

Are Microcredit Borrowers in Bangladesh Over-indebted?

Shahidur R. Khandker

Rashid Faruque

Hussain A. Samad

The World Bank
Development Research Group
Agriculture and Rural Development Team
August 2013



Abstract

Microcredit programs in Bangladesh have experienced spectacular growth in recent years, with a growing number of borrowers availing credit from multiple microcredit agencies. There is a growing concern that if there are not sufficient returns to borrowing from microfinance institutions (MFIs), some borrowers might be taking loans that they will not be able to repay. A household may be considered over-indebted, for example, if its debt liability exceeds 40 percent of its income or assets. Using a long panel of household survey data from Bangladesh, the paper finds that some 26 percent of microcredit borrowers are over-indebted on this

measure versus 22 percent of non-microcredit borrowers. Econometric analysis suggests that both MFI competition and multiple borrowing raise indebtedness. However, repeated borrowing, while it affects short-term liability adversely, does affect the long-term debt-asset ratio favorably. That is, repeated borrowing helps increase assets more than debt over time. Microcredit borrowers in Bangladesh are thus not necessarily over-indebted. But when borrowing is seen as protection against shocks such as floods even at the cost of being indebted, MFIs may offer micro-insurance schemes to safeguard borrowers against economic shocks.

This paper is a product of the Agriculture and Rural Development Team, Development Research Group. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at skhandker@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Are Microcredit Borrowers in Bangladesh Over-indebted?¹

Shahidur R. Khandker

Rashid Faruquee

Hussain A. Samad

JEL codes: G23; D69;

Keywords: Microfinance, poverty, indebtedness, Bangladesh

Sector Board: ARD

¹ Shahidur R. Khandker is lead economist in the Agriculture and Rural Development Unit of Development Research Group, Rashid Faruquee is a Visiting Research Fellow at the Institute of Microfinance (InM), and Hussain A. Samad is a consultant at the World Bank. The authors are grateful to Will Martin for helpful comments on an earlier draft and Kelley Smith for editorial assistance. The paper is part of a study jointly sponsored by the Research Committee of the World Bank and the Institute of Microfinance (InM), Bangladesh. Views expressed in the paper are those of the authors and do not reflect the views of the World Bank, InM or any other affiliated organizations.

Are Microcredit Borrowers in Bangladesh Over-indebted?

1. Introduction

Microcredit, originating in Bangladesh over three decades ago, has grown rapidly in recent years and provided credit to poor people, especially women, worldwide. Its success has attracted millions of clients, and many of them have access to multiple lenders (microfinance institutions or MFIs). Many clients also have access to micro-deposits and general payment services.

One of the original reasons for the success of microcredit was that microcredit providers had a good assessment of microcredit borrowers' willingness and ability to repay, resulting in high overall repayment rates. In recent years, however, some microcredit markets seem overextended and some borrowers have been taking loans that they would eventually face serious difficulties in repaying. Such borrowers may be characterized as "over-indebted". In recent years, microcredit programs have come under growing criticism and scrutiny because of the fear that they might have caused some borrowers to fall into a debt trap.

Generally a full understanding of the phenomenon of indebtedness in microfinance would require answers to questions such as: How severe is the indebtedness of microcredit borrowers? Does the indebtedness of microcredit borrowers have the potential to nullify all the welfare benefits of the program? Is indebtedness due to low returns to micro-investments or something else? Are the terms and conditions of microloans too stringent? Even if microfinance generates benefits over a short period of time, the accrued benefits may not be sustainable in the long run. For example, a lack of proper assessment of product demand may cause micro-entrepreneurs to face diminishing returns on micro-investments. When realized returns fall

short of expected ones, micro-entrepreneurs may borrow repeatedly, creating a vicious cycle of micro-debt dependency.

Growing indebtedness itself may not be alarming if a household's net worth (the value of assets net of its liability from all sources including microfinance) grows along with its loan portfolio, even with membership in multiple programs. It is likely that some households who have borrowed either from a single source or multiple sources are not over-indebted because their net worth has kept pace with or even exceeded their debt. However, this may not be the case for others. It is therefore important to identify the borrowers who are over-indebted, understand the reasons for such over-indebtedness, and determine corrective measures to prevent them.

In Bangladesh, MFIs report that they have about 35 million borrowers. Although there has not been any study of over-indebtedness, a few studies have examined the extent of multiple borrowing among microcredit borrowers.² The Institute of Microfinance (InM) has carried out a study on the extent and scope of multiple program membership. By December 2012, although the MFIs in Bangladesh reported 35 million borrowers, the actual membership was in fact only 25 million discrete borrowers, indicating some 40 percent with overlapping membership. The incidence of multiple program membership has increased rapidly over time, rising from only 9 percent in 2000 to 31 percent in 2009 (Khalily and Faridi, 2011). This study concludes, however, that households with overlapping membership accumulate higher net assets over time

² Multiple borrowing or overlapping membership is defined as borrowing from more than one Microfinance Institution (MFI) source for the same or similar purpose, and the terms apply to both individuals and households.

despite the increase in their loans. Thus, overlapping membership did not necessarily contribute to over-indebtedness, as this study suggests.³

However, findings from some other countries suggest that indebtedness and multiple borrowing may be positively correlated. For example, Vogelgesang (2003) finds that increasing competition among lenders and an easy supply of credit is associated with higher levels of indebtedness in Bolivia. On the other hand, some studies find a positive correlation between the length of loan maturity and indebtedness (Gonzalez 2008). Gonzalez (2008) also finds that the households with more experience with particular lenders are less likely to be over-indebted.

It is possible for over-indebtedness to grow if the overlapping households fail to increase their level of income and net savings. An increase in the income of the overlapping households will not be enough to reduce their indebtedness unless it is either used to repay loans, to contribute to net savings, or both. The role of overlapping memberships plus a host of other demand and supply factors are examined using longitudinal household survey data, given growing loan portfolios as well as asset-holding.

The purpose of this study is to examine the phenomenon of over-indebtedness among microcredit borrowers in Bangladesh, using a panel household survey over a 20 year period. The paper is organized as follows. Section 2 reviews the literature concerning alternative measures and possible sources of over-indebtedness. Section 3 describes the household panel survey data that is rich in measuring both short- and long-term measures of over-indebtedness. Section 4 analyzes the data in terms of the nature and extent of indebtedness among MFI and non-MFI borrowers and the proximate factors influencing the extent of over-indebtedness over time. Section 5 lays out a deterministic model to estimate the major causes of over-

³ Overlapping membership seems a problem when the lenders don't know who are overlapping members and hence the value of their security is less than they thought, and hence their assets are more risky than expected.

indebtedness (both demand-and supply-side factors). Section 6 discusses the results of the ultimate factors causing indebtedness including the possible effect of multiple program membership. Section 7 uses the household panel data to estimate the long term effect of microcredit on indebtedness, after controlling for household and community level explanatory variables of indebtedness including the extent of MFI competition measured by the density of MFIs at the community level. The final section concludes the paper and recommends actions for redressing or preventing over-indebtedness.

2. Concepts and drivers of over-indebtedness

Over-indebtedness is a complex concept that has been defined in multiple ways. Haas (2006) defines over-indebtedness as the inability of borrowers “to repay all debts fully and on time”. Others suggest that a household is over-indebted if it cannot meet its payment obligations arising from all debt contracts (Maurer and Pytkowska 2010; Wisniwski 2010). But over-indebtedness is a situation that occurs chronically over a period of time (Wisniwski 2010), and is often beyond the borrowers’ control (Schicks 2010). To count one as over-indebted, the debt problems need to be at least structural and persistent over a period of time (Canner and Lockett 1991; Fisher 1933; Faruqee, 2013).⁴

Researchers differ in assessing what level of repayment problems would be considered “over-indebted”. Some would count only legally bankrupt borrowers as over-indebted. Others would include, in the category of over-indebted, cases of defaults or arrears, or even all borrowers who struggle with an unhealthy debt balance. Other scholars have therefore proposed several indicators as proxies for indebtedness, such as multiple borrowing and asset debt ratios (Schicks and Rosenberg 2011). An operational definition of over-indebtedness can be constructed either as a continuous variable or a categorical variable. That is, while indebtedness

⁴ This paper’s literature review draws heavily from Faruqee (2013).

can be a ratio of liability over assets, which is a continuous variable, over-indebtedness can be measured as a categorical variable showing whether a particular borrower's liability exceeds a certain percentage of his or her asset values. Such a measure of indebtedness is based on stocks of cumulative debt and assets, and hence reflects medium and long-term measures of indebtedness.

Alternatively, indebtedness may be defined as the ratio of a household's monthly repayments divided by its monthly net income, a short-term measure of indebtedness (Maurer and Pytkowska 2010). This indebtedness ratio itself, however, does not show when the borrower can be considered over-indebted, in which case a threshold is required to indicate at what point in the debt-income ratio a borrower is deemed over-indebted. Accordingly, a household may be over-indebted if the client spent more between 50 percent and 75 percent of its income on debt servicing.

In a study from Ghana, 26 percent of all respondents find it easy to repay their loans, while about one-third struggle occasionally, 26 percent struggle more frequently but not all the time, and 17 percent struggle permanently with every single installment (Schicks 2010). Some 28 percent of the microcredit clients are found severely severely indebted or over-indebted in a study from Bosnia and Herzegovina (Maurer and Pytkowska, 2010), and concludes that borrowing from multiple sources and over-indebtedness go hand in hand. In a study from Kosovo, 25 percent of the microcredit clients were found over-indebted in different degrees (Spannuth & Pytkowska, 2011). This study also finds that the level of indebtedness increases with the number of active loan contracts, and that women are less frequently insolvent than men (3 percent insolvency among women versus 7 percent among men). These studies suggest that over-indebtedness is a serious issue in some countries, and is prevalent among 25 to 30 percent of MFI borrowers. In other words, over-indebtedness seems higher than the conventional wisdom about microcredit would suggest.

