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Microcredit and Poverty Alleviation:

Can microcredit close the deal?

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Abstract

This paper explores the relationship between microcredit and poverty reduction. To investigate this question, we posit a bare-bone, household model that outlines the economic environment within which various types of family microenterprises operate. It highlights a number of issues that impinge on household earnings such as the nature of the labour market, technology, product demand and entrepreneurial skills. The paper argues that the impact of microcredit is likely to be different across household types as well as across different economic environments. The paper identifies several important demand and supply constraints to the household's graduation from poverty. These constraints are difficult to overcome in a traditional economic environment, marked by stagnant technology and market saturation. Finally, it is suggested that microcredit has a positive effect on female empowerment—i.e., the agency to make household decisions which helps to improve the quality of family consumption and 'human development indicators' of the family. This claim may hold sway in some contexts. However, our *a priori* reasoning, as well as the available contrary empirical evidence, suggests that …

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female empowerment does not spring automatically from the introduction of microcredit: female empowerment (or the lack thereof) seems to closely track women's trajectory of economic success.

I am working to achieve a world in which there will be a poverty museum in every country, so that people will be able to remember the time when poverty was a widespread affliction. And everyone will wonder why it took so long for this bane of mankind to be finally banished forever.
Muhammad Yunus[1]

1 Introduction

In the wake of the worst famine of Bangladesh in the post-world war era, Professor Muhammad Yunus launched in 1976 a microcredit experiment to assist a group of poor, highly indebted households in Chittagong, Bangladesh.[2] This experiment that was later to emerge as the Grameen Bank marked the beginning of the modern-day microcredit movement, which in the last few decades has blossomed into a global phenomenon. While precise data are difficult to obtain, the total volume of microcredit lending (as of February 2011) is reported to be about US$65.2 billion, covering more than 94 million borrowers from 1,800 microfinance institutions in nearly 130 countries (MIX 2011). This phenomenal success of microcredit in such a short time span has attracted global attention from policy makers, development economists, and social thinkers—culminating in the award of the Nobel Peace Prize for Muhammad Yunus and the Grameen Bank in 2006. The idea of microcredit as an effective tool of poverty reduction is now widely embraced by individuals of diverse and conflicting ideologies. For example, among its converts, it counts liberal economist Jeffrey Sachs (2005)[3] and rock singer and social activist Bono[4] on the one hand, and free-market enthusiast and anti-aid best-selling author Moyo (2009)[5] on the other.

A considerable volume of literature now analyses different dimensions of microfinance—see for example, Aghion and Murdoch (2006); Karlan and Morduch (2010). In popularizing modern-day microcredit, an important contribution of Muhammad Yunus—besides his role as an indefatigable interlocutor between the global poor and the international development community—has been his innovations in credit contracts that made the poor bankable. These innovations in the form of joint liability, peer-monitoring, and dynamic incentives have helped today's microcredit programmes to overcome such issues as adverse selection and

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[1] From an interview with the Eemagazine of Credit Suisse. Available at: http://emagazine.credit-suisse.com/app/article/index.cfm?fuseaction=OpenArticle&aoid=246543&lang=EN (accessed 19 July 2012)

[2] See Yunus (2010) on the genesis of the Grameen Bank.

[3] Sachs (2005) envisions a pivotal role for microcredit in the process of economic development. According to Sachs (2005: 27) 'The key to ending extreme poverty is to enable the poorest of the poor to get their foot on the ladder of development. The ladder of development hovers overhead, and the poorest of the poor are stuck beneath it. They lack the minimum amount of capital necessary to get a foothold, and therefore need a boost up to the first rung.'

[4] Bono extols the virtues of microcredit as a viable tool for long-term poverty reduction: 'Give a man a fish, he'll eat for a day. Give a woman microcredit, she, her husband, her children and her extended family will eat for a lifetime' (*New York Times*, 21 September 2005).

[5] While Bono and Moyo may have diametrically opposite views on the role of foreign aid in economic development and poverty reduction, they share a similar, positive perspective on microcredit.

moral hazard that traditionally bedevil the access of the poor to credit.[6] By demonstrating that the poor are bankable and by providing access to credit, present-day microcredit programmes have made a contribution toward fostering a degree of financial inclusiveness that did not exist before.

Notwithstanding this success, there is a good deal of skepticism about microcredit as a tool of poverty reduction. Despite a considerable increase in micro-lending in developing countries, poverty shows few signs of abating in many poor countries.[7] This persistence of poverty has generated widespread doubt, which has been reflected in both public scholarship and academic studies, about the effectiveness of microcredit. For example, in an incisive commentary in *New Yorker* magazine, Surowiecki (2008) echoed this concern, 'There's no doubt that microfinance does a tremendous amount of good, yet there are also real limits to what it can accomplish. Microloans make poor borrowers better off. But, on their own, they often don't do much to make poor countries richer.'

Similarly, a substantial body of academic studies by economists and other social scientists records a similar note of scepticism. In an earlier survey paper, Weiss and Montgomery (2004) reviewed empirical economic studies that delve into the question of the effectiveness of microcredit in poverty reduction. The central message that emerges from the paper is that the empirical evidence regarding the impact of microcredit on poverty is far from conclusive. In a recent review of the evidence, Duvenduck et al. (2011) sound a similar note of caution, 'There is no clear evidence yet that microfinance programmes have broadly positive impacts.'

Though some of the empirical studies report a favourable impact, the effect has often been weak and muted; moreover, some of the major studies that found a favourable impact have recently been challenged. Here three landmark studies from Bangladesh are worth highlighting. Pitt and Khandker (1998), using the instrumental variable method, conclude that microcredit increases consumption expenditure, reduces poverty, and increases non-land assets. In particular, the 'headline' result was that annual household expenditure increases by 18 *taka* for every additional 100 taka borrowed by women, compared with 11 taka borrowed by men.[8] Using the same dataset but applying a different estimation methodology—the difference-in-difference approach—Morduch (1998) finds that microcredit has little or no effect on poverty, although it reduces consumption volatility of the poor. Using household-level panel data, a subsequent study by Khandker (2005) finds the impact of microcredit on poverty much weaker compared to his earlier study with Pitt (Pitt and Khandker 1998). He concludes that, although microcredit has had a positive effect on the very poor (it raises their consumption and non-land assets), it has had little effect on aggregate poverty. In a recent paper, Roodman and Morduch (2011) attempt to replicate the afore-mentioned three econometric studies on Bangladesh—although most of their attention is focused on the

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[6] Much of the theoretical literature on the subject has analysed these issues—see, for example, Stiglitz (1990); Besley and Coate (1995); Ghatak (2000); Laffont and N'Guessan (2004); Rai and Sjostrom (2004).

[7] There is little consensus on the role of microfinance in economic development. For example, Islam (2009) makes a spirited case for microfinance to foster inclusive growth by promoting an egalitarian initial distribution. On the other hand, Bateman and Chang (2009) contend that microfinance has no critical role to play in the process of economic development; they argue that the recent miraculous economic transformation of China and other East Asian economies took place without the visible presence of microcredit.

