

NOTES ON MICROFINANCE: ITS IMPLICATIONS ON WAGE INEQUALITY, MIGRATION AND MACROECONOMIC STABILIZATION

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Abstract: This paper presents an extensive study as on why traditional banking ecosystem may not desirably propitious for credit needs of micro enterprises and thus the warranty behind having institutional setup to cater the credit needs of this vulnerable but crucial sector of less-developed economy in as much as issues unemployment, migration and income equality are concerned. The chapter begins with developing a micro-foundation in line with optimal portfolio choice theoretic approach for the aversion of tradition banking enterprises towards the cater these micro enterprising. There it proceeds to examining the importance of MFIs in enable dissemination of affordable credit to micro units in general equilibrium approach (Jones, 1965). Besides, the chapter considers the relevance MFIs as counter-recessionary tools in line with Keynesian tradition.

Keywords: Microfinance, Wage Inequality, Migration and Wage Inequality, Macroeconomic Stabilization, Keynesianism

Introduction

The firmament of development economics is widely spanned over the issue labour migration and wage inequality so far economic dualism is concerned. The development of underdevelopment has been popular jargon to this end. The underlying theoretical perspective goes much against the so-called caliber of market system in facilitating regional evenness in the pattern of growth and economic development. The fundamental issue with economic privation in rural

areas correlate directly with the lack of access to credit, technology and advanced logistics for marketing of the produce. The aversion of formal credit sector to cater credit needs of this economically backward segment of the broader society has been delineated in popular literature and is much talked about in the domain of policy making. The context of state subvention in credit sponsorship in the warranted without any denying. Nonetheless the government at levels has

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its own financial constraints which are intertwined in nature due to the interdependence across different tiers as what is federal and quasi-federal setting. This has much changed the paradigm policy discourse toward how forming roadmap for enabling private sector find incentive to cooperate with the rural enterprises with capital technology. However, there is lack of academic culture on how the risk associated with such cooperative behaviour of the private sector can be compensated. This therefore raises a quintessential need for appropriate understanding choice-theoretic issues and finding out the practicable means to iron out the snags in the way of desired development. In this backdrop the context microfinance takes paramount role in addressing the problems emerging out economic dualism in as much as it has the potential to cater the requisites of economic empowerment and amelioration of the rural society as whole. The broad context of social dualism has a mutually reinforcing relation with economic dualism which however can be connected with the need for institutionalization of microfinance. The question of economic inequality thus can be addressed in the light how this institutionalization can be applied as means rather than ends. The preponderance of MFI is emergent since 1980s in India in institutionalized, the manifestation of which is establishment National Bank for Agriculture and Rural Development (NABARD), Small Industrial Development Bank of India (SIDBI) and more recently, Micro Unit Development and Refinance Agency

(MUDRA). It is this backdrop the develops micro-foundation-based approach to explain the need for state intervention to enable equitable access of credit for micro enterprises and extend it to a general equilibrium perspective to address the contexts of rural-urban migration and wage inequality. Besides, attempt has been made to overhaul the macroeconomic implication of development of MFIs. Thus the paper is divided into four segments – review of literature, micro-foundation for credit aversion of formal credit institution , a general equilibrium analysis of role of MFI is taming wage inequality and mitigation of migration and a aggregative model in Keynesian paradigm to conclude with.

Literature Review

Migration of poor people involves huge cost and this act as a hindrance factor behind the movement of poor people from one place to another. Abbar and Seelly (2009) show that migrating shorter distance (rural to rural/ rural to urban) incurs lower cost. But this is not always true. Various researchers (Afsar 2009; Dang 2005a; IOM and Bangladesh Bank 2009; Kwankye and Anarfi 2011; Mahmood 2011; Ranabahu 2004) show that people who migrate can be benefited economically from their moves in two ways: firstly, migration increases livelihood and employment opportunities, and secondly, it often increases their financial income. Microfinance and migration are closely related. Neoclassical economic theories explain migration as arising out of geographic disparities in wages, such that labor flows out of labor-

surplus, capital-scarce (low wage) markets and into labor-scarce, capital-surplus (high wage) markets (Lewis 1954). MFIs are located in the poor, rural areas where migration is common, and they are already providing financial services in those contexts. Thus they are primed to be providers of financial products aimed at migrant families (Bylander,2013). In 2012, anthropologist David Stoll reports an extensive ethnographic account on how microcredit has supported clandestine migration from Guatemala to the United States. Amelia Duffy-Tumasz (2009), through ethnographic work in Senegal, describes how households use microcredit as a cash advance on remittances from relatives living abroad. She suggests that in this context microcredit is not seen as a source of cheap credit for business expansion but rather a means of sustaining the household when remittance payments are uneven. Bylander and Hamilton, (2015) using household survey data from Cambodia, an MFI-saturated country, find that households using formal credit and households with greater access to formal credit are more likely to have labor migrants than households without access. Ahsan(2005) surveying the rural poor of Bangladesh reports that probability of participation in migration by household members is positively related to the probability of the household being a credit recipient.

A study by Yabucchi and Chowdhury (2007) shows that the effects of international migration of labour on the wage inequity crucially depend on both

the relative capital intensities between the low-skill and high-skill sectors and the institutional nature of the markets for unskilled labour. They also find that wage inequality among migrants decreased significantly between 2002 and 2007. Marjit&Kar (2005) have shown that unskilled (skilled) migration worsens (improves) the wage inequality under the necessary and sufficient condition that the distributive share of the intersectorally mobile factor (i.e. capital) of the skilled sector is greater (lower) than that of the unskilled sector. Qu and Zhao(2014) on the wage distribution further shows that the high-wage migrants experienced slower wage growth than middle-and low-wage migrants – a primary cause of declining inequality of migrants. Meng and Zhang (2001), Knight and Yueh (2009), Demurgeet. al. (2009) and Deng and Li (2010) and Zhu(2015) find that migrant workers work more hours and receive less pay than urban natives. A study by Ageyi (2020) reports that migrant workers in High Income Countries (HIC) are more likely to work in lower-skilled and low-paid jobs that do not match their education and skills. Higher-educated migrant workers in HICs are also less likely to attain jobs in higher occupational categories relative to non-migrant workers. This reflects the fact that migrants in HICs are likely to be affected by skills mismatch and have difficulties transferring their skills and experience across countries, in large part due to lack of adequate skills recognition systems for qualifications of migrant workers. Migration flows were strongly affected by income inequalities and differences in

economic development between the sending and receiving countries. Countries with a flourishing economy, strong labour demand, and high wage levels became attractive for immigrants from countries with high unemployment rates, low wage levels, and stagnating economies (Fassmann and Munz, 1992). Within the source countries, most migrant workers originated from poor agricultural regions with weak labour demand, such as northern Portugal, western Spain, southern Italy, and northern Greece (Bade, 2003).