Following Schicks (2010), drivers of over-indebtedness may be external, lender related and borrower related. Among external factors, adverse shocks to income or expenses can make debt unmanageable. Similarly, the institutional and legal environment can enhance or reduce the risks of over-indebtedness. In microfinance markets in developing countries, institutional protection from over-indebtedness is weak, and a significant share of the responsibility for over-indebtedness lies with lenders. MFIs can push borrowers beyond their limits due to aggressive marketing that over-emphasizes portfolio growth. They may offer products that are not appropriate to the borrower's situation, enforce unrealistic installment schedules, resist the need to reschedule loan agreements, artificially limit maturities, delay disbursements, and the like. Micro lenders also contribute to over-indebtedness through their operating procedures, being too lax about up-front evaluations of repayment capacity, offering non-transparent terms and conditions or delegating approval decisions to people rewarded on the basis of loan approvals. Finally, microcredit borrowers may have a role in creating over-indebtedness due to personal difficulties, resisting temptation, and social pressures, which can lead to irresponsible borrowing decisions. The tendency towards over-borrowing also depends on borrowers' socio-demographic and economic characteristics. Some researchers cite factors typical for developing countries such as natural disasters and changes in government policies (e.g., new taxes that increase input prices) (Stearns 1991), economic or political crises, and fluctuations in foreign currency markets (Bensoussan 2009).

The institutional and legal environment can influence the behavior of the lenders and borrowers. For example, the existence of credit bureaus and the level of competition can enhance or reduce the risks of over-indebtedness. A system that allows easy flows of market information, judicial efficiency, and existence of reasonable credit alternatives is critical in mitigating the problem (Anderloni and Vandone 2008; Vandone 2009).

Whatever the institutional environment, over-indebtedness is ultimately created by lenders and borrowers. According to Vogelgesang (2003), MFI policies largely determine over-indebtedness and default levels. Microfinance institutions tend to underestimate their impact on borrowers' debt load, believing that their loans would substitute for existing informal loans with poor terms, although that is not the case. Another mechanism that may drive MFIs to loan too much to clients is their volume-focused incentive system for staff members (Brix and McKee 2010; DeVaney 2006; Rahman 1999).

MFIs may further increase over-indebtedness risks if they offer products that are not appropriate to their borrowers' situations. For example, if maturities are short and installment schedules are too inflexible, borrowers with volatile incomes may face problems repaying on time. The difficulties get exacerbated if MFIs are reluctant to reschedule loans for borrowers even when they have real liquidity difficulties.

The purpose and manner of loan use also affects repayment capacity. If a loan is used for activities that yield substantially lower return than the interest rate or yield no return (e.g., a loan used for consumption smoothing), over-indebtedness may follow. Also, the timing of loan disbursement can be crucial. In Bouquet et al.'s (2007) empirical work on Madagascar, disbursement timing was the most frequent product feature that borrowers cited as a reason for repayment problems. Productive investments, especially those subject to seasonality, require resources to be available when the investment opportunity exists. If MFIs do not disburse on time, borrowers do not earn the returns required for repayment.

Over-indebtedness may also arise from borrowers' behavior.. For example, Soman and Cheema (2002) find that borrowers inexperienced with credit and trusting the bank's judgment may erroneously view the size of their credit limit as the limit of what they can afford. High credit limits may encourage individuals to borrow beyond what they can really afford. Economic

characteristics causing indebtedness include low income (Anderloni and Vandone 2008), income instability (Webley and Nyhus 2001), low wealth (Del-Río and Young 2005; Disney, Bridges and Gathergood 2008) and low returns on the investment that the loan is used for (Gonzalez 2008; Hulme 2007).⁵

3. Long panel survey data and its characteristics

Microcredit has become an important instrument in Bangladesh and elsewhere to assist the poor. But as microcredit becomes more widespread and borrowing rises rapidly, policymakers are keen to know whether its benefits can be sustained in the long run. One long-term indicator of the welfare of MFI borrowers is their degree of over-indebtedness and how over-indebtedness relates to the increasing competition and supply of microcredit from a host of lenders. The current concerns about microcredit in Bangladesh actually may come from both supply and demand sides. On the supply side, there has been unprecedented growth (over \$2 billion annual disbursement and 30 million individual accounts), increased competition among NGOs, high interest rates despite competition and product innovations. On the demand side, rising competition among the borrowers for the limited markets, unskilled entrepreneurship, and more frequent weather-related disasters are making micro-investments less profitable and more risky. However, a study of over-indebtedness requires a longitudinal perspective with borrowing data from various sources including MFIs, as well as information on household assets and other characteristics and selected community characteristics.

Fortunately, our panel surveys have these data for households over a period of 20 years. The first survey in 1991/92 was carried out jointly by the World Bank and Bangladesh Institute of Development Studies (BIDS) to study the role of microfinance in poverty reduction for the

⁵ In what follows, we tried to implement an empirical model that attempts to identify some of the drivers of the causes of indebtedness from both demand and supply sides, notwithstanding the limitations of the survey data used here.

poor. This survey of 1,769 households was randomly drawn from 87 villages of 29 *upazilas* in rural Bangladesh.⁶ These households were revisited in 1998/99. Among the 1,769 households surveyed in 1991/92 survey, 131 could not be retraced in 1998/99, leaving 1,638 households available for the re-survey. The attrition rate is therefore 7.4 percent. The 1998/99 survey included also new households from both the original survey villages and newly included villages, for a total of 2,599 households (2,226 from the original villages and 373 from the new). Among the households in old villages, 279 households were newly-sampled households and 1,947 were original panel households. The number of panel households surveyed in 1998/99 (1,947 households) was more than that surveyed in 1991/92 (1,638 households) because some of the original households split after the first survey to form new households.

The households were resurveyed again in 2010/11 with the help of the Institute of Microfinance (InM). The resurvey tried to revisit all the households (2,599) surveyed in 1998/99. However, due to attrition, only 2,342 households were identified. The attrition rate during the third round survey is about 10 percent. Due to household split-off we ended up interviewing 3,082 households in 2010/11 with 740 households split off during this period.

There is a total of 1,509 households common to all three surveys and the analysis of this study is restricted to these households only. Table 1 shows the participation status in various programs in three surveys. Membership grew steadily for all programs with the exception of BRDB, a government program, which lost a good share of its members due to reorganization between the second and third survey waves. Grameen Bank is the largest among all MFIs, and its membership among survey households increased from 8.7 percent in 1991/92 to 15.1 percent in 1998/99, and then to 27.4 percent in 2010/11. Besides the four major programs, many other programs developed during the last 20 years, predominantly serving rural communities. In fact, the aggregate coverage of these programs is higher than the coverage of Grameen Bank, serving

⁶ An *upazila* is an administrative unit that is smaller than a district and consists of a number of villages.

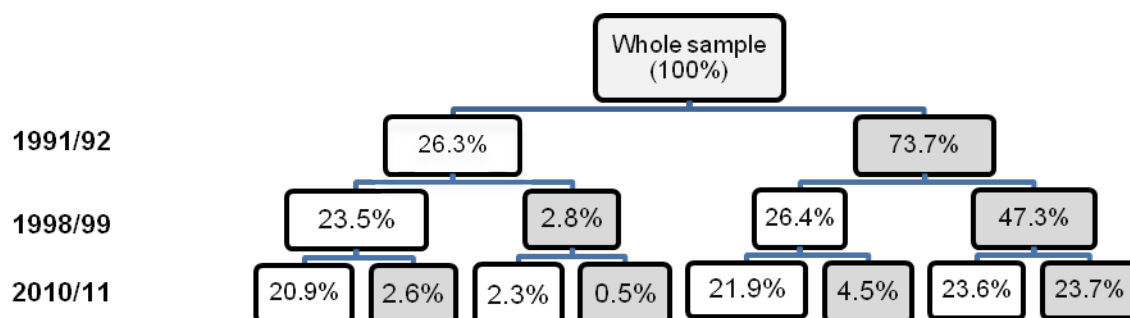
almost 33 percent of the rural households in 2010/11. One important aspect of microcredit participation is the overlapping or participation in multiple programs, which was almost nonexistent in the early 1990s but has grown significantly since then. In fact in 2010/11, among the Grameen Bank members in our study, almost 61 percent were also members of other programs (Khandker and Samad 2013).

The overall program participation rate increased from 26.3 percent in 1991/92 to 48.6 percent in 1998/99 and to 68.5 percent in 2010/11. Table 1 also shows that not all microcredit participants are borrowers. This may happen because new members of many programs have to wait for some time before they can borrow, and some programs also have non-borrowing membership plans which allow individuals to save money with microcredit programs. That said, a great majority of microcredit members are borrowers, as shown in Table 1. For example, in 2010/11, about 69 percent of the rural households were microcredit members, while microcredit borrowers constitute about 56 percent of the households, implying that 13 percent of the rural households are non-borrowing members.

Figure 1 presents the breakdown of original 1,509 households from 1991/92 to 2010/11 by program participation status. In 1991/92, only 26.3 percent of 1,509 households were microcredit program participants. By 1998/99, there was a 2.8 percentage point drop in the share of participants while there was an increase in participation of 26.4 percent from the original non-participants. Similar transitions continued as we can see in the 2010/11 survey data. A trend is clear from such transitions – at each stage over time, a very high proportion of the participants remained with the programs, and also a good proportion of non-participating households eventually joined microcredit program, resulting in substantial growth in

membership. Importantly, more than 80 percent of the participants from earlier years remained in the programs at least for 10 years.⁷

Figure 1: Transition of microcredit participation status over time: 1991/92-2010/11



4. Extent of indebtedness, multiple borrowing and credit constraints

Now consider the extent of indebtedness among these program participants over time. We follow two measures of indebtedness: one stock-based and the other flow-based. The stock-based measure of indebtedness is defined as the ratio of debts to assets, while the flow-based measure of indebtedness is the yearly loan payment over the yearly household income.⁸

Next, we define various degrees of indebtedness using some cut-off points. For both measures, households with an indebtedness ratio of 20 percent or less are considered un-indebted. Remaining households therefore have various levels of indebtedness. More specifically, households are moderately indebted if their indebtedness ratio is between 20 to 40 percent, over-indebted if it is between 40 to 60 percent, and severely indebted if it is over 60 percent. As indicated earlier, the stock measure is perhaps a better measure than the flow measure, as indebtedness is a long-term measure and hence, a household’s liability may be

⁷ One may counter this by arguing that these households are trapped as they cannot either graduate or opt out from microcredit programs. We will see shortly if this counter-argument is valid.