[8] This is the basis for the claim made by Muhammad Yunus that 5 per cent of the Grameen borrowers got out of poverty every year.

influential Pitt and Khandker (1998) study. In so doing, they argued that the Pitt-Khandker results could not be replicated with data and their replication leads to significant results that are of the opposite sign! However, the Roodman and Murdoch effort was vitiated by two serious flaws—one econometric and another data-related—which once corrected restore the Pitt-Khandker results. However, Roodman and Morduch continue to claim that the Pitt-Khandker results do not establish a causal relationship between microcredit and poverty, a contention which has been duly refuted by Pitt (2011).[9]

Past empirical literature, based on observational data, was often marred by various endogeneity issues and marked by controversies over identification strategies and instrumental variables. Partly in response to these issues, recent years have seen the advent of the method of randomized control trials (RCTs), which can overcome some of the technical econometric problems that plagued earlier empirical studies.[10] Recent studies of this genre include Banerjee et al. (2009), and Karlan and Zinman (2010), who do not find any robust evidence of positive impact of microcredit on poverty. Banerjee et al. (2009) investigate the impact of microcredit in 104 slums in urban Hyderabad, India. They find that access to microcredit has had no impact on the poverty of the treatment group (measured by average monthly expenditure per capita); however, it led to an increase in expenditure on durable investments and higher profits in existing businesses, despite higher competition from new businesses. As the study was conducted 15-18 months after the opening of the microcredit programme, the results did not capture the longer run impacts of the programme (that would emerge after the conclusion of the study). This is particularly important as graduation from poverty is a slow and arduous process.

Similarly, Karlan and Zinman (2010) conduct a randomized study to identify the impacts of credit expansion for microentrepreneurs in Manila, Philippines. They report that access to credit led to a set of counter-intuitive results, including a reduction in business investments, increased profits due to dismissal of unproductive labour, and substitution of formal insurance for informal risk-sharing arrangements. They also note that the treatment effects are stronger for male and higher-income entrepreneurs compared to the females, who are the typical targets of microcredit.[11]

These RCT studies—even under idealized circumstances[12]—simply measure the 'average effect' of microcredit at a particular time and place. Individuals do differ in their use of

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[9] Morduch and Roodman also claim that the Pitt-Khandker results are highly sensitive to small changes in data.

[10] RCT studies, however, have their own limitations, as noted, among others by Deaton (2009). Rashid (2012) offers an insightful critique of RCT as a tool for evaluating microfinance.

[11] While the above studies relate to microcredit, Dupas and Robinson (2010) investigate the impact of access to bank accounts. Working with a community bank in Kenya, Dupas and Robinson find that access to bank accounts had differential impacts between men and women. While this access enabled females to substantially increase their savings, productive investment and personal expenditure, it had no measurable impact for men. However, the study has had a number of shortcomings, including the small size of the sample, the single site of the market and a single bank branch. Given these limitations, it is far from clear whether the results are generalizable to other contexts.

[12] But in reality, most RCTs hardly conform to the ideal. In a recent conference on Debates on Development, organized by New York University Development Research Institute on 12 March 2012. As Angus Deaton highlights the invisible methodological flaws that affect RCTs:

> RCTs are so highly regarded because people assume that the randomness of the selection eliminates bias. What people don't talk about is that there are actually two stages of selection. The first stage, in

microcredit and arrive at different outcomes. Similarly, different economic environments are likely to yield different outcomes to microcredit. In light of this, the recent RCT studies, with no undergirding model and an exotic-mix of results, seem to represent too thin a crust of evidence on which to base serious policy conclusions.[13]

In sum, the recent empirical literature is riven by controversy: it has yielded few robust results and shed little light in clarifying the outstanding policy issues. This inconclusiveness of the literature largely reflects the weaknesses of the current studies as well as the coarseness of available tools for analysis. With its focus on the 'average', the empirical literature has suffered twin failures. First, it failed to go beyond the averages to identify the characteristics of successful cases and explore policy options. Second, it failed to recognize the fact that the impact of microcredit, like many other development interventions, is context-specific, contingent on the supporting environment and not amenable to easy generalization.[14]

In this paper, we seek to broaden the scope of the inquiry. Rather than asking the usual binary question—whether or not microcredit is effective in reducing poverty—we reframe the question: under what conditions does microcredit work? In so doing, we explore the various links between microcredit and poverty reduction.[15] We also explore whether microcredit, with its emphasis on female lending, has other qualitative impacts on family wellbeing above and beyond simple pecuniary effects.[16]

In exploring the links between microcredit and poverty, we limit ourselves to income-poverty. This is an obvious simplification as poverty is a multi-dimensional concept.

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which researchers start with the entire population, and choose a group which will in the second stage be randomly divided into the study and control groups, is NOT random. Selection in the first stage may be determined by convenience or politics, and therefore may not be representative of the entire population. At the same time, the studied populations in RCTs are actually very small, which means that an outlier in the experimental group can have a huge distortionary effect.

The above excerpt is taken from the web posting of the proceedings of the conference. Available at : http://nyudri.org/initiatives/deaton-v-banerjee/ (accessed on 21 July 2012).

[13] The authors of these studies are themselves aware that the method does not underwrite any strong claim for external validity. For example, Karlan and Zinman (2011, 1283) note that whether or how microcredit works requires replicating the research across different settings to 'reveal whether treatment effects truly differ across settings, or whether the existing muddle is due more to methodological differences (and flaws).'

[14] The situation seems to be similar to many other development interventions. For example, the macroeconomic evidence on aid effectiveness has been highly contentious and yielded few generalizable results (see, for example, Arndt et al. (2009)). The success of foreign aid, akin to microcredit, has been to a large extent very context-specific.

[15] Theoretical work on this topic is almost non-existent. An exception is a recent paper by Ahlin and Jiang (2008) who explore, within the context of an occupational choice model, the long-run impact of microcredit on individual economic outcomes. Differentiating technologies into a hierarchy of three categories—subsistence, self-employment and entrepreneurship—Ahlin and Jiang argue that microcredit opens up self-employment opportunities for many who would otherwise work for wages and lowers the use of both the least-productive subsistence technology and the most-productive entrepreneurial technology. They note that while the long-run impact of microcredit on economic development is indeterminate, it has a salutary effect on poverty and income inequality. It may be mentioned here that the focus and the method of the current paper are significantly different from the Ahlin and Jiang paper.

[16] Drawing on his own experience from the Grameen Bank, Yunus (2010) notes: 'Female borrowers brought much more benefit to their families than male borrowers. Children immediately benefited from the income of their mothers.'

However, in addition to examining the impact on the borrower's income, we also investigate the impact of microcredit on female empowerment and the pattern of consumption. To investigate these questions, we rely on arguments that are based on a bare-bone model. As the purpose of this article is not to make a contribution to the analytics of the area, but to sort out the arguments germane to the question, the model has been kept deliberately simple. It abstracts from such considerations as imperfect information and uncertainty, issues that have featured prominently in other theoretical works, as cited earlier. While these aspects are important to address the question of the failure of the rural credit markets and ways to overcome them, they are somewhat less central to the subject of this paper. Instead, this paper highlights such issues as the nature of the labour market, technology, product demand, entrepreneurship, and intra-household decision-making. We will argue that these are the aspects that have a critical bearing on household poverty in an impoverished, rural setting.