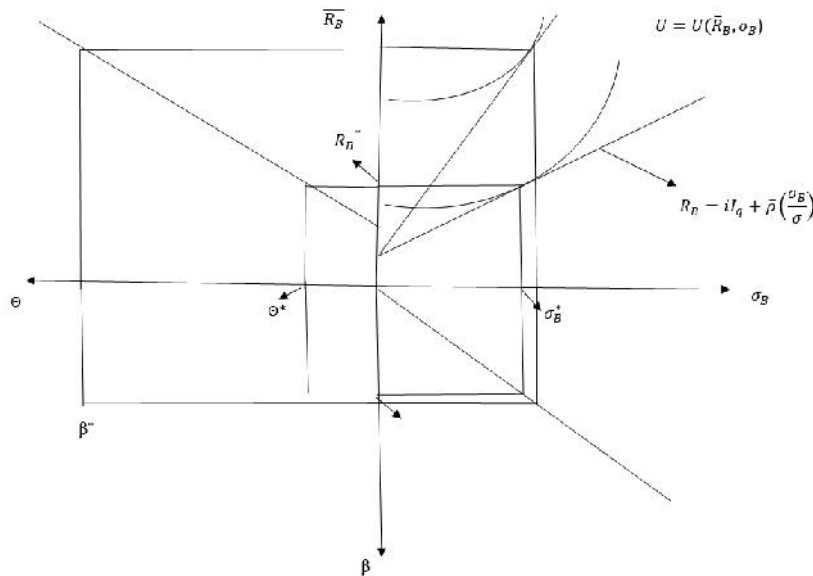
Micro-foundation for Credit Aversion and Usurious Treatment with Micro Units

In this section we consider a representative banking entity of the tradition profit-driven banking sector. Here we assume that the banks classify the borrowers (enterprises) depending on their net worth and financial parameter as: quality borrowers and non-quality

borrowers and it is foregone that microunits fall under the second category. With this in the representative bank, decides on the fraction of credit for micro-enterprises(β) and the degree of risk premium (θ). Moreover, bank is assumed to risk-averse economic agent and thus the determine the optimal portfolio choice by maximizing utility over expected return (\bar{R}_B) and risk (\dagger_B^2) as shown below:

$$\text{Max } U = U(\bar{R}_B, \dagger_B) \frac{\partial U}{\partial \bar{R}_B} > 0, \frac{\partial U}{\partial \dagger_B^2} < 0$$

subject to $\bar{R}_B = iI_q + \dots (i + \theta) \beta [L^S - I_q]$ and $\dagger_B^2 = [(i + \theta)\beta]^2 [L^S - I_q]^2$ where, i is the risk free interest charged to the quality borrowers investing I_q , \dots is the expected repayment rate for the non-quality borrower rationed out, σ^2 denote variance of repayment rate, L^S planned supply new loans. Let us elucidate the utility maximizing choice in terms of the



following figure.

Note: the R_b and σ_b are functions of θ and β , thereupon it is easy to determine them once optimal expected return risk combination is determined from utility maximizing choice. Let us also look into the impact of increase in repayment rate on risk portfolio choice and risk premium on non-quality loans. In the case the risk-return line in first quadrant will get steeper, indicating a rise in risk and expected return on non-quality loan and increased in fraction of loans to non-quality borrowers. There is point to be made that the micro enterprises lack due to the dearth of economic solvency and uncertainty over business may be due to the products made by them is inelastic to income and price. These micro entities lack on proper maintenance of book of accounts as per the *defacto* standard leading to difficult with banking assessing the solvency of business and these are factors that explaining low value of $\bar{\pi}$ associated with micro-entities and thereof, a low value β and high θ [this closely correlates with the problems of incomplete information, namely, adverse selection and moral hazards]. Thus, there is need for separate credit delivery system to be put in place and hence the microfinance.

Mathematical Intuitive Approach

In this section it will essentially demonstrated as to why the strictly positive value of θ is associated with value of β close to or even zero. This exercise begins positing bank to maximize profit as indicated below.

$$\pi = iI_q + \bar{\pi} (i + \theta) \beta [L^s - I_q] - \gamma [I_q + \beta [L^s - I_q]] - i_d D_0 \quad \dots (2)$$

The first order condition as it stands:

$$\frac{\partial f}{\partial S} = \bar{\pi} (i + \theta) [L^s - I_q] - \gamma [L^s - I_q] = 0 \Rightarrow$$

$$\theta = \frac{\gamma}{\bar{\pi}} - i \quad \dots (3)$$

$$\frac{\partial f}{\partial S} = \bar{\pi} \beta [L^s - I_q] = 0 \Rightarrow \beta^* = 0 \quad \dots (4)$$

Now if (3) is taken with less than or equal

to then $\left(\frac{\gamma}{\bar{\pi}} - i \right)$ can be interpreted as the maximum risk premium that bank may exact from the non-quality borrowers and correspondingly, the second condition make more precise sense.

General Equilibrium Approach to role of Microfinance

The section presents a general equilibrium model in line Jones (1965, 1971) to examine the role of micro-finance institutions in expansion of rural sector and financial inclusion and overall promote sustainable development. In the model, there are three sectors: X (exports sector), Y (import competing sector) and Z (rural sector). There types inputs being considered: S (skilled labour), L_u (unskilled-labour) and K (capital) To be precise, X is relatively skill-intensive and uses K, Y uses S, L_u and K and Z uses L_u and K. Moreover, the unskilled is faced with choice of getting employed in Y will higher pay and staying in Z earning lower wage, something that add the angle migration to this model. Moreover, the

assumption goes on to let the sector fixed coefficient production. Besides, it has been assumed the unskilled labour is not fully employed in rural sector for want of capital inducing migration to Y. The model is based on the following equations:

$$P_X = a_{SX}W_S + a_{KX}r \quad \dots(1)$$

$$P_Y = a_{SY}W_S + a_{KY}r + a_{UY}W_U^Y \quad \dots(2)$$

$$P_Z = a_{UZ}W_U^Z + a_{KU}(r + \theta) + a_{YZ}P_Y \quad \dots(3)$$

$$W_U^Y = \left[\frac{a_{UY}Y}{\bar{L}_U - \left(\frac{a_{UZ}}{a_{KZ}} \right) K_Z} \right] = W_U^Z \quad \dots(4)$$

$$a_{SX}X + a_{SY}Y = \bar{S} \quad \dots(5)$$

$$a_{KX}X + a_{KY}Y = \bar{K} \quad \dots(6)$$

$$Z = \frac{\bar{K}_Z}{a_{KZ}} \quad \dots(7)$$

Let us now walk into brief description of this model. The model developed here mimics a small open economy so much so that price of commodities except P_Z are exogenously given. Moreover, wage earned by unskilled labour in Y is instructionally fixed. It is to be noted the rural sector which predominantly houses the micro enterprises at large is subject to risk premium (θ). There is unemployment among skilled labour due to the paucity of capital as an outcome deficient access to affordable credit. Now the first four equation describes the price subsystem which is however not separable from the output subsystem as denoted by (5) - (6) taken together. So given Y, W_U^Y , K_Z and