⁸ The stock-based measure excludes land asset from the calculation of indebtedness, since the value of land has sky-rocketed in last 8-10 years, making it somewhat unstable. Even after including land in asset, the trends in the asset-debt ratios do not change much.

better measured against its assets, rather than its income. Moreover, income generation is a process rather than an end in itself; hence, accumulated debt at a particular point of time is better assessed against accumulated assets. However, debt servicing obligations must be met from income, and from that point of view the flow measure may better reflect the current situation of the households. We therefore present the extent of indebtedness using both measures in this paper for comparison.

Table 2 presents the distribution of different types of indebtedness among the sample households over the study period 1991/92 to 2010/11. The aggregate measures of indebtedness over the three periods are remarkably similar for both flow (income-liability) and stock (asset-liability) measures. Thus, 24.3 percent of the households, as per the asset-liability measure, and 25.1 percent, as per the income-liability measures, were indebted on an average over the 20 year period. While 6 percent are over-indebted by any measure, more than 10 percent were severely indebted; that is, liability constitutes more than 60 percent of the assets or income of these households.

As per the asset-liability measure, while 20.5 percent were indebted in 1991/92, 30.6 percent were so in 2010/11, implying an annual increase of less than one percentage over the period of 20 years. The percentage of over-indebted borrowers also increased from 4.8 percent in 1991/92 to 6.7 percent in 2010/11, while 9.5 percent were severely indebted in 1991/92 compared to 14.6 percent in 2010/11. However, the percentage increase in the incidence of indebtedness (for all types) is higher for the income-liability measure. For instance, the share of severely indebted households rose from only 1.3 percent in 1991/92 to 19.9 percent in 2010/11. These findings are consistent with those from other countries such as Bolivia and India.

The findings reported in Table 2 are all based on rural households. Table 3 shows similar distribution for MFI and non-MFI borrowers (who borrow from commercial and

agricultural development banks). Interestingly, both types of borrowers are indebted but at different levels, as the extent of indebtedness is generally higher (although not statistically significant always) for MFI borrowers than for non-MFI borrowers. For example, according to the stock measure, overall, some 17 percent of the MFI borrowers are severely indebted compared to 13 percent of the non-MFI borrowers. Indebtedness also increased for both groups over time. For example, among the MFI borrowers, some 10 percent were moderately indebted in 1991/92, compared with 18 percent and 19 percent in 1998/99 and 2010/11, respectively.

One possible reason for rising indebtedness is the increase in incidence of multiple program membership or multiple sources of borrowing. Table 4 presents the distribution of program membership (single program borrowers versus multiple program borrowers) over time by the extent of indebtedness. Multiple program membership has increased over the years: it was nonexistent in 1991/92, 11.9 percent in 1998/99 and 36 percent in 2010/11 (Table 4). As Table 4 suggests, indebtedness is higher for multiple program members than for single program members. For example, as per the stock measure, in 1998/99, over-indebtedness was 9.1 percent for single source borrowers compared to 12.3 percent for multiple source borrowers. In the same year, the corresponding figures for severe indebtedness were 17.9 percent and 25.7 percent, respectively. Therefore, indebtedness is highly correlated with borrowing from multiple sources. Lenders do not know if their borrowers have loans from other lenders unless borrowers reveal this.

Why do households borrow from multiple sources? One possible reason for multiple program membership is a credit constraint. A household is considered credit constrained if its loan amount, given the interest rates and other terms, is less than the desired amount. In other words, the household is likely to seek additional credit from other sources, to satisfy its unmet demand. The decision to borrow from multiple sources may thus depend on the extent of the

credit constraint a borrower encounters at her first choice of lender. In other words, a single source borrower may have been less credit constrained than a multiple source borrower.

We compare the distribution of multiple MFI memberships with the extent to which households are credit constrained (Table 5).⁹ We find that incidence of multiple program membership is much higher among the credit-constrained households than among those who are not credit constrained. This percentage has risen over time. Thus, in 1998/99, some 16 percent of credit-constrained households were borrowers from multiple programs compared to 7.5 percent among those who were not credit constrained. In 2010/11, this percentage increased to 55.3 and 33 percent, respectively.¹⁰

Does the extent of indebtedness then vary by the extent of credit constraint? Table 6 shows this distribution. Overall, the extent of indebtedness is higher for credit constrained households than for credit unconstrained households, and this difference also grew over time. For example, according to the stock measure of indebtedness, we find that among credit constrained households, 31 percent were indebted in 1991/92, rising to 49 percent in 1998/99 and 57 percent in 2010/11. The corresponding figures for the credit unconstrained households were 34 percent in 1991/91, 44 percent in 1998/99 and 43 percent in 2010/11. If borrowing from multiple sources was primarily caused by unmet demand for credit, and the higher amounts of borrowing were mostly for supporting productive uses of loans, we would expect less indebtedness among the multiple source borrowers. But as we see in Table 4, this is not the

⁹ This is determined by asking the households if they would have demanded more loans than they obtained given that all terms and conditions remain the same.

¹⁰ Note that while the incidence of multiple borrowing among the credit-constrained households is higher than that among the unconstrained households for individual years, the aggregate figures show a reverse pattern. That is because the number of borrowers for the credit-constrained households in 2010/11 is much smaller than that for the credit-unconstrained households during the same period, and this pushes the aggregate average for the constrained households to a lower value than that for the unconstrained households.

case. That is, the extent of indebtedness is higher among multiple source borrowers than among single source borrowers. This finding is consistent with both measures of indebtedness.¹¹

However, the extent of indebtedness may not always be a reliable measure of the welfare of a household. Because the extent of indebtedness is defined somewhat arbitrarily by cutoff points, we are not sure if household net worth (a stock measure of total value of assets net of outstanding loans from all sources) accumulated over time follows a similar pattern. In fact, as Table 7 suggests, although un-indebted households had significantly more net worth than their corresponding indebted households in earlier years (1991/92 and 1998/99), the difference in net worth of these two groups was not statistically significant in 2010/11. In fact, overall we did not find any significant difference in net worth between those who were indebted and those who were not indebted, by any measure. Similarly, overall net worth is not necessarily higher for a single source borrower than for a multiple source borrower (Table 8). However, the same relationship is not valid for a credit constrained household against a credit unconstrained household, although we see no such statistical difference in each year. Household net worth does not vary significantly between the credit-constrained households and unconstrained households in any given year; however, unconstrained households have a higher net worth overall, which is statistically significant (Table 9).

These findings suggest that even if the multiple program members borrow more and are more credit constrained than single source borrowers, it does not follow that multiple source borrowers are worse off than single source borrowers. Hence, the incidence of multiple source borrowing is not necessarily a scenario of high indebtedness for MFIs in Bangladesh. Yet the fact the incidence of multiple source borrowing has risen to as high as 40 percent in recent years suggests that rising MFI competition has perhaps contributed to the growing multiple program

¹¹ There is an alternative explanation. Households that are poor credit risks have to go to multiple lenders to get the credit they want.

membership and rising indebtedness in Bangladesh. This, however, is not necessarily a major source of concern as net worth of the borrowers is also rising over time. In what follows, we address whether the village-level density of MFIs measured by the numbers of NGOs in a village, a possible source for raising multiple program membership and a measure for MFI competition, is causing the extent of over-indebtedness in Bangladesh.

5. Estimating determinants of indebtedness with panel data

As we saw earlier, both demand- and supply-side variables affect the observed outcomes of indebtedness among microcredit borrowers. The demand-side variables (say a vector X) are measured by household characteristics such as age, education, and gender of the borrower and those of his/her spouse, type of business/enterprise owned, dependency ratio, land assets, etc. as well as household shocks such as exposure to natural calamities (e.g., flood), death of family members, or losses in income-generating activities. All these variables are likely to determine the extent of demand for loans as well as the loan absorption capacity of the borrowers.

On the other hand, the supply-side variables (say vector B) include rates of interest charged for various types of loans or savings products offered by different NGOs, the extent of NGO coverage in each sampled village (which measures the degree of competition among MFIs), and the types of products offered by NGOs. In addition, we include village and community infrastructure variables such as availability of commercial banks, electricity, roads, schools, and markets. They are expected to influence both returns to private investment financed by NGOs and to portfolios offered by NGOs, and thus, are proxies for both supply- and demand-side indicators of the extent of over-indebtedness as observed at the household or enterprise level.

However, the problem in estimating the role of demand, supply and environmental factors in indebtedness is that program placement by NGOs in villages is non-random, and household participation in microcredit programs is highly self-selected. Moreover, the

environmental factors are contextual and very much depend on the agroclimatic setting of the villages. In this case, simply regressing indebtedness as a measure of welfare on household-, program-, and community- level variables using cross-sectional data would be biased in estimating what influences the degree of indebtedness. Panel surveys, especially long panel surveys, are useful in estimating the causal effects of these supply- and demand-side factors on the level of indebtedness.¹² This is what we discuss below.

To estimate the net effects of both demand- and supply-side variables on indebtedness, consider the following indebtedness outcomes (Y_{ijt}) of i -th household living in j -th village in period t :

$$Y_{ijt} = \alpha X_{ijt} + \rho B_{jt} + \eta_{ijt} + \mu_{jt} + \varepsilon_{ijt} \quad (1)$$

where α measures the effects of demand-side variables (X), including household-level program participation in a microfinance program, and ρ measures the effects of supply-side variables (B), such as the presence of MFIs and commercial banks in the village as well as community-level variables including weather shocks. Also, η_{ijt} represents household-level time-varying heterogeneity, μ_{jt} represents community-level time-varying heterogeneity and ε_{ijt} is a non-systematic error.