The organization of the paper is as follows. Section 2 spells out the basic model and traces its implications for household incomes and poverty. Section 3 explores numerically the link between microcredit and graduation from poverty under a set of plausible assumptions. Section 4 extends the basic model to examine the economic effects of expanding microcredit programmes on microenterprises. Section 5 discusses the impact of microcredit on female empowerment and family consumption. Section 6 provides a brief summary of conclusions.

2   The model

2.1   Assumptions

Assume a rural household with two adult members—a male and a female. Each household is endowed with a unit of labour, and each member owns half of the unit. The female does not work outside the home but organizes a microenterprise with the microcredit available to her. In many traditional societies, female labour is non-traded in the market place[17] but products of home-based microenterprises are marketed. This is a salient assumption of the current model.[18] The male can work outside the home at an exogenously given wage rate, $\bar{w}$. Besides working as a casual worker in the rural labour market, the male can participate—depending on the marginal return—in the home-based microenterprise with the female. The wage rate for a casual worker can be at the subsistence or the below-subsistence level, depending on the state of the economy. Casual rural workers, who represent the bottom rung of the rural poor, often earn a below-subsistence wage rate in many poor countries. This wage rate can be lower than

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[17] As Mammen and Paxson (2000) have noted, women are primarily engaged in family enterprises in poor countries. They note a number of reasons for it: 'At one extreme, laws may restrict women from working outside the home; Afghanistan offers a current example. Custom or social norms may also limit the ability of women to accept paid employment, especially in manual jobs. Finally, off-farm jobs may be less compatible with child rearing, creating fixed costs of working off-farm' (p.141). However, even though social norms prohibit women from participating in paid employment in rural areas, it is not uncommon for women in many countries, including Bangladesh, to participate in paid employment in urban areas—e.g., the garment industry, where the labour forces is overwhelmingly female. Usually, social norms are more observed in rural than in urban areas.

[18] This model highlights self-employment of the female in the household, which is a critical element of the microcredit story of many countries. Despite the salience of self-employment in the real world, there is not much analysis of the issue in economics. In the Nobel lecture, Yunus (2007: 54) laments this: 'I have tried to demonstrate that credit for the poor can generate self-employment and generate income for them. By recognizing the household as the production unit and self-employment as a natural way for people to make a living, the economic literature has missed out an essential feature of economic theory.'

the poverty-threshold, which is for simplicity assumed to be z. In other words, we shall assume that the poverty line for a household of two (husband and wife) is given by z.

2.2 Household optimization

Next, we will assume that the household decision-making process entails a two-stage optimization. In the first stage, the household makes a decision with respect to credit. In the second stage, it makes a decision with respect to the allocation of male effort between the home enterprise and the (outside) casual labour market. At the first stage, it is assumed the female can avail herself of microcredit to organize a microenterprise[19], although the microcredit institution fixes the amount and the interest rate. Let us assume that the production function of the microenterprise is given by:

$$Q = A\pi K^a L^{(1-a)}$$

where Q, A, K, L denote output, the technological progress parameter, the amount of loan provided to the household and the amount of labour allocated to the microenterprise respectively. Finally, π represents an entrepreneurial efficiency factor that augments output. It is assumed that π directly reflects entrepreneurial abilities: the more entrepreneurial the female is, the higher the value of π. In the following, we shall assume that $\pi = 1$. This is the case of a representative microentrepreneur with an 'average 'level entrepreneurial ability. We shall relax this assumption in a subsequent section.

The above production of the microenterprise can be expressed in intensive form:

$$q = Ak^a$$

with k being the amount of loan per worker provided to the family microenterprise. As is obvious, the higher the level of A, the greater the level of productivity. Finally, it is assumed that $0 \prec a \prec 1$, which means that the productions function exhibits the usual neoclassical property of diminishing marginal productivity. With the above assumptions, the net income of the microenterprise, w, is the difference between the net revenue, Apk^a, and the interest cost of the loan, rk (where p is the price of output and r is the interest rate) is given by:

$$w \equiv Apk^a - rk \tag{1}$$

At the first stage, if the borrower is given the option to maximize the net-income, she would borrow k up to the point where the marginal productivity of capital is equal to or the less than the interest rate: $Apak^{a-1} \leq r$.

Denote the value of k, where this marginal-productivity condition is satisfied, as $k*$. In other words,

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19 The model assumes that microcredit is used only for productive purposes. This simplifying assumption, which precludes the possibility of credit being used for inter-temporal consumption, helps us to focus sharply on the role of credit in addressing long-term poverty.

$$k* = \arg\max [\, Apk^a - rk \,] \tag{2}$$

And the corresponding value of w is given by:

$$w* \equiv w\ (k*|r, A, p) \equiv [\, Apk^{*a} - rk* \,] \tag{3a}$$

It may be noted that $w*$ is the maximized value of net earnings of the microenterprise (henceforth abbreviated as NEM) if there were no credit rationing; it essentially represents the implicit wage rate. When the female receives no credit, she cannot organize the microenterprise and NEM reduces to zero. Thus:

$$w*(0|r, A, p) = 0 \tag{3b}$$

The above discussion leads us to the following observation:

Observation 1: In our current setting, the home-based microenterprise provides an indirect mechanism for trading non-marketed female labour in the market. Without access to microcredit, female labour and entrepreneurship skills remain largely untapped—except for the purposes of household chores and other home-based non-pecuniary activities.
Now by simply applying the envelope theorem, it can be easily shown that NEM has the following properties:

$$\partial w*/\partial r \ \text{p} \ 0 \ \text{ for } \forall r \in (0, \overline{r}) \tag{3c}$$
$$\partial w*/\partial k \ \text{f} \ 0 \ \text{ for } \forall k \in (0, k*) \tag{3d}$$

Finally,
$$\partial w*/\partial A \ \text{f} \ 0 \ \text{ and } \ \partial w*/\partial p \ \text{f} \ 0 \tag{3e}$$

Eq. (3c) indicates that an increase in the interest rate decreases NEM. This is a maximum $r = \overline{r}$, such that $k* = 0$ and $w* = 0$. Eq. (3d) states that an increase in the size of the loan increases NEM as long as the household remains credit-constrained, i.e. the available credit $k \prec k*$. Finally, Eq. (3e) states that NEM is positively related to the productivity of microenterprise (the state of technology) and the price of the product produced by the microenterprise.

In the second stage, the household decides on the allocation of marketable work effort. While the female effort is sunk in the home enterprise, the male effort is divided between home enterprise and casual work, depending on the relative 'lucrativeness' of these two options. Assume that the male allocates a portion of his labour, e, to the home enterprise and a portion of his labour, $(1/2 - e)$ to the casual labour market place at a wage rate, $\overline{w}$. In other words, the household devotes in aggregate $(1/2 + e)$ units of effort to the home enterprise and

$(1/2-e)$ unit of effort to the wage labour market.[20] The optimizing decision of the household can be expressed as follows: [21]

To choose $e \in [0,1/2]$ To maximize $y \equiv (1/2+e)w* + (1/2-e)\overline{w}$.