\bar{L}_U , equation (4) determines W_U^Z . The first two equations together determine W_S and r and for this r equation (3) determines P_Z . Again, the last three equations determine the outputs of the sectors. That completes the model.

Impact of Introduction of Micro-Finance Institutions (MFIs)

MFIs are specialized lending institution which enable efficient allocation of credit to micro -enterprising by dint sharing information sharing on borrowers and thereby ensuring the minimization of incomplete information problem faced traditional banking sector. Moreover, MFIs are capable enabling better debt recovery through the use joint liability contract or risk pooling. Moreover, MFIs are backed large development banking which enables them to seek the benefit of risk sharing. Now the introduction MFI acts to relax capital constraint operative with the rural sector the consequence has been through the comparative statics and 'hat algebra'. Thus, the results are as follows:

$$0 = \theta_{SX} \hat{W}_S + \theta_{KX} \hat{r} \quad \dots(8)$$

$$0 = \theta_{SY} \hat{W}_S + \theta_{KY} \hat{r} \quad \dots(9)$$

$$\hat{P}_Z = \theta_{UZ} \hat{W}_U^Z + \theta_{UR} (\hat{r} + \hat{\theta}) \quad \dots(10)$$

$$\hat{Y} = \hat{W}_U^Z - \left(\frac{L_{UZ}}{L_{UY}} \right) \hat{K}_Z \quad \dots(11)$$

$$\beta_{SX} \hat{X} + \beta_{SY} \hat{Y} = 0 \quad \dots(12)$$

$$\beta_{KX} \hat{X} + \beta_{KY} \hat{Y} = 0 \quad \dots(13)$$

$$\hat{Z} = \hat{K}_Z > 0 \quad \dots(14)$$

To begin we consider (12), (13) and (14), we get :

$$\widehat{X} = \widehat{Y} = 0$$

Substituting (16) into (11) we get:

$$\widehat{W}_U^Z = \left[\left(\frac{L_{UZ}}{L_{UY}} \right) \right] \widehat{K}_Z > 0 \quad \dots(17)$$

From (10), we have:

$$\widehat{\pi}_{UR} = \frac{1}{\pi_{UR}} (\widehat{P}_Z - \pi_{UZ} \widehat{W}_U^Z) - \widehat{r} \quad \dots(18)$$

Now, from (8) and (9), we get $\widehat{W}_S = \widehat{r}$

So that, we get $\widehat{Y} = 0$. And consequently, $\widehat{W}_U^Z > 0$. The reason being that expansion in Z raises the demand for Y as the latter is used in input in the production of the former. Now the increase K-stock in K-constrained Z sector will facilitate the expansion of output with the unutilized unskilled labour, given the domestic demand may lead to fall in \widehat{P}_Z , notwithstanding the increase in \widehat{W}_U^Z .

Thus, we get, $\widehat{\pi}_{UR} < 0$. This in turn suggests a deterioration in terms of trade between non-tradable versus tradable goods. Thus, the inception of MFI-led credit ecosystem brings down the risk premium as well. Now if the rural sector is subjected to international trade, then will become exogenously given, henceforth $\widehat{P}_Z = 0$ and

thus, $\widehat{\pi}_{UR} = \frac{1}{\pi_{UR}} (-\pi_{UZ} \widehat{W}_U^Z) < 0$. These, apart introduction MFIs brings down inter-sectoral wage difference in unskilled labour and can potentially help reduce the

incentive migration which takes role in creating urban unemployment and urban poverty. Besides, there is possibility of the wage inequality between skilled and unskilled labour to narrow down and along with that it opens up the way to eradication of rural poverty as well.

Micro finance institutions operate with a very close network with commercial banks. It helps to reduce the risk premium (θ) though diversification. MIs in a small region have better information about borrowers' credit worthiness. This comparative advantage enables MIs to achieve debt recovery than commercial banks. So θ decreases.

Welfare Implications

The overall welfare effect can be expressed as:

$$dW = R_Z^S \widehat{W}_S + R_Z^K (\widehat{r} + \widehat{K}_Z) + R_Z^{UY} \widehat{Y} + R_Z^{UR} (\widehat{Z} + \widehat{W}_U^Z) - R_{TZ} \widehat{P}_Z \quad \dots(9)$$

Where, R_Z^i denotes the total real income of factor 'i' in terms of Z and R_{TZ} denotes the total real income in terms of Z. Now in this case the expression of the change in welfare reduces to

$$dW = [R_Z^K (\widehat{K}_Z) + R_Z^{UY} \widehat{Y} + R_Z^{UR} (\widehat{Z} + \widehat{W}_U^Z) - R_{TZ} \widehat{P}_Z] \quad \dots(10)$$

This is so because that $(\widehat{K}_Z), \widehat{Y}, \widehat{Z}, \widehat{W}_U^Z > 0$ and $\widehat{P}_Z < 0$. Hence it proves an improvement in overall welfare in association with the introduction of micro-finance ecosystem.

Macroeconomics of Microfinance and Macroeconomic Stability

In this section we shall a macroeconomic model in Keynesian line to examine the macro implications of microfinance in closed economy framework. The very is to overhaul the role microfinance in terms of policy induced push for credit lending to the micro enterprises by imposition of priority sector lending requirement to be followed by banks. The model also manifest distributive aspect of microfinance in terms how its efficient functioning may enhance the share wage income and thereof can create push for consumption spending. The model consists goods market and credit market. In credit market apart from the micro entities covered under priority sector lending mandate, there are two of borrower - quality borrowers with aggregate investment of I_q and non-quality borrowers I_{nq} . The interest rate is flexible and is market determined and non-quality borrowers are charged risk-premium (θ). We assume the banks raise funds from saving deposits. Workers save in money and bank deposits while, the non-worker profiteers save in bank deposits and share issued by banks which is required to maintain capital reserve as compliance with capital adequacy norms. Moreover, investments are credit financed. Thus, we have the following specifications.