Calculating deviations of all variables from their respective mean values equation (1) can be written as,

$$(Y_{ijt} - \bar{Y}_{ij}) = \alpha(X_{ijt} - \bar{X}_{ij}) + \rho(B_{jt} - \bar{B}_j) + (\eta_{ijt} - \bar{\eta}_{ij}) + (\mu_{jt} - \bar{\mu}_j) + (\varepsilon_{ijt} - \bar{\varepsilon}_{ij})$$

¹² The empirical model may not capture the role of all factors, including the institutional factors, that influence the extent of indebtedness because of lack of information available from the survey data used here. However, because of the panel data fixed-effects method, the bias due to such omitted variables may be minimal, as these omitted variables may not vary much over time. Hence, their roles are controlled by the fixed-effects method.

$$\square \Delta Y_{ijt} = \alpha \Delta X_{ijt} + \rho \Delta B_{jt} + \Delta \eta_{ijt} + \Delta \mu_{jt} + \Delta \varepsilon_{ijt} \quad (2)$$

Since the terms, η , μ , and ε are correlated, consisting of unobserved village and household heterogeneity, and cannot be differenced out over time, the simple OLS estimation of equation (2) will be inconsistent. More specifically, because of time-varying unobserved village and household heterogeneity, panel estimation models such as FE techniques may not yield consistent estimates, since we cannot difference out the time-varying unobserved heterogeneity. There are two possible ways we can control for the resulting bias. One is to apply a FE method to model (2) that controls for initial household and village characteristics. The idea behind this approach is that initial factors control for the time-varying heterogeneity that correlates the errors of borrowing and outcome equations. More specifically, following Jalan and Ravallion (1998), we rewrite model (2) as

$$\Delta Y_{ijt} = \alpha \Delta X_{ijt} + \rho \Delta B_{ijt} + \gamma X_{ij0} + \delta B_{j0} + \Delta \varepsilon_{ijt} \quad (3)$$

where X_{ij0} is a vector of household- and community-level demand-side variables of the initial year (i.e., 1991/92) and B_{j0} is a vector of household- and community-level supply-side variables.¹³

6. Results on the determinants of indebtedness

Table 10 provides descriptive statistics for all explanatory variables used in the regression. It includes both household- and community-level variables. The table provides descriptive statistics of most of the explanatory variables for three panel years (1991/92, 1998/99 and 2010/11), except for the fact that the summary statistics for the shock variables, such as

¹³ Another way to control for the bias due to time-varying heterogeneity is to apply a propensity score-based weighted fixed effects method (see, Hirano, Imbens and Ridder, 2003). We present, however, only the FE with initial conditions of model (3).

exposure to natural calamities, are given only for two years (1998/99 and 2010/11) as these variables were not available in the 1991/92 survey. Overall some 41 percent of the households borrowed from MFI sources, compared to only 5 percent that borrowed from formal sources. Some 13 percent of villages have access to commercial banks, while an average 5 MFIs operate in each village, implying a large concentration of microfinance organizations in Bangladesh. Yet 33 percent of MFI borrowers are found to be credit constrained. Interestingly, 32 percent of the households borrowed from a single source and about 10 percent from multiple sources. While 48 percent of households experienced natural calamities, some 9 percent of households lost at least one family member or otherwise incurred losses in their income-generating activities (e.g., loss of a cow), and 4 percent of households had some type of financial losses (e.g., theft) over the three years prior to the survey.

Table 11 presents the fixed-effects estimates of indebtedness (whether a household is indebted, meaning its debt liability is more than 20 percent of income or stock of debt is more than 20 percent of the non-land assets). We have estimates using alternative model specifications (one model uses three-years of panel data and the other two-years of panel data with shock variables). The debt-asset based measure, being a long-term measure of indebtedness, is found to have a declining trend over time.

Among the family characteristics, male-headed households are more indebted than female-headed households in the short-run, but not in the long-run. Similarly, households headed by younger members are more likely to be indebted than those headed by older people in the short-run, but again the age of the household head does not matter for long-run indebtedness. While the education level does not matter in our sample (perhaps because the average schooling of household heads is only 3 years), the dependency ratio (proportion of dependents among the household's members) matters a lot, irrespective of model specifications: a higher dependency rate means higher indebtedness both in the short- and long-term.

Agricultural landholding increases indebtedness in the short run without affecting the long-term indebtedness. This is perhaps because households that are highly dependent upon agriculture may find it difficult to smooth income, given the high variability in agricultural income.

Natural calamities increase the probability of indebtedness among rural households in the short-run without having any significant long-term effects on their overall indebtedness. The more MFIs are serving a community, the higher the probability that a borrowing household is indebted. This is equally valid for both the short- and long-run indebtedness of rural households. The presence of commercial banks in a community is also likely to increase the probability of being indebted, at least in the long run. Therefore, like demand-side variables, the supply-side variables play an important role in determining the overall extent of indebtedness.

So far we have considered the impact of both demand- and supply-side variables on the overall measure of indebtedness without making a distinction among the various levels of indebtedness. However, an analysis of the extent or severity of indebtedness is equally important in order to understand the underlying factors that contribute to such severity. Considering that the indebtedness categories (moderate indebtedness, over-indebtedness, and severe indebtedness) represent gradually worsening situations, we run an ordered logit model to determine if the factors contributing to the overall indebtedness play similar roles in determining the severity among the indebted households.

Table 12 presents the results of this exercise based on the most recent household survey data for 2010/11.¹⁴ Restricting the discussion to the flow-based measure of indebtedness, we find that both demand-side and supply-side variables that affect the overall measure of indebtedness also affect the ordering of indebtedness. For example, the probability of severe

¹⁴ The results presented here are based on an ordered logit regression applied to 2010/11 data after controlling for initial conditions. Alternately, we tried ordered logit models using panel data of 1998/99 and 2010/11, and the results are not qualitatively different from what are reported in Table 12.

indebtedness is higher than the probability of moderate indebtedness when a household is struck with a natural calamity. Similarly, the village density of microfinance organizations affects the probability of being severely indebted more than the probability of being moderately indebted. So, the factors that affect overall indebtedness also affect its severity among indebted households.

7. Impact of microcredit participation on household indebtedness

We have explored the role of various factors, including the availability of microcredit programs in a community, in determining the extent and severity of indebtedness where indebtedness is defined by the extent of debt liability exceeding a certain percentage of a household's income or assets. We find that while MFIs help to expand the outreach of institutional finance to households left out by formal financial institutions, the presence and extent of coverage of multiple MFIs can cause an overflow of credit that may exacerbate a borrower's indebtedness. The village-level density of MFIs may measure not only the supply of but also the demand for MFI services. Hence, we need to distinguish the demand from the supply of community-wide microfinance services by including an additional variable called microfinance program participation of a household (C_{ij}) in the equation (1) above:

$$Y_{ijt} = \alpha X_{ijt} + \rho B_{jt} + \beta C_{ijt} + \eta_{ijt} + \mu_{jt} + \varepsilon_{ijt} \quad (4)$$

where β represents the impact coefficient of microfinance program participation at the household level. That is, equation (4) is an indebtedness equation, conditional on microfinance program participation. Note that like the indebtedness outcome, program participation is also an outcome endogenously determined by a host of demand- and supply-side variables, as depicted in equation (1).

Thus, following the differenced-out method outlined earlier and introducing the initial conditions of 1991/92 as additional controls for time-varying heterogeneity associated with borrowing from microcredit programs, we get the following differenced model as per equation (3):

$$\Delta Y_{ijt} = \alpha \Delta X_{ijt} + \rho \Delta B_{jt} + \beta \Delta C_{ijt} + \gamma X_{ij0} + \delta B_{j0} + \Delta \varepsilon_{ijt} \quad (5)$$

We have so far considered Y as a categorical (0/1) variable indicating whether a household is indebted or not, based on the cut-off point at 20 percent of the debt-income or debt-asset ratio. The concern with estimating impacts on a categorical variable is that the changes are observed only when the underlying continuous variable (debt-asset ratio, for example) changes across the cut-off point. That is, the categorical variable is insensitive to any changes in the continuous variable as long as they are confined to above or below the cut-off point. For example, the categorical indicator of indebtedness for a household does not change when its debt-asset ratio rises from 0 to 0.19 or falls from 0.70 to 0.21, even though these changes are quite significant to understanding a household's indebtedness. Even worse, in certain cases changes in the categorical variable may be misleading regarding the overall indebtedness situation.¹⁵ Therefore, the categorical indicator of indebtedness may not be the variable of choice when we are interested in changes in indebtedness over the whole spectrum of the debt-asset ratio. That is what we are interested in when we want to assess microcredit participation impacts on household indebtedness. The concern for policymaking purposes is whether an increase in the debt due to borrowing is accompanied by a relatively higher increase in the income or assets induced by the borrowing, rather than whether the debt is less than 20 percent of the income or asset.

¹⁵ This is possible when, for example, the debt-asset ratio gets worse by going up from a value little below 0.20 to one little over 0.20 for a small number of households, and at the same time gets much better by dropping from 0.70 to 0.25 for a large number of households. In this case, the categorical indicator would report a rising indebtedness when in fact the debt-asset ratio would show a large improvement.

Therefore, in equation (5), we use the debt-asset ratio or debt service-income ratio rather than the categorical variable of being indebted as the dependent variable, while the key policy variable on the right hand side is whether the household is a borrower of a microcredit program, given the presence and density of MFIs in a village.

The results of this exercise, again following a fixed-effects method with the control of initial conditions of 1991/92, are presented in Table 13. For brevity, we have shown only the coefficients of household-level program participation variable.¹⁶ Thus, given village-level program density, the coefficient of household-level program participation measures the net effect of participation on household indebtedness, which is proxied by the ratio of liability to assets or liability to income. Both are continuous rather than categorical variables. This estimation method allows for continuous adjustment due to program participation rather than a quantum jump underlying a categorical indicator of indebtedness.

