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Are Two Sources of Credit better than One?: Credit Access and Debt among Microfinance Clients in Bangladesh

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Are Two Sources of Credit better than One?: Credit Access and Debt among Microfinance Clients in Bangladesh *

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Abstract

The recent collapse of several microfinance sectors as well as the current COVID-19 pandemic has given rise to a growing concern about the risk of multiple borrowing among microcredit clients in developing countries. Researchers argue that availability of multiple sources of credit has tempted clients to take multiple loans simultaneously, and subsequently default on loans. However, there is little empirical evidence on the impact of multiple borrowing on welfare. Using a spatial fuzzy regression discontinuity design, in this paper I empirically study the impact of an additional source of credit on outstanding and delinquent debt and monthly income by comparing individuals with access to two sources of credit with individuals with access to a single source of credit. In addition, I find that access to an additional source of credit leads to a reduction in a borrower's outstanding debt by USD 44.75 and a decline in number of outstanding loans by 0.07. However, an additional source of credit has no effect on delinquent debt or monthly income of borrowers. In addition, I provide evidence of no effect of outstanding debt on psychosocial wellbeing of borrowers in terms of their happiness, life satisfaction, financial satisfaction and health satisfaction.

Keywords: microfinance, multiple borrowing, indebtedness, outstanding debt, psychosocial wellbeing, regression discontinuity design

JEL Classification: G21/ G51/ I31

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1 Introduction

Microcredit was introduced in early 1980s with the goal of financial inclusion of the poor. It was considered to be the stepping-stone of bringing the poor out of poverty by giving them access to formal financial services. During the late 1990s, the industry experienced a rapid growth reaching approximately 200 million clients with 3000 microfinance institutions (MFIs) worldwide (MIX, 2014). This unprecendented growth of the microfinance industry led to a sharp increase in competition among microfinance institutions (Hermes and Lensink, 2007). Competition among the MFIs has driven down the interest rates in some microfinance sectors and has also given the clients a wider choice of services (McIntos and Wydick, 2005). However, researchers have argued that availability of multiple sources of credit has tempted clients to take more than one loan simultaneously (McIntosh and Wydick, 2005; Mpogole et al, 2012). Increased competition among MFIs for clients has led to a decline in the average quality of borrowers (Khandker, Khalily and Samad, 2016). In addition, the literature documents an increase in the practice of borrowing simultaenously from multiple MFIs and defaulting on MFI loans (Chen, Rasmussen and Reille, 2010; Guha and Chowdhury, 2013).

These trends have led to a growing discussion about the risk of multiple borrowing and delinquency among microcredit clients in developing countries due to increased availability of credit (Taylor, 2011; Guerin et al, 2011; Kappel et al, 2010). The recent collapse of the microfinance sectors in Andhra Pradesh of India, Nicaragua and some parts of Bolivia has made multiple borrowing more of a growing concern for the microfinance industry and development practitioners (Gonzalez, 2008; Mader, 2013). In addition, the current COVID-19 pandemic has given rise to a discussion on borrowers' inability to repay loans and subsequent indebtedness due to income collapse during lockdown (Malik et al, 2020). Researchers argue that the lockdown might lead to multiple borrowing and subsequently cause financial distress among microfinance clients in developing countries (CGAP, 2020; Zheng and Zhang, 2020; Shammi et al, 2020).

This paper contributes to the emerging literature by investigating whether access to multiple sources of MFI loans has an impact on borrowing among microfinance clients in Bangladesh. Furthermore, it examines if borrowing subsequently leads to an effect on psychosocial wellbeing of the microfinance borrowers. MFIs in Bangladesh follow an exogenous operational rule of covering a certain radius to seek and serve borrowers. This operational rule creates a discontinuity in credit access, and provides the basis for the identification strategy of this paper. I use this quasi-experimental set up to estimate the impact of an additional source of credit using a spatial regression discontinuity design (RDD). To study the impact of an additional source of credit, I compare individuals with access to two sources of credit – i.e. those located within the operating zones of 2 MFI branches – with individuals with access to a single source of credit. Using the geo-referenced location of all branches of the three largest MFIs in Bangladesh – ASA,

BRAC and Grameen Bank – established between 1974-2014 combined with a nationally representative household survey of women born between 1975-1994 in Bangladesh, I provide evidence on impact of multiple sources of credit on borrowing and its subsequent impact on psychosocial wellbeing of the borrowers.