(i) Accumulation of new deposits: $dD = [q(1 - c_w)(1 - \tau)\alpha_w + q_1(1 - c_p)(1 - \tau)\alpha_p]Y$, where $c = c_w\alpha_w + c_p\alpha_p$, c_i denotes propensity to consume by class 'i', for $i = W, C$ and α_i denotes the income share.

We assume q_1 to be decreasing non-performing asset in banks(N).

(ii) Supply of new loans to micro-units covered by lending norms = $\bar{S}(1 - \sigma)(1 - c)(1 - \tau)Y$, where σ required reserve ratio

(iii) Supply of loan to quality and non-quality investors = $(1 - \bar{S})(1 - \sigma)(1 - c)(1 - \tau)Y$

(iv) Demand for loan by quality and non-quality excepting the micro enterprises covered under priority lending scheme = $I_q(i, \varepsilon_1) + I_{nq}(i + \theta, \varepsilon_2)$

(v) Aggregate absorption is given sum total of aggregate consumption expenditure by worker, profiteers, aggregate investment and government spending.

(vi) The risk premium is assumed to be increasing in non-performing asset i.e., $\theta = \theta(N)$, $\theta' > 0$

(vii) Government gives credit subsidy on priority sectors loans.

(viii) Assuming that banks hold excess reserve and borrow from central bank for fund at repo rate (r), the planned supply loans to quality and non-quality investors can be rephrased as $L_s = (1 - \lambda(i - r))(1 - \bar{S})[q(1 - c_w)(1 - \tau)\alpha_w + q_1(1 - c_p)(1 - \tau)\alpha_p]Y$, where $\lambda_\phi < 0$, $\phi \equiv i - r$

Thus, the credit market equilibrium condition except for priority credit is given by:

$$I_q(i, \varepsilon_1) + I_{nq}(i + \theta, \varepsilon_2)$$

$$= (1 - \lambda(i - r)) (1 - \bar{S})(1 - \sigma) [q(1 - c_w) (1 - \tau)\alpha_w + q_1 (1 - c_p) (1 - \tau)\alpha_p]Y \quad \dots(1)$$

On the other hand, goods market equilibrium condition is given by:

$$Y = (c_w\alpha_w + c_p\alpha_p)(1 - \tau)Y + I_q(i, \varepsilon_1) + I_{nq}(i + \theta, \varepsilon_2) + \bar{S}(1 - \sigma) [q(1 - c_w)\alpha_w + q_1 (1 - c_p)\alpha_p](1 - \tau)\alpha_p Y + G \quad \dots(2)$$

Now we shall totally differentiate both sides of (1) and (2) to work out the comovement if I and Y when goods market and credit are equilibrium. Thus, we have the following.

$$\frac{di}{dY} = \frac{1 - \left[\frac{(c_w r_w + c_p r_p) + \bar{S}(1 - \dagger)}{[q(1 - c_w)r_w + q_1(1 - c_p)r_p]} \right] (1 - \dagger)}{I_{qi} + I_{nq,(i+\theta)}} < 0 \quad \dots(5)$$

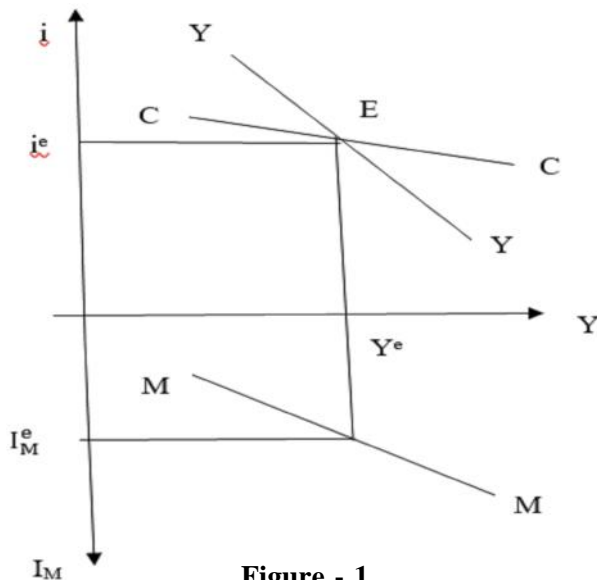
$$\frac{di}{dY} = \frac{(1 - \dagger)(1 - \bar{S})(1 - \dagger)}{[1 - (c_w)r_w + q_1(1 - c_p)r_p](1 - \dagger)} \left[\frac{q(1 - c_w)}{(1 - \dagger)r_w + q_1} \right] Y < 0 \quad \dots(6)$$

Let us now explain the above results. To begin with (5), we find that increase in interest rate is associated with the decrease in Y. The reason being that following unitary increase in interest rate, the aggregate investment contracts by $[-(I_{qi} + I_{nq,(i+\theta)})]$ units. This results in excess supply in goods market and inducing Y to fall. Now for every unit of contraction

in Y excess supply fall by one unit. However, the aggregate consumption declines by $[(c_w\alpha_w + c_p\alpha_p) (1-\tau)]$ units. Moreover, contraction of savings happens to the tune of $[q(1 - c_w)\alpha_w + q_1(1-c_p)\alpha_p] (1-\tau)$ and to that end the supply of new deposits and consequently, the supply of new loans to the priority sector contracts by $\bar{S}(1 - \dagger) [q(1 - c_w)\alpha_w + q_1(1-c_p)\alpha_p] (1-\tau)$ units and the investments coming up from this sector. Thus, the net contraction of excess supply following unit fall in Y is $[1 - [(c_w\alpha_w + c_p\alpha_p) + \bar{S}(1 - \dagger) [q(1 - c_w)\alpha_w + q_1(1-c_p)\alpha_p]](1-\tau)]$ units. Hence Y falls by the $[-(I_{qi} + I_{nq,(i+\theta)})] / [1 - [(c_w\alpha_w + c_p\alpha_p) + \bar{S}(1 - \dagger) [q(1 - c_w)\alpha_w + q_1(1-c_p)\alpha_p](1-\tau)]]$ units, reciprocal of the absolute slope of goods market equilibrium scheduled YY. Now let us come to the case of (4), wherein, unit increase in Y yields an increase in the supply new deposits and thereof, the supply of new loans by $[(1 - \bar{S})(1 - \sigma)[q(1 - c_w)\alpha_w + q_1(1-c_p)\alpha_p](1 - \tau)]$ units and at the given interest rate, this causes excess supply in credit market. This induces in interest rate to require to fall. Then following a unit fall in interest rate the demand for credit rise by $[-(I_{qi} + I_{nq,(i+\theta)})]$ units, while rise in supply of new loans by $[-\lambda_\phi(1 - \bar{S})(1 - \sigma)[q(1 - c_w)(1 - \tau)\alpha_w + q_1(1 - c_p)(1 - \tau)\alpha_p]Y]$ units. Thus, credit market will clear if and only if is greater than and thus comes up net fall in excess supply to the tune of $[-(I_{qi} + I_{nq,(i+\theta)})] + [-\lambda_\phi(1 - \bar{S})(1 - \sigma)[q(1 - c_w)(1 - \tau)\alpha_w + q_1(1 - c_p)(1 - \tau)\alpha_p]Y] = [[(I_{qi} + I_{nq,(i+\theta)})]$