Denoting $e* = \arg\max[y = (1/2+e)w* + (1/2-e)\overline{w}]$, we can characterize the properties of the optimal solution as follows:

$$w* - \overline{w} \prec 0 \text{ for } e* = 0 \tag{4a}$$

$$w* = \overline{w} \quad \text{ for } e* \in (0,1/2) \tag{4b}$$

$$w* - \overline{w} \succ 0 \text{ for } e* = 1/2 \tag{4c}$$

Eqs. (4a)- (4c) define the optimal value of $e*$ and the relationship between NEM to the casual wage rate. Substituting $e*$ into y, we can derive its maximized value $y*$, which we call net household income (NIH). The above can be summarized as follows:

$$y* = \begin{cases} (1/2)(\overline{w}+w*)with(w* \prec \overline{w}) \\ \overline{w} \\ w* \, with(w* \succ \overline{w}) \end{cases} if \begin{cases} e* = 0 \\ e* \in (0,1/2) \\ e* = 1/2 \end{cases} \tag{4d}$$

The above discussion leads to the following observation:

Observation 2: To maximize income, the household allocates its effort between the home-based microenterprise and the casual labour market, based on its calculus of respective marginal returns. When the marginal return from the microenterprise falls short of the casual wage rate, the household continues to devote all of its male work effort to the casual labour market and its income level remains constrained to the market wage rate. When NEM, the marginal return from the microenterprise, exceeds the casual wage rate, the household devotes all its male work effort to the microenterprise.

2.3 Household income function and poverty

Case (i) illustrates the worst case scenario, where NEM, the marginal return from microenterprise, is very low, even compared with income of the male member who works as a casual worker. In this situation, the male continues to work outside home for a wage-income and NIH (net household income) is: $y* = (1/2)w + (1/2)\overline{w} \prec \overline{w}$. Recall that the poverty threshold for a family is z. With $\overline{w} \prec z$, it is obvious: $y* \prec \overline{w} \prec z$. In this instance, NIH falls short of the poverty threshold. Nevertheless, this situation represents an

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[20] This basic framework excludes the possibility of hired workers, i.e., outside nonfamily workers being employed in microenterprises. This assumption is motivated by the observation that most microenterprises, which are supported by tiny loans, are typically small and managed exclusively by family labour. However, we shall relax this assumption in a latter section to explore the possibilities of replication and scaling up.

[21] Without any loss of generality, the current optimizing problem can be reformulated as a single-stage optimizing programme (see Appendix). However, the approach taken in the text affords easy intuitive economic explanation of the underlying economic logic.

improvement for the family over the case where there is no microcredit. Without microcredit, the female income (implicit wage) is $w = 0$ and NIH reduces to: $y* = (1/2)\overline{w} \prec \overline{w} \prec z$.

Case (ii) illustrates the situation where NEM is at the margin equal to the casual wage rate for the male. In this situation, the male member can either work in the microenterprise or in the casual labour market (or a combination of the two). NIH is given by: $y* = \overline{w} \prec z$. Once again, the family remains mired in poverty, with NIH falling behind the poverty threshold.

Case (iii) represents the best of the three scenarios, where the male's marginal earnings from working at the microenterprise exceed the wage rate as a casual worker in the rural labour market. In this instance, the male works full-time at the microenterprise and NIH is given by: $y* = w \succ \overline{w}$. However, even in this case, the household may not necessarily escape poverty, as the household income may not be high enough—due to low prices and productivity—to exceed z, the poverty line. Moreover, when $w* \succ \overline{w}$, it might unleash forces that might bring $w*$ down to the level of $\overline{w}$. This may happen for the following reasons: When $w* \succ \overline{w}$, it might induce more families to seek borrowing from microcredit institutions. As Section V shows, an increase in the number of borrowers leads to an increase in the output of the microenterprises; this in turn leads to a decrease in the price (p) as these goods are internationally non-traded and the domestic market is limited. Next, as Eq. (3e) shows, with a decrease in p, there will be a decrease in $w*$. Thus, the dynamics of the situation may induce $w* \rightarrow \overline{w}$.

It may be noted in passing that the opposite dynamics may not work in reverse when $w* \prec \overline{w}$. The reason for this asymmetry is as follows. When $w* \prec \overline{w}$, it does not induce the female borrower to exit the credit market because such a move, which will reduce her income level to zero, would be worse than the status quo.

Observation 3: Assuming that the household wants to maximize its income, its income will remain equal to or below the casual labour market wage rate, as long as the household depends on casual work. As the casual wage rate is often low in most developing countries, the household income level is likely to fall below the poverty line. When the household is fully engaged in the microenterprise, its income will exceed the casual wage rate. Even in such a case, the dynamics of the situation may unleash economic forces that may bring household income to the casual wage level. If household income exceeds the casual wage level, it may, however, not necessarily exceed the poverty line.

2.4 Properties of NIH and implications for policy

Assuming the best-case scenario (where all the family efforts are devoted to the microenterprise), we can define NIH, which identifies the maximum household income $y*$ as: $y*(r,k,A,p) = \max[Apk^a - rk]$.

It can be shown by simple application of the envelope theorem that $y*$ has the following properties:

$$\partial y*/\partial r \leq 0 \text{ for } \forall r \in (0, \overline{r}) \tag{5a}$$
$$\partial y*/\partial k \geq 0 \text{ for } \forall k \in (0, k*) \tag{5b}$$

$\partial y*/\partial A \succ 0, \ \ \partial y*/\partial p \succ 0$ (5c)

The above properties of NIH suggest:

Observation 4: Reducing the interest rate and relaxing the credit constraint will increase NIH, the household income. Similarly, an increase in the price(s) of the product(s) produced by the microenterprise and an increase in its productivity will contribute to increasing NIH.

The last two factors (price and productivity) have a crucial bearing on the economic wellbeing of households. The first relates to the nature of goods and services they produce and their demands. These goods and services are essentially non-traded internationally, whose prices are determined locally and nationally. These prices remain low due to the low purchasing power of the people, reflecting poverty and low income of the society. One way out of this conundrum of depressed domestic demands and low prices is to change the product-mix of these microenterprises, away from non-traded domestic goods to traded international goods. However, this is not something easily achieved. Apart from education and skills, microenterprises would require for their economic success improved access to market information and technology as well as greater linkages with the international economy (including integration with international supply chains) than currently exist in poorer societies. Much of the growth and prosperity of East Asian small enterprises can be traced to their ability to liberate themselves from the shackles of depressed domestic demands through various types of integration—horizontal (clustering and networking) and vertical (sub-contracting) as well as local and international (Hayami 2006). This indicates that while micro-intervention is important, it needs to be supplemented by supportive policies at the macro-level.

The second factor relates to the supply side: low productivity of the microenterprise due to traditional and primitive technology that keeps the household income level low. The solution to this problem lies in the adoption and application of new, improved technologies in microenterprises.[22] No doubt, the advent of some kind of 'general purpose technology' that brings about quantum shifts in the production functions of the microenterprises can transform these enterprises both technologically and economically.

In this connection, an insight of Schultz (1964) from his famous book, *Transforming Traditional Agriculture,* is germane to the current discussion. According to Schultz, finance can play only a supportive, but not a transformative, role in alleviating poverty; the latter has to be played by innovative technologies—such as the high-yielding seed-fertilizer technology in agriculture —that can significantly augment productivity and growth. A similar argument was made by de Soto (2009), who notes, 'Production always takes priority over finance. As Adam Smith and Karl Marx both recognized, finance supports wealth creation, but in itself creates no value.' If this line of argument is correct, then microcredit can play an important, but only supportive, role in alleviating poverty—the prime impetus for growth and poverty reduction has to come from productivity-augmenting new technologies that apply to microenterprises. While technology has a critical bearing on poverty, the impact may not be instantaneous; it can take time for technology to get diffused, adapted and mastered by the

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[22] Some critics of microcredit, for example, Bateman and Chang (2009), argue that microfinance hinders the adoption of new technology by creating an environment that helps to perpetuate primitive technology and thwarts industrial upgrading.