There are different ways to measure household program participation. We measure it in four ways: by whether a household borrows from a microcredit program or non-MFI sources (model 1 of Table 13), by whether a household borrows from a single or multiple sources (model 2), by the cumulative amount of borrowing from microcredit sources (model 3) and finally, by three categories of borrowing (model 4) - the cumulative amount of borrowing in the short-term (the previous 5 years), the cumulative amount of borrowing in the medium-term (the previous 10 years) and the cumulative amount of borrowing over the long-term (the amount borrowed in more than the previous 10 years).

Table 13 shows that each indicator of microcredit program participation (measured either by a participation dummy or by the amount of cumulative borrowing) has an

¹⁶ Note that the coefficient of the village density of MFIs lost its significance when household-level participation of microfinance organizations is taken into account. This means that household-level indebtedness is caused primarily through program-level participation, not through program density. This may also mean program density is a poor measure of MFI competition.

unequivocally negative effect on the debt liability. More specifically, microcredit participation reduces the household debt-asset ratio by almost 20 percent and the loan servicing to income ratio by 8 percent. Borrowing from a single source lowers the debt-asset ratio by 17.2 percent, while borrowing from multiple sources reduced the debt-asset ratio by 22.8 percent. These comparisons are against those who did not borrow from any source.

Findings are shown against the amount of cumulative borrowing as a measure of program participation. A 10 percent increase in the amount of borrowing reduces the debt-asset ratio by almost 0.7 percent. That is, the returns to income or assets because of the borrowing are higher than the increase in the liability. But when the dummy of whether borrowers borrow from multiple sources along with the cumulative amount of borrowing as an additional variable as given in model 3 of Table 13, we find that the debt-asset ratio is positively related to multiple program membership. That is, given the negative effect of borrowing on the debt-asset ratio, the probability of borrowing from multiple sources as opposed to a single source has an adverse effect on the debt-asset ratio. The same pattern also holds for the debt servicing relative to the income. That is, borrowing from multiple sources may not necessarily a “blessing in disguise”.

In fact, when the amount borrowed is categorized by the length of the borrowing period, we see that short-term loans increase assets more than debt, and while the trend is reversed for the intermediate term loans, it holds again in the long run. That is, there is an inverted U-shape relationship between indebtedness and the amount of borrowing over time. Interestingly, such a relationship does not hold for the short-term measure of indebtedness. With increasing amounts borrowed, debt servicing costs decline relative to income in the short-term but increase over the medium- and long-term. That is, the debt-asset ratio ultimately declines over time, even if continuous borrowing may increase debt payment relative to income in the short-term.

The findings suggest that MFI participation, independent of other factors including village-level program density, has, on average, contributed more to the growth of assets than of liabilities. While this pattern may not be obvious in the short- or medium-term, asset accumulation eventually overtakes debt liability as households continue to borrow and make productive investments.¹⁷

This relationship is depicted clearly in Figure 2. Here, three types of indebtedness are regressed first against cumulative borrowing and its squared term (using a logit model), and then their predicted probabilities are plotted against the cumulative borrowing to get the long-term trend of the indebtedness. As shown, it is obvious that while indebtedness increases at the beginning as borrowing rises, it does so at a decreasing rate, and at a certain point its growth can theoretically be zero.

Hence, as Figure 2 shows, the probability of being indebted falls as the amount of borrowing increases. However, the probability of being moderately indebted is higher at each level of borrowing than other measures. This is perhaps because this is an early stage rather than a later stage of indebtedness, and borrowers may not be too worried about the severity of indebtedness at this point. In any case, due to the declining shape of the indebtedness curve, on average, microcredit adds value to assets more than it accumulates debt. Thus, there is a declining debt-asset ratio over borrowing. The message is clear from this analysis: microcredit participants are not necessarily over-indebted as argued by many without any hard evidence. This does not mean that

¹⁷ It makes perfect sense that the long-term borrowers (those with a history of 10+ years of borrowing) must be making productive investments, or they would not have stayed with microcredit programs for so long.

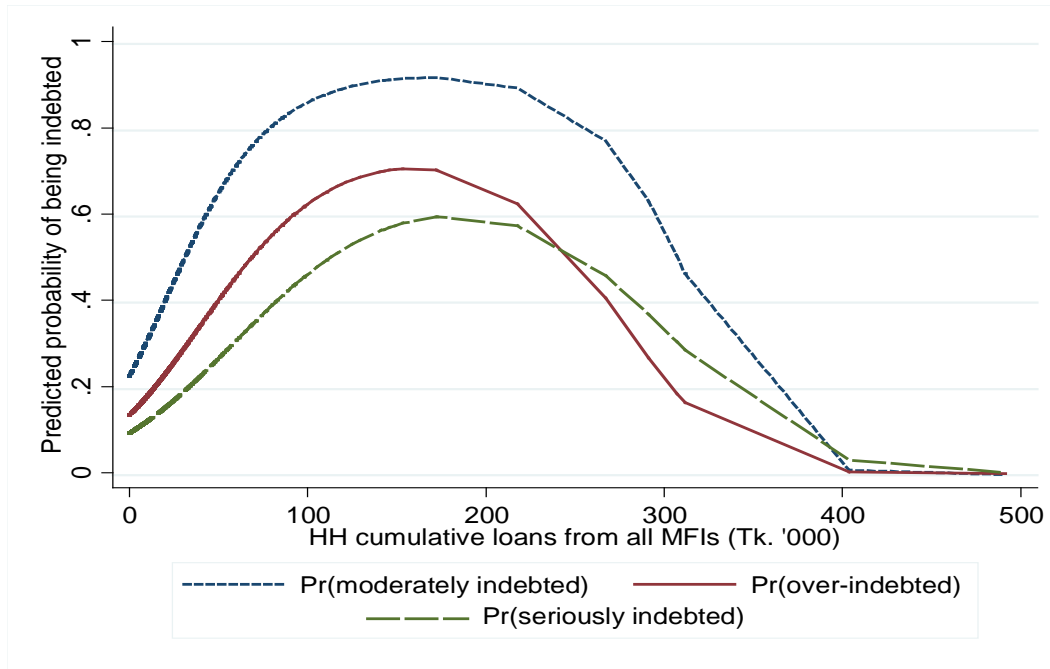


Figure 2: Predicted probabilities of various types of indebtedness with the change in microcredit borrowing amount (all 3 years)

all households that borrow from microcredit organizations would benefit in the same way. An in-depth analysis is thus perhaps necessary to determine, which households, among the long-term borrowers or members of multiple programs, are indeed over-indebted and what could be done to help them manage the extent of over-indebtedness.

8. Conclusions

The available literature describes the potential effects of over-indebtedness on both microfinance borrowers and lenders. Over-indebtedness affects a lender's financial or institutional sustainability, and the effect on borrowers can be a debt trap that pushes them further down into poverty.

When borrowers are nearly indebted, they struggle to make repayments, cut back on basic consumption as well as other important household expenditures, such as education or

healthcare. In addition, over-indebtedness has material costs, such as late fees and, in default cases, seizure of assets. Moreover, the resulting loss of creditworthiness can limit access to credit and cause liquidity problems. These consequences may occur despite the fact that microfinance is meant to alleviate poverty through income generation activities. This suggests that there may be a thin line between the debt trap and poverty alleviation as far as microfinance effects are concerned.

Our long-term panel data analysis confirms that continuous microcredit participation or borrowing from multiple sources generally adds more to assets than to liabilities over time. This perhaps shows that microloans of various types as developed by MFIs in Bangladesh support both investment and consumption, including creating a liquidity buffer for emergency needs in situations of health problems or other unanticipated expenses. In fact, barriers to access to financial services by the poor may cause over-indebtedness, since consumers' lack of access to credit can force many of them to borrow from high-cost informal sources which increase their risk of falling into over-indebtedness. Thus, as we also find, borrowing from multiple sources is not necessarily a pathway to being over-indebted. However, in order to achieve the desired effects, it is important for both lenders and borrowers to invest in sectors where returns are sufficient.

While long-term borrowing from MFIs, coupled with productive investments, helps households avert the debt trap, there are certainly many borrowers who are not so lucky.¹⁸ Risk and vulnerability are everyday realities for the poor, including microcredit borrowers. Over time, they need to develop strategies for managing both expected and unexpected risks by

¹⁸ This paper, however, did not analyze who these borrowers are and why they are not as fortunate as others, because of lack of sufficient information about their enterprises and other characteristics. This is why a separate in-depth study is required on this process of indebtedness.

combining income, savings, credit, informal insurance mechanisms, and accumulated assets to meet their financial challenges and risks.¹⁹

The risk management strategies currently being used by many poor people may not adequately protect them against repeated risk events, however. When economic shocks begin to add up, these strategies often fail because poor households do not have enough assets to sustain them. Formal insurance mechanisms in the form of micro-insurance can help fill in this gap. Micro-insurance not only protects the assets of the poor from economic shocks, but allows them to mobilize those assets and increase their income by reducing their need to save so much for a rainy day.

¹⁹ Risks can be anticipated depending on their likelihood. For example, certain regions are more prone to floods than others. So risk of flood can be anticipated (and is taken into account) for those areas.