+ $[[\lambda_\phi(1-\bar{s})(1-\sigma)[q(1-c_w)(1-\tau)\alpha_w + q_1(1-c_p)(1-\tau)\alpha_p]Y]]$ units. Hence, following a unit in rise in Y interest rate falls by the absolute value of the reciprocal R.H.S in (6). Thus the credit market equilibrium

(CC) scheduled is negatively sloped. Now for the stability of simultaneous equilibrium in goods and credit market equilibrium, YY schedule has to be steeper than CC in (Y, i) plane as illustrated below.



Impact of Monetary Policy on Microfinance

Here we shall examine the impact cut in repo rate (r). This exercise can be worked out comparative statics as what follows.

$$\frac{dI_M}{dr} = \bar{s}(1-\tau) [q(1-c_w)\alpha_w + q_1(1-c_p)\alpha_p](1-\tau)] \left(\frac{dY}{dr}\right) < 0 \quad \dots(8)$$

$$\frac{dY}{dr} = \frac{\left(\frac{\lambda_\phi(1-\bar{s})(1-\tau) \left[\frac{q(1-c_w)(1-\tau)r_w}{+q_1(1-c_p)(1-\tau)\tau_p} \right] Y}{(I_{qi} + I_{nq,i^{++}}) + \lambda_\phi(1-\bar{s})(1-\tau) \left[\frac{q(1-c_w)(1-\tau)r_w}{+q_1(1-c_p)(1-\tau)\tau_p} \right] Y} \right)}{\left(\frac{1 - [c_w r_w + c_p r_p] - \bar{s}(1-\tau) \left[\frac{q(1-c_w)r_w}{+q_1(1-c_p)\tau_p} \right] (1-\tau)}{(I_{qi} + I_{nq,i^{++}})} \right) - \frac{(1-\tau)\lambda_\phi(1-\bar{s})(1-\tau) \left[\frac{q(1-c_w)r_w}{+q_1(1-c_p)\tau_p} \right] (1-\tau)}{(I_{qi} + I_{nq,i^{++}}) \left(\lambda_\phi(1-\bar{s})(1-\tau) \left[\frac{q(1-c_w)(1-\tau)r_w}{+q_1(1-c_p)(1-\tau)\tau_p} \right] Y \right)}} < 0 \quad \dots(7)$$

These results suggest a cut in repo rate results in increase in Y and thereof, rise in deposit accumulation, leading to the increase in credit flow to micro enterprises covered under priority norms and so is the investment by this sector causing its expansion.

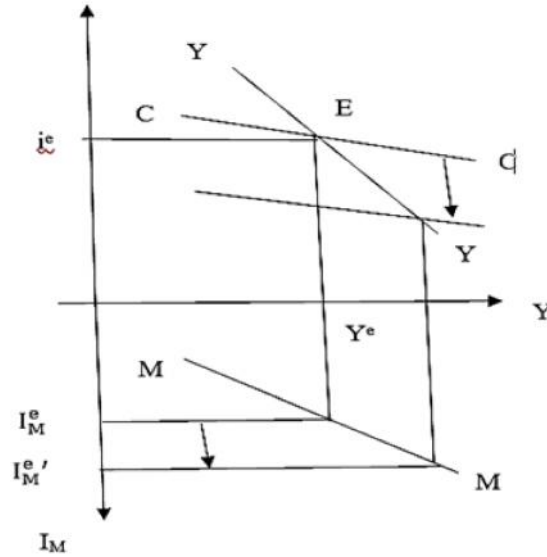


Figure - 2

Let us now explain the above multiplier effect on Y and how it cascades into an expansion of production in micro enterprises. Following a unitary fall in r , ceteris paribus, banks are prompted to reduce excess reserve holding by $[-\lambda_\phi(1-\bar{S})(1-\sigma)[q(1-c_w)(1-\tau)\alpha_w + q_1(1-c_p)(1-\tau)\alpha_p]]$ units and to that extent supply of new loan will rise leading to excess supply in credit market. In response to this interest rate will tend to fall to clear off the credit market. Now following a unitary fall in credit market excess supply dips by $[-(I_{qi} + I_{nq,(i+\theta)}) + \lambda_\phi(1-\bar{S})(1-\sigma)[q(1-c_w)(1-\tau)\alpha_w + q_1(1-c_p)(1-\tau)\alpha_p]Y]$ units thus the interest rate has to fall by the term in the numerator of (7). Now, consequent upon this, the total investment rise by

$$\left[- (I_{qi} + I_{nq,(i+\theta)}) \frac{\left[\begin{array}{c} \lambda_\phi(1-\bar{S})(1-\sigma) \\ [q(1-c_w)(1-\tau)\alpha_w \\ + q_1(1-c_p)(1-\tau)\alpha_p] Y \end{array} \right]}{\left(\begin{array}{c} I_{qi} + I_{nq,(i+\theta)} + \lambda_\phi(1-\bar{S})(1-\sigma) \\ [q(1-c_w)(1-\tau)\alpha_w \\ + q_1(1-c_p)(1-\tau)\alpha_p] Y \end{array} \right)} \right]$$

units and this at given Y results in excess demand in goods market. Hence Y will increase. Now following a unitary rise in Y , excess demand falls by unity but there happens expansion in consumption expenditure and increased supply of new loan to priority sector leading to rise in investment. As a result, net fall in excess demand becomes $[1 - [(c_w\alpha_w + c_p\alpha_p) + \bar{S}(1-\sigma)[q(1-c_w)\alpha_w + q_1(1-c_p)\alpha_p](1-\tau)]]$ units.