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poor before they experience sustained improvements in productivity to cross the poverty threshold.

2.5 Entrepreneurial ability and poverty

In the basic model earlier, we have assumed homogeneous borrowers of 'average' ability. Next we introduce the possibility of heterogeneous microentrepreneurs of different abilities and explore its implications for poverty reduction. Recall that the production function of the microenterprise is represented by: $q = A\pi k^a$, where π represents an entrepreneurial efficiency factor that augments output.

To analyse further, let us assume without any loss of generality that the entrepreneurial efficiency factor π is related to entrepreneurial ability ξ by the simple function: $\pi = \exp(\xi)$. Further assume that $\xi \in (-\infty, \infty)$ and $\xi \Box N(0,1)$; that is, ξ is a standard normal distribution with mean 0 and variance 1.

Assume further that there is no credit constraint and both husband and wife are fully employed in the microenterprise. Noting that $\pi = \exp(\xi)$, NIH for the female with entrepreneurial ability ξ can be expressed as:

$$y^*(\xi) = \exp(\xi)(1-a)Apk^{*a} \tag{6a}$$

For the 'average' microentrepreneur, $\pi = \exp(0) = 1$ and the corresponding NIH and optimal

$k*$ are denoted by:

$$y^*(0) = (1-a)Apk^{*a} \equiv w* \tag{6b}$$

$$k*(0) = \arg\max(Apk^a - rk) \tag{6c}$$

Assume further $y^*(0) \equiv w* \prec z$, where z is the poverty line. In other words, the income of the average entrepreneur falls short of the poverty line. Also note that when $\xi = \infty$, then $y*(\infty) = \infty$.

It can be easily seen that $y*(\xi) = \exp(\xi)(1-a)Apk^{*a}$ is a continuous and increasing function of ξ, over the interval $[0, \infty]$. Further note that $z \in (w*, \infty)$, then the application of the mean-value theorem implies that there exists $\xi* \in (0, \infty)$ such that $y^*(\xi*) = z$.

Noting that $k^*(\xi) = \arg\max[\exp(\xi)Apk^a - rk]$, it can be demonstrated in a fairly straight-forward way that $k^*(\xi)$ is a monotonically increasing function of ξ. It can also be easily shown that: $k*(\xi) = \exp[\xi/(1-a)]k*(0) \succ k*(0)$ for $\forall \xi \succ 0$. This implies that individuals with higher entrepreneurial skills will borrow more and scale up their business operations.
In the basic model, we have assumed that the entrepreneur is endowed with an average level of entrepreneurial ability and does not hire any outside worker. However, this may not be a

realistic assumption for successful entrepreneurs with more than average levels of entrepreneurial abilities. To incorporate hired labour, we need to add more structure to the current bare- bone model. Assume that the microenterprise makes a return above the casual wage rate—i.e., $w \succ \overline{w}$—and wants to scale up her business. To scale up, she needs to hire outside workers; however, this involves two types of costs—wage cost and the cost of monitoring hired workers. For illustrative purposes, assume that, when n units of labour are hired, the enterprise incurs the market wage bill ($\overline{w}n$) and the monitoring cost (δn^2), where $\delta \succ 0$. It is assumed that the monitoring cost is strictly convex, implying that as more workers are hired, the marginal monitoring cost increases. Finally, δ can be interpreted a conversion factor that translates the psychological cost of monitoring into monetary cost. With these assumptions, the NIH of the scaled-up enterprise is given by:

$$y**(\xi) = y*(\xi) + y*(\xi)n - (wn + \delta n^2)$$

Note that $y**(\xi)$ denotes the NIH from the scaled-up enterprise, which is the sum of the NIH from the original enterprise (the first term) and the NIH from the expansion of business. The second term in the RHS denotes the income from scaling up and the third term inside the parenthesis indicates the total labour costs. Straight-forward maximization would yield the optimal amount of labour hired:

$$n*(\xi) = [y*(\xi) - \overline{w}] / 2\delta$$

As the above closed-form solution for $n*(\xi)$ indicates, scalability is fundamentally determined by the entrepreneurial ability in relation to different elements of costs for hired workers.

The above leads us to the next observation:

Observation 5: In an unfavourable economic environment, the 'average' microentrepreneur may be mired in poverty. That does not, however, preclude the possibility of others with higher than average entrepreneurial abilities (belonging to the right-tail of the normal distribution) from escaping poverty. There will be some individuals with high-level entrepreneurial skills who will be able to expand business beyond the basic household level with hired workers. The level of scalability will depend positively on individual entrepreneurial skills and negatively on the market wage and monitoring costs.

The above observation is corroborated by a whole slew of 'real life' microcredit success stories across the world; see, for example, Accion International and others (2010). This happens even when there are many others—even within the same programme—stumble and fail to cross the poverty line.

3   **Microcredit and poverty: numerical illustrations**

The following explores numerically the link between NIH and poverty graduation. In doing so, we will concentrate on the best-case scenario of the basic model. Recall that it assumes an entrepreneur of average ability; there is no credit constraint; and both husband and wife are fully employed in the microenterprise. In this case, NIH is given by:

$$y* = Apk*^a - rk* = (1-a)Apk*^a$$

For a household whose income lies below the poverty line, the Watts' measure of poverty; see, for example, Zheng (1993) is given by:

$$M \equiv \ln z - \ln y*$$

Next, we define $G \equiv y*/z$, which is the relative income of the poor as a proportion of the poverty line. This relative income of the poor, which is also known as the welfare ratio (see, Blackorby and Davidson 1987), reflects the extent of income shortfall (of the poor) from the poverty line. The Watts-index of poverty can thus be expressed as:

$$M = -\ln(y*/z) \equiv -\ln G, \text{ with } G \in (0,1) \tag{7b}$$

This shows that as the relative income of the household increases (implying a lower shortfall from the poverty line), the poverty index decreases. Next we explore the impact of productivity growth on graduation from poverty. To do so, we will assume:

$$A(t) = A(0)(1+\mu)^t \tag{7c}$$

That is, A, the productivity parameter, grows over time at a rate μ. Substituting (7c) into (7b), one can find the values of t when the household will be able to overcome poverty, starting at various levels of relative income. Three parameter values for productivity increase for the poor are set at 3 per cent, 5 per cent, and 8 per cent per annum. Figure 1 shows the exit time t is for different relative income levels. Two observations are in order regarding the figure. First, the figure refers to the average microenterprise, whose income is below the