The borrower outcomes in this study are: i) outstanding debt (amount and number of outstanding loans) and ii) delinquent debt (amount and number of delinquent loans). Outstanding debt is measured as total debt which the borrowers had not repaid in full at the time of the survey. Delinquent debt is measured as total debt that a borrower had failed to repay within the period of the repayment schedule. The psychosocial wellbeing outcomes used in this study are self-reported measures of overall happiness, life satisfaction, financial satisfaction and health satisfaction.

I find that access to an additional source of credit leads to a reduction of a borrower's outstanding debt. Amount of outstanding loans decline by USD 44.75 (which is around BDT 3470)[1] and number of outstanding loans decline by 0.07. However, I do not see any effect of an additional source of credit on delinquent debt. In addition, I find no impact of outstanding debt on psychosocial wellbeing of borrowers.

The findings of this study are particularly interesting amidst the current pandemic. This is because, in a competitive credit market or for a market with a given market interest rate, according to standard economic theory, an additional MFI branch should have no effect on borrowing. This study aligns with the existing literature suggesting that, due to information asymmetry among MFIs, clients borrow from multiple sources for two reasons: (i) to accumulate the desired amount of credit as MFIs practise credit rationing and, (ii) repay existing loans (Mpogole et al., 2012; Karim, 2011; Krishnaswamy, 2007). In addition to borrowing outcomes, I exploit a fuzzy regression discontinuity design to estimate if the outstanding debt has an effect on psychosocial wellbeing. The results of impact of outstanding debt on psychosocial wellbeing of the microfinance clients imply that lower debt does not affect borrower welfare. This points towards important policy implications for microfinance institutions around the globe. In light of recent microfinance sector collapses and current unprecedented times of the pandemic, this paper contributes to the growing literature by providing causal evidence on the concern, especially amidst the current pandemic, about indebtedness and wellbeing of borrowers in presence of economic challenges of lockdown and increased competition of microfinance institutions. The results corroborate with the results of Angelucci, Karlan and Zinman (2013) finding no effect of group loans on life satisfaction and economic situation. However, the authors studied the impact of loans (not outstanding debt) on borrower welfare. They also found an increase in happiness and trust in

[1] 1 USD= 77.55 BDT (Bangladeshi Taka) according to the exchange rate in 2014.

others among borrowers which could be due to high frequency of group meetings and formation of a social network. I focus on debt of borrowers to find that increased access to credit leading to lower debt does not result in positive effect on wellbeing of clients.

The remainder of the paper is organised as follows. Section 2 discusses the related literature. Section 3 describes the microfinance sector of Bangladesh. The data used in the analysis is discussed in section 4 and section 5 sets out the empirical methodology. The results are reported in section 6 and discussed in section 7.

2 Related Literature

There is a growing literature on multiple borrowing and indebtedness in the microfinance sector. Anecdotal evidence from different developing countries such as Phillipines, Nicaragua and Morocco suggests that microfinance clients are often over-indebted (CGAP, 2012). The authors measure over-indebtedness as the scenario when the borrowers struggle to meet the repayment of their existing loan. According to the study, the borrowers often take up multiple loans to smooth out repayment schedule. Independent household surveys carried out in Kenya, Sri Lanka and Bangladesh revealed that over 70% of the respondents who were consistent microfinance clients in all three countries had problems in loan repayment because of multiple pending loans (Boiwa and Bwisa, 2014; Ravichandran, 2016; Afroze et al, 2014). Boiwa and Bwisa (2014) found a strong correlation between borrower's characterisitics, such as education and household size, with multiple borrowing among a small group of borrowers in Kenya. Afroze et al. (2014), using interviews of a sample of borrower in Bangladesh, found that 71% of the survey respondents reported to have multiple loans. Furthermore, 69% of the respondents reported having delinquent loans. The study showed that borrowers with multiple loans had repayment problems compared to borrowers with a single loan.

As an alternative approach, Schicks (2013) proposed to measure over-indebtedness among borrowers by using 'sacrifices' borrowers make to meet their repayment obligations. The study estimated that about 30 percent of urban microcredit clients in Ghana are over-indebted and subsequently make heavy sacrifices, in terms lower consumption, to repay their loans. The author suggested that over-indebtedness has the potential to push borrowers further into poverty, accompanied by the material, psychological and sociological consequences of debt.