However, increased savings leads to increase in supply of new loans to the tune of $[(1 - \lambda)(1 - \bar{s})(1 - \sigma)[q(1 - c_w)\alpha_w + q_1(1 - c_p)\alpha_p](1 - \tau)]$ units and consequently interest rate is to fall by $[-(I_{qi} + I_{nq,(i+\theta)}) + \lambda_\phi(1 - \bar{s})(1 - \sigma)[q(1 - c_w)(1 - \tau)\alpha_w + q_1(1 - c_p)(1 - \tau)\alpha_p]Y]$. Therefore, there happens an increase in aggregate demand by $[(I_{qi} + I_{nq,(i+\theta)}) [(I_{qi} + I_{nq,(i+\theta)}) + \lambda_\phi(1 - \bar{s})(1 - \sigma)[q(1 - c_w)(1 - \tau)\alpha_w + q_1(1 - c_p)(1 - \tau)\alpha_p]]Y]$ units. Thus, the net fall in excess demand is $[1 - [(c_w\alpha_w + c_p\alpha_p) + \bar{s}(1 - \sigma)[q(1 - c_w)\alpha_w + q_1(1 - c_p)\alpha_p](1 - \tau)](1 - \tau) + [(I_{qi} + I_{nq,(i+\theta)}) [(I_{qi} + I_{nq,(i+\theta)}) + \lambda_\phi(1 - \bar{s})(1 - \sigma)[q(1 - c_w)(1 - \tau)\alpha_w + q_1(1 - c_p)(1 - \tau)\alpha_p]]Y]$ units. Thus, for unitary fall in r , the ultimate increase in Y happens to the tune of:

$$\left[\frac{\left[\frac{\left[\begin{array}{l} \} \zeta (1 - \bar{s})(1 - \tau) \\ \left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] Y \\ \left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] \end{array} \right]}{(I_{qi} + I_{nq,(i+\theta)}) \} \zeta (1 - \bar{s})(1 - \tau)} \right]}{1 - (c_w r_w + c_p r_p) + \bar{s}(1 - \tau) \left[\begin{array}{l} q(1 - c_w)r_w \\ + q_1(1 - c_p)r_p \end{array} \right] (1 - \tau)} + (I_{qi} + I_{nq,(i+\theta)}) \left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] Y \right]} \right]$$

units. This expression can in turn be reduced to:

$$\left[\frac{\left[\frac{\left[\begin{array}{l} \} \zeta (1 - \bar{s})(1 - \tau) \\ \left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] Y \\ \left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] \end{array} \right]}{(I_{qi} + I_{nq,(i+\theta)}) \} \zeta (1 - \bar{s})(1 - \tau)} \right]}{1 - (c_w r_w + c_p r_p) + \bar{s}(1 - \tau) \left[\begin{array}{l} q(1 - c_w)r_w \\ + q_1(1 - c_p)r_p \end{array} \right] (1 - \tau)} \right]}{\left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] Y} \right]$$

Thus, the multiplier effect on Y comes into being. Following this, the supply of new to micro enterprises multiplies to:

$$\left[\frac{\bar{s}(1 - \tau) \left[\begin{array}{l} q(1 - c_w)r_w \\ + q_1(1 - c_p)r_p \end{array} \right]}{\left[\begin{array}{l} \} \zeta (1 - \bar{s})(1 - \tau) \\ \left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] Y \\ \left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] \end{array} \right]}{(I_{qi} + I_{nq,(i+\theta)}) \} \zeta (1 - \bar{s})(1 - \tau)} \right]}{(1 - \tau) \times \left[\frac{1 - (c_w r_w + c_p r_p) + \bar{s}(1 - \tau) \left[\begin{array}{l} q(1 - c_w)r_w \\ + q_1(1 - c_p)r_p \end{array} \right] (1 - \tau)}{(I_{qi} + I_{nq,(i+\theta)})} \right]}{\left[\begin{array}{l} q(1 - c_w)(1 - \tau)r_w \\ + q_1(1 - c_p)(1 - \tau)r_p \end{array} \right] Y} \right]} \right]$$

This is what has been illustrate in fig.1. The CC curve shift downwards reflecting the fall in interest rate at given Y and this results in excess demand in goods market leading to rise in Y and thereof, increase in the equilibrium investment by micro-enterprises from I_M^e to $I_M^{e'}$.

Recession and Micro-finance as Counteractive Response

Now we shall examine the counter-

recessionary role of microfinance acting through fiscal stimulus. To this end we make wage share of income increasing in such fiscal stimulus and so holds for \bar{S} .

Thus $\alpha_w = \alpha_w(\bar{S}), \alpha'_w > 0$.

Thus we have the dispensation as depicted in fig.3.

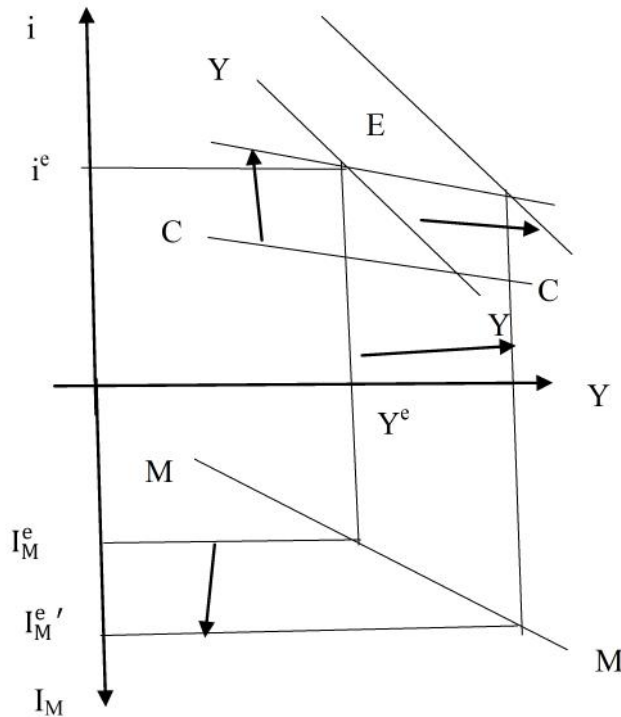


Figure - 3

In the above figure, YY schedule shifts rightward with doubly expanding on back of the uptick in consumption

expenditure by workers and expansion of investment spending by micro-enterprises. This would seemingly create

a possibility for crowding effect on the other components of aggregate investments due reallocation of credit toward micro sector, but the possibility gets nipped by the larger expansion of savings resulting from expansion of Y . Thus, ultimately Y ends rising and the interest rate ends up falling. Moreover, the investment by large firm would remain relatively inelastic to interest rate depending on the degree of recession, hence the magnitude of potential effect would be relatively lower. Now we shall elucidate the same mathematically and thus it follows:

$$\frac{dY}{d\bar{S}} \left[\frac{c_w r'_w + (1-\dagger) \left[\frac{q(1-c_w)(1-\dagger)r_w}{+q_1(1-c_p)(1-\dagger)r_p} \right] Y}{1-(c_w r_w + c_p r_p) + \bar{S}(1-\dagger)} \right] > 0 \quad \dots(9)$$