Figure 1: Productivity growth and poverty exit time
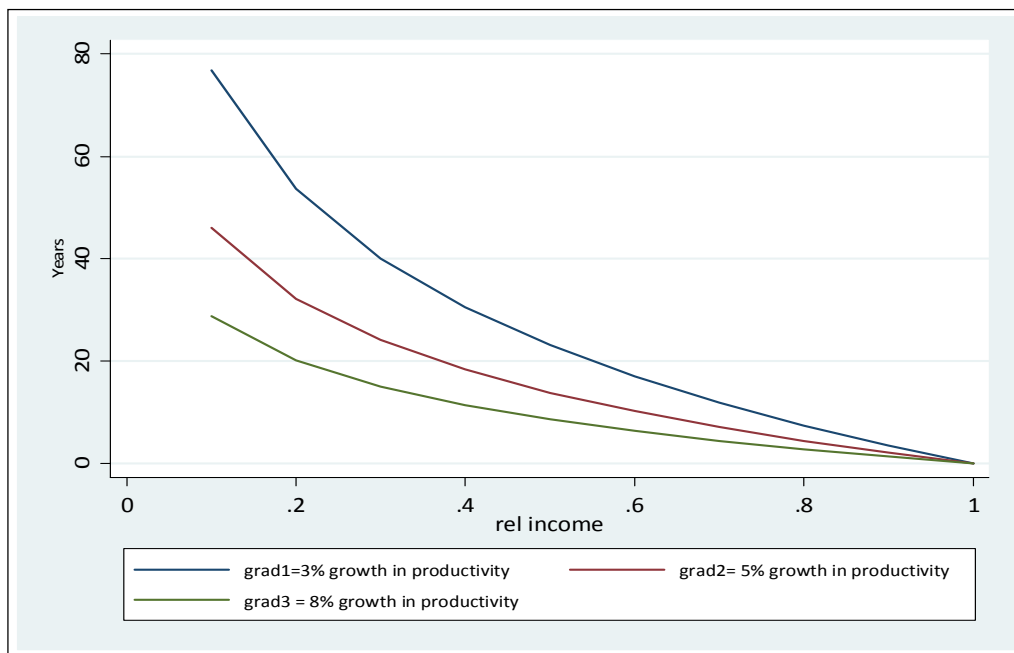
Source: author's illustration.

poverty line. In other words, the analysis does not apply to individuals with exceptional entrepreneurial abilities whose welfare ratios exceed unity. Second, we have assumed a fairly high rate of continuous productivity growth for microenterprises over the years. However, even with such optimistic assumptions—as the numerical simulations in the diagram indicate—it takes the household a fairly long time to claw its way out of poverty when the initial poverty-gap is significant.

Next, we note the role of entrepreneurship in overcoming poverty. The relative income of a poor microenterprise household with an entrepreneurial efficiency π is given by:

$$G \equiv (1-a)Ap\pi k*^{a}/z.$$

Recall that entrepreneurial efficiency factor π is related to entrepreneurial ability by $\pi = \exp(\xi)$. It is further assumed $\xi \in (-\infty, \infty)$ and $\xi \square N(0,1)$ such that $Mean(\xi) = 0$ and $Variance(\pi) = 1$. Thus, the relative income of the 'average' microenterprise household, with $\pi = \exp(0) = 1$, is given by: $G* \equiv (1-a)Apk*^{a}/z$.

It can be easily seen that $G = G*\pi$. If $G = 1$, then $G*\pi = 1$, which defines the relationship between relative income and the level of entrepreneurial efficiency required to overcome poverty. This implies that the poorer the economic environment (with lower productivity and output prices), the higher the level of entrepreneurial ability required to overcome poverty.[23] In a richer society with higher productivity and higher output prices, it is possible for even a person with an average entrepreneurial ability to escape poverty.[24]

Table 1: Entrepreneurship ability required to overcome poverty for various welfare ratios

Welfare Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Entrepreneurship Efficiency	10	5	3.3	2.5	2	1.7	1.4	1.3	1.1	1
Entrepreneurial Ability	2.30	1.60	1.19	.916	.693	.531	.337	.262	0.95	0

Source: author's calculations.

Table 1 illustrates the idea with numerical values. In a richer economic environment, an individual with an average ability can overcome poverty (the last column in the table), while in a poorer society with a harsher economic environment, it requires a much higher level of entrepreneurial ability. As one moves farther toward the columns to the left, one requires higher and higher levels of entrepreneurial efficiency to overcome poverty. However, these

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[23] The critical role of economic environment in entrepreneurial success was most starkly expressed by Warren Buffet, one of the most successful entrepreneurs in today's world, 'I personally think that society is responsible for a very significant percentage of what I've earned. If you stick me down in the middle of Bangladesh or Peru or someplace, you'll find out how much this talent is going to produce in the wrong kind of soil.' Cited in Collins et al. (2004: 17).

[24] In other words, this implies that as economic development takes place, the earnings of the average entrepreneur increases and so do the rates of success of microcredit. It was corroborated by Ahlin, Lin and Miao (2011), who note that the success of microcredit depends on the economic environment, which is determined by the state of the macro economy and its undergirding institutional environment.

levels of efficiency can be acquired by individuals of exceptionally high levels of entrepreneurial ability, which only exist in the extreme tail end of the normal distribution.

A quick summary of our earlier discussion is given below:

Observation 6: Even in the best-case scenario where the male member is fully employed in the microenterprise, it may take a period of sustained productivity growth for the poor household to graduate from poverty, depending on the household's position in the poverty scale. Similarly, it may take much higher than average entrepreneurial abilities (that lie in the extreme tail of the normal distribution) to overcome poverty, if the household finds itself situated at the bottom end of the poverty scale.

4   Microcredit and market saturation

In this section, we will discuss briefly how the expansion of microcredit can lead to a reduction in the incomes of the existing microenterprises through market saturation—a perverse possibility noted, among others, by Osmani (1989) and Bateman and Chang (2009).

To illustrate this, we will deviate from the simplifying assumption of a competitive product market. Rather than assuming that the price of the microenterprise product is exogenously fixed, we will posit the Cournot-type competition among microenterprises. Under Cournot competition, a microenterprise maximizes its income based on the assumption that its maximizing decision does not affect the decisions of its competitors. The results reported below follow directly from the standard Cournot model.

For brevity of space, we will limit ourselves to the best-case scenario where the male member of the family works for the household enterprise. We will further assume that there are n identical microenterprise units, which are producing a homogeneous good whose market demand is given by a linear demand function. It is a standard simplifying assumption:

$$p = u - vS \tag{8a}$$

where p indicates price; $u, v \succ 0$ are demand parameters; and $S = \sum_{i=1}^{n} q_i$ denotes aggregate demand and $S_{-i} = S - q_i = \sum_{i \neq j} q_i$, aggregate demand for all microenterprise units other than unit i.

Next, we derive the cost function of the i-th microenterprise unit, which is defined as: $C(q_i, r) = \min\{rk_i : Ak_i^a \geq q\}$. Optimization of the problem yields a simple solution: $C(q_i) = aq_i$. The cost function is a linear function of q_i and independent of r.

