'.
- If some remains unemployed, then N_M and N_P both falls thereby reducing the total level of employment (N).Total unemploymentwill rise, as the Indian economy is experiencing in recent time.

'Rich' being the elites of the economy are assumed to posses' larger amount of 'Black Money' which other two sectors lack. If others have so, then they will also undergo entrepreneurial activities and will belong to the topmost category. Thus this turmoil of demonetization results into an adverse selection problem where although the 'rich' are targeted but leads to a negative impact on the poor and thereby expanding the rich-poor inequality forcing the poor more downwards in terms of income and utility.

Conclusion

Demonetization in India has been a radical, unprecedented stride embarked on by the Indian government for a righteous ground of eliminating out unaccounted wealth and corruption from the system. But, quite unfortunately, the entire nation have suffered a setback owing from a reduction in their consumption-investment pattern and interest rates, to employment and prices and hence GDP. Adding on to this is an escalating disparity among the elites and the masses as a resultant of the adverse selection problem generated by this over-ambitious move.

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