Let us now explain (9). Following unitary increase in \bar{S} , ceteris paribus investment by micro enterprises picks up by $[(1-\sigma)[q(1-c_w)\alpha_w + q_1(1-c_p)\alpha_p](1-\tau)Y]$ units and resultantly with the increase in share of wage income, aggregate consumption rises by $[c_p\alpha'_p(1-\tau)Y]$ units. Thus, the

overall increase in aggregate demand in goods market becomes $[c_p\alpha'_p + (1-\sigma)[q(1-c_w)\alpha_w + q_1(1-c_p)\alpha_p + \bar{S}_q(1-c_w)\alpha_w](1-\tau)Y]$. Thus, Y will have to increase to clear off excess demand. Now, the rest of the portion follows as already explained before.

Impact of rise in Non-Performing Asset on Microfinance

Here we shall examine how a rise in non-performing asset due to the default medium and large firms adversely effects the credit flow to micro-enterprises and this in turn makes the overall economy suffers. This is particularly true about less-developed countries where micro-enterprises are predominant source of employment as they use relatively labour-intensive technique, while medium and large are dependent relatively capital-intensive techniques. The increase in NPA(N) leads to sale shares issued by banks and reducing their net worth and capital adequacy ratio inducing deleveraging and thereof, fall in supply of credit. Moreover, such adverse development brings down the investment by microenterprises and thereof, drags down the share of wage. Now we are going quantify this dispensation by making \bar{S} a falling function of N as banks fail to comply government mandated fraction of loans to be allocate to micro enterprises covered under priority sector lending norm. Under the binding capital adequacy norms, the planned supply of new loan to non-priority sector is linked new shares used by banks as:

$$L_s = \left(\frac{1}{y} \right) E_s \quad \dots(10)$$

Now, the demand for shares is given by:

$$E_D = q_2 \alpha_P Y, \quad q_2 = 1 - q_1 = q_2(N), \quad q_2' < 0 \quad \dots(11)$$

Now, herein, we assume price of share is fixed, so that there arise two plausible cases - (a) $E_D \leq E_S$ and (b) $E_D > E_S$

Now, for capital adequacy norm to be binding, we get the planned supply of loans to non-priority sector as

$$L_S = \left(\frac{1}{y}\right) E_D = \left(\frac{1}{y}\right) q_2 \alpha_P (1 - \tau) Y \quad \dots(12)$$

In this case, the loan market equilibrium gets rephrased to:

$$I_q(i, \varepsilon_1) + I_{nq}(i + \theta, \varepsilon_1) = \left(\frac{1}{y}\right) q_2 \alpha_P Y, \quad \eta = \eta(N), \quad \eta' < 0 \quad \dots(13)$$

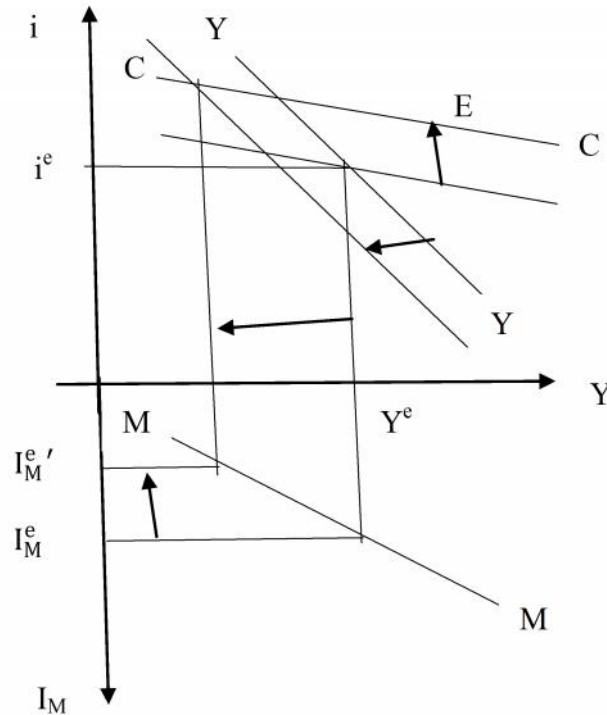


Figure - 4

The above figure demonstrates how following spike in NPA, the credit supply contracts leading rise in interest rate at

given Y which is essentially what upward shift in CC signifies. Moreover, contraction of credit flow to micro

enterprises leads to contraction consumption by wage earners at large and therefore, aggregate demand shrinks leading to leftward shift in YY schedule. As a results equilibrium Y fall while interest rate rises and on the other side, the equilibrium investment by micro enterprises contract. Let us now quantify this dispensation. This has performed by comparative static exercise and results of which are as follows

$$\frac{dY}{dN} \left[\begin{array}{l} \left[c_p r'_p + (1-\tau) \left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] \bar{s}' \right] (1-\tau) Y \\ \bar{s}(-q_2')(1-c_p)r_p \\ - (I_{qi} + I_{nq,(i+.)}) \\ \left[(1-\tau)(1-\tau) \left[\begin{array}{l} (\bar{s}') \left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] \\ + (1-\bar{s}')(-q_2')(1-c_p)r_p \end{array} \right] (1-\tau) \\ \frac{[(I_{qi} + I_{nq,(i+.)})]_{\zeta} (1-\bar{s})(1-\tau)}{\left[\begin{array}{l} q(1-c_w)(1-\tau)r_w \\ + q_1(1-c_p)(1-\tau)r_p \end{array} \right] Y} \end{array} \right] \\ \frac{1-(c_w r_w + c_p r_p) + \bar{s}(1-\tau)}{\left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] (1-\tau)} \\ \frac{(I_{qi} + I_{nq,(i+.)})}{(1-\tau)(1-\bar{s})(1-\tau)} \\ \frac{\left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] (1-\tau)}{[(I_{qi} + I_{nq,(i+.)})]_{\zeta} (1-\bar{s})(1-\tau)} \\ \frac{\left[\begin{array}{l} q(1-c_w)(1-\tau)r_w \\ + q_1(1-c_p)(1-\tau)r_p \end{array} \right] Y}{\left[\begin{array}{l} q(1-c_w)(1-\tau)r_w \\ + q_1(1-c_p)(1-\tau)r_p \end{array} \right] Y} \end{array} \right] \dots(14)$$