References

- Anderloni, L., and D. Vandone, "2008. Households Over-Indebtedness in the Economic Literature," Working Paper no. 2008-46, State University of Milan, Department of Economics, Business and Statistics.
- Bensoussan, P. 2009. "Successes and limits of microfinance," Newsletter no. 4. PlaNet Finance. Saint-Ouen.
- Brix, L., and K. McKee. 2010. "Consumer Protection Regulation in Low-Access Environments: Opportunities to Promote Responsible Finance," Focus Note no. 60. CGAP, Washington, DC.
- Canner, G. B., and C. A. Lueckert. 1991. "Payment of household debts," *Federal Reserve Bulletin* 77(4): 218.
- Del-Río, A., and G. Young, 2005. "The impact of unsecured debt on financial distress among British households," Working Paper no. 262, Bank of England, London.
- DeVaney, P. L. 2006. "Bringing Pro-Consumer Ideals to the Client: A Consumer Protection Guide for Financial Institutions Serving the Poor," Washington, DC: ACCION Publications.
- Disney, R., S. Bridges, and J. Gathergood. 2008. "Drivers of Over-Indebtedness: Report to the Department for Business, Enterprise and Regulatory Reform," Centre for Policy Evaluation, University of Nottingham.
- Faruqee, Rashid. 2013. "Indebtedness among Microcredit Borrowers", (mimeo), Institute of Microfinance, Dhaka.
- Fisher, I. 1933. "The Debt-Deflation Theory of Great Depressions," *Econometrica* 1(4): 337–357.
- Gonzalez, Adrian. 2008. "Microfinance, Incentives to Repay, and Overindebtedness: Evidence from a Household Survey in Bolivia", Presented in partial fulfillment of the requirements for the degree Doctor of Philosophy in the Graduate School of the Ohio State University.
- Haas, Oliver (2006), "Overindebtedness in Germany", *Working Paper No. 44*, ILO, Geneva.
- Hulme, D. 2007. "Is microdebt good for poor people? A note on the dark side of microfinance," in T. Dichter and M. Harper (Eds.), *What's wrong with Microfinance?* :19–22. Warwickshire: Intermediate Technology Publications.
- Khalily, M. A. Baqui and Rushad Faridi. 2011. "Multiple Memberships (Overlapping) in Micro Credit Markets of Bangladesh," Institute of Microfinance & Palli Karma Sahayak Foundation, Dhaka, Bangladesh.

Khandker, Shahidur R. and Hussain A. Samad. "Are Microcredit Participants in Bangladesh Trapped in Poverty and Debt?" World Bank Policy Research Working Paper No. 6404, Washington, DC: World Bank.

Maurer, Klaus, and J. Pytkowska. 2010, "Indebtedness of Microcredit Clients in Bosnia and Herzegovina, Results from a comprehensive field study", European Fund for Southeast Europe (EFSE).

Rahman, A. 1999. "Micro-credit Initiatives for Equitable and Sustainable Development: Who Pays?" *World Development* 27(1): 67–82.

Schicks, Jessica. 2010. "Microfinance Over-indebtedness: Understanding Its Drivers and Challenging the Common Myths", CEB Working Paper No. 10/047, Brussels: Solvay Brussels School of Business and Management. <http://ideas.repec.org/p/sol/wpaper/2013-64675.html>

Schicks, Jessica and Richard Rosenberg. 2011. "Too Much Microcredit? A Survey of the Evidence on Over-Indebtedness," *Occasional Paper No. 19*, CGAP.

Soman, D., and A. Cheema. 2002. "The Effect of Credit on Spending Decisions: The Role of the Credit Limit and Credibility," *Marketing Science* 21(1): 32–53.

Spannuth, Sylvia and Justyna Pytkowska. 2011. "Indebtedness of Microcredit Clients in Kosovo," EFSE.

Stearns, K. 1991. "The Hidden Beast: Delinquency in Microenterprise Credit Programs," *Discussion Paper Series no. 5*, ACCION International. Washington DC.

Vandone, Daniela. 2009. *Consumer Credit in Europe: Risks and Opportunities of a Dynamic Industry*, Heidelberg: Physica.

Vogelgesang, U. 2003. "Microfinance in Times of Crisis: The Effects of Competition, Rising Indebtedness, and Economic Crisis on Repayment Behavior," *World Development* 31(12): 2085–2114.

Webley, P., and E. K. Nyhus. 2001. "Life-Cycle and Disproportionate Routes into Problem Debt," *British Journal of Psychology* 92: 423–446.

Wisniwski, Sylvia. 2010. "Overindebtedness: Evidence, Causes and Consequences", EFSE Presentation, September 23.

Vogelgesang, Ulrike. 2003. "Microfinance in Times of Crisis: The Effects of Competition, Rising Indebtedness, and Economic Crisis on Repayment Behavior," *World Development* 31(12): 2085–2114.

Tables

**Table 1. Microcredit program participation rate among households (%):
1991/91-2010/11**

| Survey year | GB | BRAC | BRDB | ASA | Other programs (one or multiple) | Any program | Non-participant |
|----------------------|----------------|----------------|--------------|----------------|-------------------------------------|----------------|-----------------|
| 1991/92 (N=1,509) | 8.7 (8.6) | 11.2 (9.0) | 6.4 (5.8) | 0 (0) | 0 (0) | 26.3 (23.3) | 73.7 |
| 1998/98 (N=1,758) | 15.1 (13.6) | 16.2 (10.1) | 8.3 (4.4) | 4.1 (3.6) | 14.9 (11.4) | 48.6 (38.0) | 51.4 |
| 2010/11 (N=2,322) | 27.4 (21.7) | 20.9 (12.3) | 4.7 (1.3) | 23.8 (19.3) | 32.9 (28.2) | 68.5 (56.2) | 31.5 |

Note: Sample is restricted to 1,509 panel households from 1991/92 survey that are common to all three surveys. Sample size is higher in 1998/99 and 2011 because of household split-offs. Figures in parentheses are percentages of borrowers. Sum of the figures across columns for 1998/99 and 2010/11 exceeds 100% because of household participation in multiple programs.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/2011

Table 2: Extent of household indebtedness: 1991/92-2010/11

| Extent of household indebtedness | Stock-based measure | Flow-based measure |
|--|---------------------|--------------------|
| 1991/91 (N=1,488) | | |
| Indebtedness index | 0.205 | 0.053 |
| Un-indebted households (%) | 78.4 | 93.0 |
| Moderately indebted households (%) | 7.3 | 4.8 |
| Over-indebted households (%) | 4.8 | 0.9 |
| Severely indebted households (%) | 9.5 | 1.3 |
| 1998/99 (N=1,750) | | |
| Indebtedness index | 0.192 | 0.125 |
| Un-indebted households (%) | 77.0 | 0.791 |
| Moderately indebted households (%) | 9.4 | 0.107 |
| Over-indebted households (%) | 4.5 | 0.057 |
| Severely indebted households (%) | 9.1 | 0.045 |
| 2010/11 (N=2,287) | | |
| Indebtedness index | 0.306 | 0.473 |
| Un-indebted households (%) | 62.8 | 57.3 |
| Moderately indebted households (%) | 15.9 | 14.0 |
| Over-indebted households (%) | 6.7 | 8.8 |
| Severely indebted households (%) | 14.6 | 19.9 |
| Aggregate for 3 periods (N=5,525) | | |
| Indebtedness index | 0.243 | 0.251 |
| Un-indebted households (%) | 71.5 | 73.8 |

| | | |
|------------------------------------|------|------|
| Moderately indebted households (%) | 11.5 | 10.5 |
| Over-indebted households (%) | 5.5 | 5.7 |
| Severely indebted households (%) | 11.5 | 10.0 |

Note: Indebtedness index is defined by household debt to non-land ratio in stock-based measure and household annual loan payment to annual income ratio in flow-based measure. A household is considered un-indebted if the ratio is less than or equal to 0.2, moderately indebted if the ratio is higher than 0.2 but less than or equal to 0.4, over-indebted if the ratio is higher than 0.4 but less than or equal to 0.6, and finally, severely indebted if the ratio is higher than 0.6

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 3: Extent of HH indebtedness by the source of borrowing: 1991/92-2010/11

| Extent of household indebtedness | Stock-based measure | | | Flow-based measure | | |
|--|---------------------|-------------------|--------|--------------------|-------------------|--------|
| | MFI borrowers | Non-MFI borrowers | t-stat | MFI borrowers | Non-MFI borrowers | t-stat |
| 1991/91 (N=763) | | | | | | |
| Un-indebted households (%) | 68.0 | 57.6 | 2.65 | 78.0 | 76.5 | 0.42 |
| Moderately indebted households (%) | 10.1 | 23.8 | -4.88 | 14.0 | 19.4 | -1.79 |
| Over-indebted households (%) | 7.3 | 6.0 | 0.64 | 4.0 | 0.0 | 2.88 |
| Severely indebted households (%) | 14.6 | 12.6 | 0.67 | 4.0 | 4.1 | -0.08 |
| 1998/99 (N=896) | | | | | | |
| Un-indebted households (%) | 53.6 | 62.8 | -1.80 | 48.6 | 73.2 | -4.80 |
| Moderately indebted households (%) | 18.2 | 15.2 | 0.73 | 26.6 | 12.0 | 3.28 |
| Over-indebted households (%) | 9.4 | 8.8 | 0.23 | 14.4 | 3.7 | 3.05 |
| Severely indebted households (%) | 18.8 | 13.2 | 1.42 | 10.4 | 11.1 | -0.22 |
| 2010/11 (N=1,461) | | | | | | |
| Un-indebted households (%) | 55.6 | 46.2 | 1.62 | 27.2 | 34.6 | -1.41 |
| Moderately indebted households (%) | 19.0 | 25.3 | -1.36 | 23.7 | 26.6 | -0.58 |
| Over-indebted households (%) | 8.4 | 13.3 | -1.50 | 14.9 | 15.1 | -0.05 |
| Severely indebted households (%) | 17.0 | 15.2 | 0.41 | 34.2 | 23.7 | 1.89 |
| Aggregate for 3 periods (N=3,120) | | | | | | |
| Un-indebted households (%) | 56.9 | 56.4 | 0.17 | 41.0 | 64.9 | -8.46 |
| Moderately indebted households (%) | 17.4 | 21.5 | -1.84 | 23.1 | 18.8 | 1.77 |
| Over-indebted households (%) | 8.5 | 8.7 | -0.12 | 13.1 | 5.0 | 4.31 |
| Severely indebted households (%) | 17.2 | 13.4 | 1.74 | 22.8 | 11.3 | 4.89 |