The net income of the i-th microenterprise is given by:[25]

$$y_i = pq_i - aq_i \qquad (8b)$$

Under the Cournot-Nash assumption, differentiating eq. (8b) with respect to q_i yields the first-order condition for maximizing income for the i-th microenterprise, which can be rearranged as: $q_i = \{(u-a) - vq_{-i}\}/2v$

As all enterprises are identical, then: $q_1 = q_2 = q_3 = ... = q_n = q$ and $q_{-i} = (n-1)q$

Each enterprise produces a quantity given by:

$$q = [(u-a)/2v] - [(n-1)q/2]$$

Further manipulation yields the following:

$$q = (u-a)/[(n+1)v] \qquad (8c)$$

Total output of all the microenterprises together is given by:

$$S = nq = [n(u-a)]/[(n+1)v] \qquad (8d)$$

Price is given by:

$$p = (a+na)/[(n+1)v] \qquad (8e)$$

Finally, the net income of each enterprise is given by:

$$y = (u-a)^2/[(n+1)^2 v] \qquad (8f)$$

From above equations it can be seen that the values of p and y decrease and the values of q and S increase as n increases. The above results can be summarized as follows:

Observation 7: As more households are given access to credit, more microenterprises emerge; assuming a Cournot-competitive market structure and linear, downward-sloping demand, an increase in the number of microenterprises leads to greater output for the microenterprise sector, but less output, price and NIH for the existing microenterprises.

This suggests that even though microcredit is good for households previously excluded from credit, it is not necessarily beneficial for the existing microenterprises due to market saturation. Bateman and Chang (2009) argue that the advocates of microcredit tend to

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[25] Alternatively, eq. (8b) can be been written as: $y_i = pq_i - rk_i$. However, we decided to express it in terms of the cost function: $y_i = pq_i - aq_i$ for ease of algebraic manipulation.

overlook this problem of negative demand externality—i.e., the possibility of economic immiserization of the existing microenterprises due to the expansion of the credit programme.

An obvious solution to this conundrum would entail expanding demand through access to the international market, which would involve changing the product mix and improving quality. However, enhancing international competitiveness would require a nurturing environment for microenterprises, supported by a congenial policy framework, encompassing macroeconomic, trade and sector policies. Without such a supportive environment, these microenterprises are likely to remain forever 'micro' with little or no forward and backward linkages and few employment possibilities (Chowdhury 2009).

5   Microcredit, female empowerment and family consumption

Recent years have seen the emergence of a sizeable literature on the impact of microfinance on female empowerment within the household (see for example, Pitt, Khandker and Cartwright 2006; Ashraf et al. 2010). This empowerment, which stems from increased income from microcredit, is likely to result in greater agency in household decisions and a changed pattern of family consumption. As women have distinctly different preferences from men (see for example, Lundberg et al. 1997) and are more inclined to spend on children and family goods, it is opined that female empowerment is likely to lead to higher spending in health, education and nutrition, expenditures that contribute to improved human development outcomes for the family (Duflo 2003).

The above views on empowerment should be juxtaposed against the views of authors—such as Goetz and Gupta (1996), Hunt and Kasynathan (2001) and Karim (2008)—who contend that microcredit has had little or no effect on female empowerment.[26] Moreover, it often results in spousal conflicts within the household, leading to domestic tension and even violence.

We will argue that both these apparently contradictory outcomes, which are seemingly salient in real world, are feasible with plausible assumptions in a standard economic framework.[27] In the following, we posit a collective household model a la Browning and Chiappori (1998). As Browning and Chiappori have shown, if the behavior of the household is Pareto-efficient, then the household preference function can be represented by a weighted utility function of the form:

$$\Omega = U(x)(1-d) + U*(x)d \tag{9a}$$

where U represents the preferences of the male over a bundle of consumption goods x, and $U*$ represents the preferences of the female over the same consumption bundle x. Finally, the weight $d \in [0,1]$ represents the bargaining power of the female in the intra-household allocation process. As the recent empirical literature suggests (see for example, Duflo and

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[26] In their RCT study of India, Banerjee et al. (2009) did not pick up any evidence of female empowerment, either.

[27] The real world represents a whole continuum of outcomes, rather than the binary outcomes that the bulk of the current body of empirical studies seems to convey. It is therefore important, particularly for policy purposes, to go beyond the binary 'average' and investigate the conditions that produce different outcomes.

Udry (2003), Anderson and Eswaran (2005) and Basu (2004)), the power coefficient d is an increasing function of the intra-household income distribution—i.e., the relative share of female-to-male incomes in the family. In the following, we use the notation as well as the analysis from Section II. First, we define: $\varphi \equiv w / \overline{w}$, the relative share of female to male incomes. Next, we assume, for purely illustrative purpose, the following empowerment rule. It follows a step function, which seems to be consistent with the available empirical evidence cited above[28]:

(i)   With no microcredit, $w = 0$; then, $\varphi = 0$, and $d(\varphi) = 0$. Similarly, when there is microcredit but $w \in (0, \overline{w})$; then $\varphi \in (0,1)$, and $d(\varphi) = 0$. In this case, with $d = 0$, female preferences are given no weight and the household utility function is identical to that of the male.

(ii)   When there is microcredit but $w = \overline{w}$; then $\varphi = 1$ and $d(\varphi) = 1/2$. In this case, with $d = 1/2$, both male and female preferences receive equal weights in the household utility function.

(iii)   When there is microcredit but $w \succ \overline{w}$; then $\varphi \succ 1$ and $d(\varphi) = 1$. In this case, with $d = 1$, male preferences receive no weight in family decisions.

Summarizing, the empowerment function is represented as a step function of φ:

$$d(\varphi) = \begin{Bmatrix} 0 \\ 1/2 \\ 1 \end{Bmatrix} when \begin{Bmatrix} \varphi \in [0,1) \\ \varphi = 1 \\ \varphi \succ 1 \end{Bmatrix} \tag{9b}$$

In this simple illustrative example, when $\varphi \in [0,1)$, the female empowerment—the female agency to make household decisions—is indicated by $d(\varphi) = 0$. However, Pitt et al. (2006) note that spousal arguments become common when women obtain an economic influence. With $\varphi \to 1$, one conjectures that power-struggle within the household intensifies till it reaches the tipping point at $\varphi = 1$ beyond which the power-balance shifts in female's favour. This diversity of outcomes as delineated above seems to be in accord with the experiences in many poor countries.[29]

This changing household power-balance has implications for the household consumption pattern. We have assumed that the male and the female have different preferences: the

[28] The essence of the empowerment rule posited here is that the member of the family who contributes the most to the household income makes the decisions, something akin to the corporate world where the shareholder owning more than half of the shares controls the company.

[29] That microcredit generates a diverse pattern of female empowerment was noted by Todd (1996). From monitoring the financial and personal lives of a group of woman borrowers in Bangladesh for over a year in the early nineties, Todd finds a close link between economic success and female empowerment. She classified these women borrowers into five different types, depending on how they exercised power in household financial matters—namely, 'managing directors', 'bankers', 'partners', 'cashbox plus' and 'cashox', in descending order of female empowerment. Todd notes that the majority of these borrowers belonged to the categories of partners or above (meaning that they were wielding equal or more power than men in household decision-making).

female attaches greater priority to family goods (health, education, and nutrition) while the male attaches a greater value to adult goods (cigarettes, and alcoholic drinks). For simplicity, we assume both have homothetic preferences with different weights for different goods:

$$U = f^a m^{(1-a)} \quad \text{with} \quad 0 \prec a \prec 1 \tag{9c}$$

$$U* = f^b m^{(1-b)} \quad \text{with} \quad 0 \prec b \prec 1 \tag{9d}$$

Where $U, U*, f, m$ denote the male utility function, female utility function, family goods, and adult goods, respectively. Further, note that $b \succ a$, implying that the female has a greater preference for family goods, , as compared with the male .