$$\frac{dI_M}{dN} \left[\begin{array}{l} \left[c_w r'_w + (1-\tau) \left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] \bar{s} \right] \\ - \bar{s}(q_2')(1-c_p)r_p \\ - (I_{qi} + I_{nq,(i+.)}) \\ \left[(1-\tau)(1-\tau) \left[\begin{array}{l} (\bar{s}') \left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] \\ + (1-\bar{s}')(-q_2')(1-c_p)r_p \end{array} \right] (1-\tau) \\ \frac{[(I_{qi} + I_{nq,(i+.)})]_{\zeta} (1-\bar{s})(1-\tau)}{\left[\begin{array}{l} q(1-c_w)(1-\tau)r_w \\ + q_1(1-c_p)(1-\tau)r_p \end{array} \right] Y} \end{array} \right] \\ \frac{\bar{s}(1-\tau) \left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] (1-\tau)^2 Y}{1-(c_w r_w + c_p r_p) + \bar{s}(1-\tau)} \\ \frac{\left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] (1-\tau)}{(I_{qi} + I_{nq,(i+.)})} \\ \frac{(1-\tau)(1-\bar{s})(1-\tau)}{\left[\begin{array}{l} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{array} \right] (1-\tau)} \\ \frac{\left[\begin{array}{l} q(1-c_w)(1-\tau)r_w \\ + q_1(1-c_p)(1-\tau)r_p \end{array} \right] Y}{[(I_{qi} + I_{nq,(i+.)})]_{\zeta} (1-\bar{s})(1-\tau)} \end{array} \right] \dots(15)$$

The impact of spike in NPA on Y is ambiguous. It is so because following an increase in NPA due to consumption plus priority sector investment effect aggregate demand contracts by $[(c_w \alpha'_w + (1-\sigma) [q(1-c_w)\alpha_w + q_1(1-c_p)\alpha_p] \bar{s}' - \bar{s} (q_2') (1-c_p)\alpha_p] (1-\tau) Y$ units, while due to increase in

investment of non-priority sector owing credit reallocation effect, aggregate demand rises by

$$\left[\frac{-(I_{qi} + I_{nq,(i+,)}) \left[\frac{(-\bar{s}') [q(1-c_w)r_w + q_1(1-c_p)r_p] + (1-\bar{s})(-q_2')(1-c_p)r_p}{(I_{qi} + I_{nq,(i+,)}) + \bar{s}(1-\bar{s})(1-\dagger)} \right] (1-\dagger)}{\left[\begin{matrix} q(1-c_w)(1-\dagger)r_w \\ + q_1(1-c_p)(1-\dagger)r_p \end{matrix} \right] Y} \right]$$

units. Hence the ultimate effect on Y dependent relative strength of positive effect vis-à-vis negative effect and the same holds true credit constrained for micro-sector activities.

Now consider the case of binding NPA norms. For this the consequence of spike in NPA is as follows.

$$\frac{dY}{dN}$$

$$\left[\frac{\left[\begin{matrix} c_w r'_w + (1-\dagger) \left[\begin{matrix} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{matrix} \right] \bar{s}' \end{matrix} \right] + \bar{s} [(-q_2')(1-c_p)r_p + q(1-c_w)r'_w \bar{s}'] (1-\dagger) Y + \left[\left(\frac{1}{y^2} \right) y' q_2 + \left(\frac{1}{y} \right) q_2' \right] r_p}{1 - \left[\begin{matrix} (c_w r_w + c_p r_p) + \bar{s}(1-\dagger) \\ \left[\begin{matrix} q(1-c_w)r_w \\ + q_1(1-c_p)r_p \end{matrix} \right] + \left[\left(\frac{1}{y} \right) q_2 r_p (1-\dagger) \end{matrix} \right] \end{matrix} \right] (1-\dagger)} \right] \dots(16)$$

The equation (16) reveals impact of a spike in NPA on Y and thereof on credit flow to micro sector. The terms in denominator is positive so as ensure market clearing as for the goods market. Let us now explain the term in the numerator. The term $[c_w \alpha'_w + (1-\sigma)[q(1-c_w)\alpha_w + q_1(1-c_p)\alpha_p] \bar{s}'$ signifies the fall in aggregate demand led by the contraction of consumption of workers and investment by micro-enterprise. However, the term $\bar{s}' [(-q_2')(1-c_p)\alpha_p + q(1-c_w)\alpha'_w \bar{s}'$ is ambiguous and the term

$$\left[\left(-\frac{1}{y^2} \right) y' q_2 + \left(\frac{1}{y} \right) q_2' \right] r_p$$

indicates the contraction of investment by non-priority sector due to worsening of capital adequacy conditions of the banks consequent upon the spike in NPA. Thus, the net effect on Y is more likely to be negative than otherwise and so is for the credit flow to priority sector.

Conclusion

Microfinance Institutions (MIs) are playing very important roles for developing and less developed countries. In this study we try to present why traditional banking ecosystem may not desirably propitious for credit needs of micro enterprises and thus the warranty behind having institutional setup to cater the credit needs of this vulnerable but crucial sector of less-developed economy in as much as issues unemployment, migration and income equality are concerned. Through Micro foundation of credit aversion we show that the strictly positive value of the degree of risk

premium is associated with the value of the fraction of credit for micro-enterprises or zero. Then this paper examines the macro implications of microfinance in closed economy framework. First, we present the impact of introduction of MIs in the less developed economy. Assuming a three sector economy it is found that the inception of MFI-led credit ecosystem brings down the risk premium. Introduction of MFIs also brings down inter-sectoral wage difference in unskilled labour and can potentially help reduce the incentive migration which takes role in creating urban unemployment and urban poverty. Besides, there is possibility of the wage inequality between skilled and unskilled labour to narrow down and along with that it opens up the way to eradication of rural poverty as well. So it proves an improvement in overall welfare in the economy with the introduction of micro-finance ecosystem. We also examine how a rise in non-performing asset due to the default medium and large firms adversely effects the credit flow to micro-enterprises and this in turn makes the overall economy suffers. Due to rising NPA contraction of credit flow to micro enterprises leads to contraction consumption by wage earners at large and therefore, aggregate demand shrinks leading to leftward shift in YY schedule. As a results equilibrium Y i.e. import competing sector fall while interest rate rises and on the other side, the equilibrium investment by micro enterprises contract.

Conflict of Interests

The authors declare that there are no conflict of interests that are directly or indirectly related to this research work.

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