Note: The sample for this table is restricted to MFI and non-MFI borrowers only. Non-MFI sources include only formal sources such as commercial banks, agricultural banks, and cooperatives.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 4: Extent of HH indebtedness and borrowing from multiple MFI sources: 1991/92-2010/11

| Extent of household indebtedness | Stock-based measure | | | Flow-based measure | | |
|--|-------------------------|---------------------------|--------|-------------------------|---------------------------|--------|
| | Single source borrowers | Multiple source borrowers | t-stat | Single source borrowers | Multiple source borrowers | t-stat |
| 1991/91 (N=689) | | | | | | |
| Un-indebted households (%) | 68.0 | - | - | 77.9 | - | - |
| Moderately indebted households (%) | 10.1 | - | - | 14.1 | - | - |
| Over-indebted households (%) | 7.3 | - | - | 4.0 | - | - |
| Severely indebted households (%) | 14.6 | - | - | 4.0 | - | - |
| Share of multiple source borrowers | 0% | | | | | |
| 1998/99 (N=827) | | | | | | |
| Un-indebted households (%) | 55.8 | 36.9 | 3.56 | 51.4 | 27.6 | 4.48 |
| Moderately indebted households (%) | 17.2 | 25.1 | -1.90 | 25.1 | 37.6 | -2.65 |
| Over-indebted households (%) | 9.1 | 12.3 | -1.03 | 13.7 | 19.6 | -1.55 |
| Severely indebted households (%) | 17.9 | 25.7 | -1.86 | 9.7 | 15.2 | -1.67 |
| Share of multiple source borrowers | 11.9% | | | | | |
| 2010/11 (N=1,411) | | | | | | |
| Un-indebted households (%) | 63.4 | 41.8 | 8.03 | 35.4 | 12.7 | 9.49 |
| Moderately indebted households (%) | 16.4 | 23.6 | -3.35 | 26.0 | 19.6 | 2.74 |
| Over-indebted households (%) | 6.2 | 12.3 | -4.01 | 14.2 | 16.0 | -0.93 |
| Severely indebted households (%) | 14.0 | 22.3 | -3.98 | 24.4 | 51.7 | -10.80 |
| Share of multiple source borrowers | 36.0% | | | | | |
| Aggregate for 3 periods (N=2,927) | | | | | | |
| Un-indebted households (%) | 61.8 | 41.2 | 9.74 | 49.1 | 15.1 | 16.63 |
| Moderately indebted households (%) | 15.4 | 23.8 | -5.13 | 23.4 | 22.1 | 0.63 |
| Over-indebted households (%) | 7.4 | 12.3 | -4.06 | 12.0 | 16.5 | -3.05 |
| Severely indebted households (%) | 15.4 | 22.7 | -4.47 | 15.5 | 46.3 | -17.75 |
| Share of multiple source borrowers | 23.7% | | | | | |

Note: The sample for this table is restricted to MFI borrowers only. Single source borrowers are those who borrowed only from one microcredit lenders during the preceding 5 years of a survey period, while multiple source borrowers borrowed from more than one microcredit lenders during the same period.
Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

**Table 5: Extent of multiple-source borrowing by credit constraint (%):
1991/92-2010/11 (Number of HHs=689)**

| Survey periods | Among HHs with credit constraint | Among HHs with no credit constraint | t-statistics of the difference |
|--------------------------|---|--|---------------------------------------|
| During 1991/92 (N=689) | 0.0 (N=508) | 0.0 (N=181) | - |
| During 1998/99 (N=827) | 16.0 (N=423) | 7.5 (N=404) | 3.81 |
| During 2010/11 (N=1,411) | 55.3 (N=187) | 33.3 (N=1,224) | 5.72 |
| Overall (N=2,927) | 19.0 (N=1,118) | 26.0 (N=1,809) | -4.18 |

Note: The sample for this table is restricted to MFI borrowers only. While the incidence of multiple borrowing among the credit-constrained households is higher than that among the unconstrained households for individual years, the aggregate figures show the reverse pattern. That is because the N for the credit-constrained households in 2010/11 (as shown in the parentheses) is much smaller than that for the credit-unconstrained households during the same period, and this pushes the aggregate average for the constrained households to a lower value than that for the unconstrained households.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 6: Extent of HH indebtedness by HH credit constraint: 1991/92-

| Extent of household indebtedness | Stock-based measure | | | Flow-based measure | | |
|---|-------------------------------|---------------------------------|---------------|-------------------------------|---------------------------------|---------------|
| | Credit-constrained HHs | Credit-unconstrained HHs | t-stat | Credit-constrained HHs | Credit-unconstrained HHs | t-stat |
| 1991/91 (N=689) | | | | | | |
| Un-indebted households (%) | 68.8 | 65.7 | 0.78 | 78.4 | 76.7 | 0.46 |
| Moderately indebted households (%) | 9.1 | 13.1 | -1.53 | 13.7 | 14.9 | -0.41 |
| Over-indebted households (%) | 7.1 | 7.9 | -0.38 | 4.0 | 4.0 | 0.00 |
| Severely indebted households (%) | 15.0 | 13.3 | 0.56 | 3.9 | 4.4 | -0.25 |
| 1998/99 (N=827) | | | | | | |
| Un-indebted households (%) | 51.0 | 56.3 | -1.54 | 45.8 | 51.7 | -1.76 |
| Moderately indebted households (%) | 17.2 | 19.2 | -0.75 | 28.9 | 24.0 | 1.56 |
| Over-indebted households (%) | 10.1 | 8.8 | 0.68 | 15.0 | 13.8 | 0.52 |
| Severely indebted households (%) | 21.7 | 15.7 | 2.20 | 10.3 | 10.5 | -0.07 |
| 2010/11 (N=1,411) | | | | | | |
| Un-indebted households (%) | 43.1 | 57.3 | -3.56 | 14.9 | 29.0 | -3.92 |
| Moderately indebted households (%) | 26.9 | 17.9 | 2.86 | 31.1 | 22.6 | 2.48 |
| Over-indebted households (%) | 10.1 | 8.2 | 0.85 | 10.9 | 15.4 | -1.55 |

| | | | | | | |
|--|------|------|-------|------|------|-------|
| Severely indebted households (%) | 19.9 | 16.6 | 1.08 | 43.1 | 33.0 | 2.61 |
| Aggregate for 3 periods (N=2,927) | | | | | | |
| Un-indebted households (%) | 55.3 | 57.6 | -1.20 | 50.2 | 36.5 | 7.17 |
| Moderately indebted households (%) | 16.5 | 17.9 | -0.89 | 24.3 | 22.5 | 1.09 |
| Over-indebted households (%) | 9.1 | 8.3 | 0.75 | 10.5 | 14.4 | -2.95 |
| Severely indebted households (%) | 19.1 | 16.2 | 1.92 | 15.0 | 26.6 | -7.13 |

Note: The sample for this table is restricted to MFI borrowers only. A household is considered credit-constrained if any member of it is credit-constrained, which is determined by the member's willingness to borrow more at the same interest rate for a given loan if there were no restrictions on the loan amount.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 7: HH net worth by the extent of indebtedness (Tk.): 1991/92-2010/11

| Extent of household indebtedness | Stock-based measure | Flow-based measure |
|--|---------------------|--------------------|
| 1991/91 (N=1,472) | | |
| Un-indebted households (%) | 136,988.8 | 128,140.1 |
| Indebted households (%) | 88,908.4 | 111,719.2 |
| | }t=2.94 | }t=0.63 |
| 1998/99 (N=1,612) | | |
| Un-indebted households (%) | 289,190.2 | 274,076.3 |
| Indebted households (%) | 118,791.6 | 172,129.9 |
| | }t=2.51 | }t=1.45 |
| 2010/11 (N=2,230) | | |
| Un-indebted households (%) | 495,874.4 | 529,296.8 |
| Indebted households (%) | 406,169.4 | 374,031.2 |
| | }t=1.34 | }t=2.38 |
| Aggregate for 3 periods (N=5,323) | | |
| Un-indebted households (%) | 320,224.7 | 307,351.7 |
| Indebted households (%) | 274,653.0 | 309,853.8 |
| | }t=1.26 | }t=0.07 |

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 8: HH net worth by multiple-source borrowing from MFIs (Tk.): 1991/92-2010/11 (Number of HHs=1,251)

| Survey periods | Single-source borrowers | Multiple-source borrowers | t-statistics of the difference |
|--------------------------|-------------------------|---------------------------|--------------------------------|
| During 1991/92 (N=678) | 67,696.7 | - | - |
| During 1998/99 (N=706) | 149,118.3 | 122,956.3 | t=0.76 |
| During 2010/11 (N=1,372) | 361,718.5 | 262,934.4 | t=2.41 |
| Overall (N=2,756) | 235,926.4 | 245,686.9 | t=0.37 |

Source: The sample for this table is restricted to MFI borrowers only. WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 9: HH net worth by credit constraint (Tk.): 1991/92-2010/11

| Survey periods | Among HHs with credit constraint | Among HHs with no credit constraint | t-statistics of the difference |
|--------------------------|---|--|---------------------------------------|
| During 1991/92 (N=678) | 70,028.8 | 60,711.6 | 1.13 |
| During 1998/99 (N=706) | 149,060.0 | 143,347.5 | 0.27 |
| During 2010/11 (N=1,372) | 269,760.2 | 334,045.2 | -1.07 |
| Overall (N=2,756) | 147,504.8 | 281,744.5 | -5.68 |

Source: The sample for this table is restricted to MFI borrowers only. WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 10: Descriptive statistics of key variables of interest

| Explanatory variables | Mean |
|--|-----------------------|
| Sex of HH head (1=Male, 0=Female) | 0.892 (0.311) |
| Age of HH head (years) | 44.9 (13.8) |
| Education of HH head (years) | 2.92 (3.71) |
| Dependency ratio | 0.411 (0.209) |
| Household land assets (decimals) | 96.5 (248.1) |
| Number of relatives that HH received money from in last 10 years | 2.1 (3.0) |
| HH faced death of family members in last 3 years† | 0.090 (0.286) |
| HH faced losses in income generation activities in last 3 years† | 0.093 (0.291) |
| HH faced natural calamities in last 3 years† | 0.482 (0.500) |
| HH faced other financial losses/expenditure in last 3 years† | 0.040 (0.196) |
| HH borrows from MFIs | 0.411 (0.492) |
| HH borrows from non-MFI commercial sources | 0.051 (0.291) |
| HH borrows from single MFI source | 0.316 (0.465) |
| HH borrows from multiple MFI sources | 0.098 (0.297) |
| HH cumulative borrowing from MFI sources (Tk.) | 7,096.0 (18,424.7) |
| HH short-term cumulative borrowing from MFI sources (Tk.) | 9,936.3 (27,646.4) |

| | |
|--|------------------------|
| HH medium-term cumulative borrowing from MFI sources (Tk.) | 13,135.0 (32,428.6) |
| HH long-term cumulative borrowing from MFI sources (Tk.) | 14,176.2 (34,322.5) |
| HH is credit constrained | 0.330 (0.470) |
| Village has commercial banks | 0.130 (0.336) |
| Number of microfinance programs operating in the village | 4.5 (3.3) |
| Number of HHs | 1,509 |

†Figures are based on 1998/99 and 2010/11 since these variables are not available in 1991/92.