Case I: There is no microcredit and no female income. In this case, with $d(\varphi) = 0$ and $y* = (1/2)\overline{w},$ the household consumption is given by the vector:

$$(a\,\overline{w}/\,2\,p^f, (1-a)\overline{w}/\,2\,p^{m)}) \tag{9e}$$

where p^f, p^m denote the prices of family and adult goods, respectively.

Case II: There is microcredit and the female earns w , which is lower than $\overline{w}$. In this case,

$d(\varphi) = 0$ and $y* = (w + \overline{w})/2$, the household consumption vector is given by:
$$[a(w+\overline{w})/\,2p^f, (1-a)(w+\overline{w})/\,2p^{m)}] \tag{9f}$$

Case III: There is microcredit and the female earns w and $w = \overline{w}$. In this case, with

$d(\varphi) = 1/\,2$ and $y* = (\overline{w} + w)/\,2$, the household consumption vector is given by:

$$[a\overline{w} + b\overline{w}/\,2p^f, (1-a)\overline{w} + (1-b)\overline{w}/\,2p^m] \tag{9g}$$

Case IV: There is microcredit and the female earns w , such that $w \succ \overline{w}$. In this case, with $d(\varphi) = 1$ and $y* = w$, the household consumption vector is given by:

$$[bw/\,p^f, (1-b)(w)/\,p^m] \tag{9h}$$

Comparing Cases I–IV, it is evident that there is an increase in the consumption of family goods as female income increases. From Case I to Case II, there is an increase in consumption of family goods due to a rise in female income (income effect), even though there is no female empowerment in decision-making. From Case II to Case III, there is a further increase in the consumption of family goods due to both an increase in female income (income effect) and an increase in female empowerment in the household decision-making (empowerment effect). Similarly, from Case III to Case IV, there is a further increase in the consumption of family goods, due to both income and empowerment effects. In the latter

case, when the woman becomes the principal income earner, it brings further female-empowerment within the household.[30]

The above discussion provides some light on the variegated outcomes of microcredit on household decision-making. This leads us to the next observation:

Observation 8: As our simple but plausible example suggests, the introduction of microcredit does not automatically lead to female empowerment. The female empowerment outcomes due to microcredit can be quite diverse and is contingent on the impact on female income. When the female income from the microenterprise falls short of the male income, the female may continue to be marginalized in household decision-making. As the female income continues to increase, it enhances her agency within the household to make decisions. This process may eventually reach a tipping point when the balance of power shifts in her favour. This dynamics of female empowerment closely tracks her economic success, resulting in changes in the pattern of household consumption and wellbeing.

6   Conclusions

The paper has shown that access to microcredit has increased the money income of beneficiary households by creating self-employment for the female members in societies where female-work remains largely non-marketed. While microfinance can potentially help the economies of poor households by allowing them to utilize their female labour as well as explore their entrepreneurial abilities, it has not necessarily afforded them an expeditious escape out of poverty. The crux of the problem lies in the economic environment where the poor households find themselves. To begin with, the immediate factors that affect their incomes adversely are the credit-limits and relatively high interest rates charged by the microcredit institutions.[31] Even in the absence of difficult credit-market conditions, there are other challenging constraints to expanding the incomes of microenterprises. Of these constraints, two are fundamental to the process of graduation of the households from poverty.

The first relates to the supply side of the equation that keeps the productivity of these microenterprises low. All microenterprises are engaged in activities where traditional and primitive technologies predominate. This absence of modern technology —that partly reflect the lack of skills and education on the part of the microentrepreneurs, traits required to adopt new technology—keeps the productivity of the microenterprises low. Next, the other fundamental constraint relates to the demand side of the equation, where the products produced by microenterprises fetch low prices. Most products produced by these rural microenterprises are (internationally) non-traded domestic goods, whose prices are often low by world standards, due to inadequate domestic demands and weak purchasing power. Paradoxically, the explosive growth of microcredit programmes can further exacerbate this

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[30] As we have noted in Section 2.3, even in the best case scenario, the household income may fall short of the poverty line. In this case, female empowerment can take place even if the family remains in poverty. When this happens, it can have a salutary effect on the health, education, and nutritional outcomes of the family due to reordering of household preference.

[31] This is not to denigrate the benefits of financial inclusiveness that microfinance has brought about in many developing countries. Despite deficiencies, microcredit institutions certainly represent an improvement over the old system of usurious rural moneylenders that existed in many developing countries.

price problem. An easy availability of microcredit can lead to the mushrooming of microenterprises, and hyper-competition can lead to a glut of traditional rural consumption goods. The entry of new microenterprises tends to decrease economic returns to the existing enterprises, as this contributes to the glut in the markets they operate. In short, while microcredit can help facilitate the development of new microenterprises, it does not necessarily ensure reasonable financial returns, which are essentially determined by the economic environment (that is defined by the technology and the market conditions) wherein the microenterprises operate.

The escape from the twin challenges of low technology and weak domestic demand lies in enhancing productivity through access to improved technology on the one hand, and in promoting greater economic openness that fosters integration with the global markets and networks, on the other. However, addressing these twin problems is not easy, as they constitute the crux of the development challenge facing the poor countries. Nevertheless, without addressing these problems, the dream of consigning poverty to museums is likely to remain no more than a pious hope for a long time to come.

Finally, it is claimed that in addition to poverty reduction, microcredit has a salutary impact on family wellbeing through its influence on the pattern of household consumption. It is argued that microcredit, which creates economic opportunities, helps alter the household power dynamics, improves the woman's agency to make family decisions and tilts household consumption more toward family goods that improve health, nutrition, and educational outcomes. However, as the paper shows and the available empirical evidence appears to confirm, female empowerment does not automatically spring from the introduction of microcredit: female empowerment (or the lack thereof) closely tracks woman's trajectory of economic success.

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Appendix

Without any loss of generality, the household optimization problem can be alternatively stated as follows. We will adopt the same notation as we have done in the text. However, to avoid notational clutter, we have assumed the following: $\pi = 1$.

To choose (k, e)

to maximize: $y = Apk^a(1/2 + e) + \overline{w}(1/2 - e) - rk(1/2 + e)$ (A1)

such that $k \succ 0, e \in [0, 1/2]$ (A2)

The first-order conditions for maximization can be stated as follows:

$$\partial y / \partial k = aApk^{a-1}(1/2 + e) - r(1/2 + e) = 0 \tag{A3}$$

$$\partial y / \partial e = Apk^a - \overline{w} - rk \begin{cases} \succ 0 \\ = 0 \\ \prec 0 \end{cases} when \begin{cases} e = 1/2 \\ e \in (0, 1/2) \\ e = 0 \end{cases} \tag{A4}$$

Rearranging (A3) and (A4), it can be easily shown that:

$$rk = aq \tag{A5}$$

$$\overline{w} \begin{cases} \succ (1-a)q \\ = (1-a)q \\ \prec (1-a)q \end{cases} when \begin{cases} e = 1/2 \\ e \in (0, 1/2) \\ e = 0 \end{cases} \tag{A6}$$

Substituting (A5) and (A6) into (A1), we can derive the NIH function:

$$y^* = \begin{cases} (1-a)q \\ \overline{w} \\ 1/2[(1-a)q + \overline{w}] \end{cases} when \begin{cases} e = 1/2 \\ e \in (0, 1/2) \\ e = 0 \end{cases} \tag{A7}$$