Note: Figures in parentheses are standard deviations.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

Table 11: Household fixed-effects estimates of being indebted

| Key explanatory variables | Model 1 | | Model 2 | |
|--|---------------------|---------------------|---------------------|---------------------|
| | Stock-based measure | Flow-based measure | Stock-based measure | Flow-based measure |
| Period=1998/1999 | -0.490 (-1.25) | -0.518** (-1.41) | - | - |
| Period=2010/2011 | -1.406** (-2.65) | -0.498 (-1.04) | -2.315** (-4.28) | -0.295 (-0.38) |
| Sex of HH head (1=Male, 0=Female) | -0.011 (-0.41) | 0.092** (2.93) | 0.043 (1.48) | 0.106** (3.10) |
| Age of HH head (years) | -0.001 (-1.12) | -0.002** (-2.14) | -0.0001 (-0.16) | -0.002** (-2.32) |
| Education of HH head (years) | -0.003 (-0.74) | -0.004 (-1.10) | -0.001 (-0.39) | -0.005 (-1.14) |
| Dependency ratio | 0.106** (2.46) | 0.146** (4.03) | 0.099** (2.16) | 0.146** (3.76) |
| Number of relatives that the HH received money from in last 10 years | -0.003 (-1.03) | -0.003 (-1.12) | -0.002 (-0.59) | -0.003 (-1.01) |
| Log household land assets (decimals) | -0.004 (-0.57) | 0.016** (2.19) | -0.010 (-1.08) | 0.025** (2.65) |
| HH faced death of family members in last 3 years | - | - | -0.021 (-0.65) | 0.003 (0.37) |
| HH faced losses in income generation activities in last 3 years | - | - | 0.037 (0.96) | 0.024 (0.59) |
| HH faced natural calamities in last 3 years | - | - | 0.044 (1.46) | 0.074** (3.06) |
| HH faced other financial losses/expenditure in last 3 years | - | - | 0.020 (0.42) | 0.001 (0.01) |
| Village has commercial banks | 0.052 (1.28) | -0.035 (-0.97) | 0.133* (1.84) | 0.009 (0.19) |
| Number of microfinance programs operating in the village | 0.012** (2.02) | 0.012* (1.97) | 0.001 (0.06) | 0.014* (1.71) |
| R ² | 0.055 | 0.188 | 0.082 | 0.131 |

| | | | | |
|------------------------|-------|-------|-------|-------|
| Number of HHs (groups) | 1,509 | 1,509 | 1,509 | 1,509 |
| Number of observations | 5,525 | 5,525 | 4,037 | 4,037 |

*=statistically significant at 10% level; **=statistically significant at 5% level or better

Note: Figures in parentheses are t-statistics based on robust standard errors clustered at the village level. Model 1 is based on all 3 survey periods while model 2 includes 2 periods: 1998/99 and 2010/11. Estimates control for initial conditions, and the regressions additionally include village level control variables such as community prices of consumer goods, daily wage rates of men and women, and infrastructure variables such as presence of schools, government and NGO food programs, electricity, paved roads, and so on.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11.

Table 12: Determinants of different types of indebtedness during 2010/11 based on ordered logit estimation

| Key explanatory variables | Stock-based measures | | | Flow-based measures | | |
|--|-----------------------|---------------------|----------------------|-----------------------|---------------------|----------------------|
| | Moderate indebtedness | Over-indebtedness | Serious indebtedness | Moderate indebtedness | Over-indebtedness | Serious indebtedness |
| Sex of HH head (1=Male, 0=Female) | 0.009 (0.68) | 0.005 (0.70) | 0.012 (0.71) | 0.044** (3.94) | 0.035** (4.34) | 0.083** (4.65) |
| Age of HH head (years) | -0.001** (-3.61) | -0.001** (-3.53) | -0.002** (-3.67) | -0.001** (-4.09) | -0.001** (-4.35) | -0.003** (-4.53) |
| Education of HH head (years) | -0.0004 (-0.29) | -0.0002 (-0.29) | -0.001 (-0.29) | -0.002* (-1.76) | -0.002* (-1.75) | -0.005* (-1.83) |
| Dependency ratio | 0.027 (1.20) | 0.016 (1.21) | 0.039 (1.20) | 0.006 (0.36) | 0.005 (0.36) | 0.015 (0.36) |
| Number of relatives that the HH received money from in last 10 years | 0.003* (1.81) | 0.002* (1.82) | 0.004* (1.84) | -0.0002 (-0.16) | -0.0002 (-0.16) | -0.0004 (-0.16) |
| Log household land assets (decimals) | -0.001 (-0.43) | -0.001 (-0.43) | -0.002 (-0.43) | 0.001 (0.49) | 0.001 (0.48) | 0.003 (0.48) |
| HH faced death of family members in last 3 years | -0.032 (-0.97) | 0.042** (2.47) | 0.506** (5.24) | -0.116** (-2.72) | -0.036 (-0.78) | 0.707** (5.27) |
| HH faced losses in income generation activities in last 3 years | 0.044** (3.80) | 0.038* (1.94) | 0.121 (1.42) | 0.014 (0.84) | 0.046** (5.91) | 0.224** (2.08) |
| HH faced natural calamities in last 3 years | 0.011 (0.91) | 0.006 (0.94) | 0.015 (0.97) | 0.025** (2.98) | 0.022** (3.32) | 0.053** (3.40) |
| HH faced other financial losses/expenditure in last 3 years | 0.044** (7.36) | 0.039** (3.84) | 0.129** (2.87) | -0.014 (-0.12) | 0.043 (1.09) | 0.357 (0.80) |
| Village has commercial bank | -0.021 (-1.14) | -0.011 (-1.19) | -0.027 (-1.26) | -0.005 (-0.45) | -0.005 (-0.46) | -0.013 (-0.47) |
| Number of microfinance programs operating in the village | 0.003 (1.24) | 0.002 (1.22) | 0.004 (1.26) | 0.006** (3.50) | 0.006** (3.48) | 0.015** (3.87) |
| Pseudo R ² | | 0.048 | | | 0.074 | |
| Number of HHs | | 2,287 | | | 2,287 | |

*=statistically significant at 10% level; **=statistically significant at 5% level or better

Note: Marginal effects are reported. The rest of the note is same as in Table 11 except for the fact the regression model is based on 2010/2011 survey data.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11

**Table 13: Alternate estimates of borrowing impact on indebtedness†
(HH fixed-effects with control for initial conditions)
(No. households/groups=1,509, No. of observations=5,525)**

| Model | Credit variable | Debt to Non-land asset-ratio | Debt servicing to income ratio |
|--------------|--|---|---|
| 1 | Household has MFI loans | -0.180** (-11.34) | -0.078** (-37.14) |
| | Household has non-MFI loans only | -0.199** (-5.14) | -0.045** (-18.39) |
| | Number of microfinance programs operating in the village | 0.003 (0.18) | 0.010 (0.83) |
| 2 | Household has MFI loans from a single source | -0.172** (-11.95) | -0.069** (-40.80) |
| | Household has MFI loans from multiple sources | -0.228** (-5.87) | -0.151** (-15.43) |
| | Household has non-MFI loans only | -0.198** (-5.20) | -0.044** (-18.27) |
| | Number of microfinance programs operating in the village | 0.002 (0.10) | 0.006 (0.52) |
| 3 | Log cumulative borrowing from MFIs | -0.072** (-10.06) | -0.147** (-26.06) |
| | Household has MFI loans from multiple sources | 0.503** (4.62) | 0.841** (13.72) |
| | Number of microfinance programs operating in the village | 0.002 (0.11) | 0.006 (0.44) |
| 4 | Log short-term cumulative borrowing from MFIs | -0.061** (-8.45) | -0.150** (-20.79) |
| | Log medium-term cumulative borrowing from MFIs | 0.061** (3.34) | 0.028** (2.37) |
| | Log long-term cumulative borrowing from MFIs | -0.053** (-2.42) | 0.055** (4.06) |
| | Number of microfinance programs operating in the village | -0.003 (-0.17) | -0.003 (-0.24) |

†Indebtedness is defined by the original variables (debt to non-land asset ratio and yearly loan payment to yearly income ratio) that are used to determine various levels of household indebtedness.

**=statistically significant at 5% level or better

Note: Figures in parentheses are t-statistics based on robust standard errors clustered at the village level. Regressions include all the control variables that are used in the estimation of Table 11 and additional variables according to 1 of the 4 models reported in this table. Regressions are based on 3 survey periods.

Source: WB-BIDS surveys 1991/92 and 1998/99, and WB-InM survey 2010/11.