Khandker and Samad (2014), using longitudinal data for 20 years in Bangladesh, found that multiple borrowing raises borrower's assets and net worth rather than create indebtedness. Using the same data in another study, Khandker and Samad (2013) defined over-indebtedness as a debt liability-to-asset ratio of 40% or more, and found a quarter of microcredit clients in Bangladesh to

be over-indebted. However, the authors found that access to microcredit lowered the probability of borrowers of being over-indebted. The borrowers accumulated larger assets than debt. Thus, access to microcredit led to a decline in debt liability-to-asset ratio. Krishnaswamy (2007) using a panel data of 500,000 clients in villages in India compared multiple borrowing to single borrowing. The study found 11% of the sample to have multiple loans. They found that multiple loans led to equal or better repayment records than single source borrowing. This is partly because 75% of the clients took up multiple loans to repay existing loans. Chaudhary and Matin (2002) carried out a survey of a sample of borrowers of BRAC in Bangladesh to study multiple borrowing. The study found that households borrowed from multiple sources due to urgent need for a large sum of money. Although the borrowers were found to be irregular in their repayment, they did not default in the long run.

While microfinance provides credit access to the poor to improve their economic outcomes, recent studies argue that the stringent repayment schedule of microcredit contracts increase financial stress of the borrowers. Field et al. (2012) conducted a field experiment in India to examine the impact of repayment flexibility on self-reported financial stress. The experiment randomly assigned borrowers in either a monthly repayment schedule or the more common weekly-repayment schedule. Availability of credit and terms of contract, other than the repayment schedule, were identical to a standard loan contract. The study found that borrowers on the monthly repayment schedule were 51% less likely to be distressed about repayments. In addition, these borrowers had invested the loans in more profitable opportunities, which in effect had resulted in higher household income. This subsequently led to lower psychological cost of indebtedness.

In addition, Angelucci, Karlan and Zinman (2013) in their randomized trial in Mexico estimate the impact of group-liability loans on borrower welfare. The study found that group loans increased happiness among clients by 0.045 standard deviations and trust in people by 0.05 standard deviation. This could be an effect of the setting of group contracts where clients are required to meet frequently. In addition, the study found 1 percentage point increase in likelihood of borrowers to report being better physical health. However, the authors found no effect of credit on life satisfaction, economic situation, job stress.

The next section discusses the microfinance sector of Bangladesh.

3 Context of Study

Microfinance was introduced in Bangladesh in mid-1970s to combat rural poverty through access to credit. The sector has experienced a phenomenal growth, at a rate of around 15% per

annum, since the mid-1990s when microfinance was announced as the primary tool for the goal of poverty alleviation in the Millenium Development Goals (CGAP, 2002). The total population of households in Bangladesh that have borrowed from MFIs is nearly 40 million (BRAC, 2019; MIX, 2013, Institute of Microfinance Annual Report, 2009). There are over a thousand microfinance institutions with a network of over 17 thousand branches across Bangladesh making it an almost saturated market (Rahman, 1999; Microfinance Regulatory Authority, 2014).

The high growth rate coupled with commercialization of the MFIs in the early 2000s increased competition among the institutions for a higher market share (Khandker, Khalily and Samad, 2016). By 2008, around 27 million borrowers had memberships of multiple MFIs often with multiple loans in 2008 (Institute of Microfinance Annual Report, 2009). Khalily and Farid (2011) estimated a 15% growth rate of overlapping loans in Bangladesh.[2] This led the government to create a regulatory agency, Microcredit Regulatory Authority (MRA), to monitor MFI outreach, policies and activities. MRA introduced an interest rate ceiling for loans for all MFIs. The increased competition among the MFIs and the interest rate ceiling of MRA subsequently led to a nearly perfectly competitive market in Bangladesh where the MFIs offer very similar loan contracts often with the same grace period, interest rates and repayment schedule.

The microfinance sector in Bangladesh is dominated by the three largest MFIs: ASA, BRAC and Grameen Bank. They account for about 62% of all microfinance borrower accounts and approximately 69% of the sector's gross loan portfolio (Khalily et al, 2014; Microfinance Regulation Authority, 2014). These 3 MFIs had doubled their market penetration since the 2000s setting out a total of around 9000 branches. This resulted in most regions being served by multiple MFIs or multiple branches of the same MFIs (Institute of Microfinance, 2009). At the end of 2008, these institutions were responsible for around 23 million borrowers with outstanding loans of BDT[3] 126 million out of total of BDT 159 million of outstanding loans for the entire microfinance sector (Insitute of Microfinance Annual Report, 2009; Credit Development Forum, 2009).

Competition among the MFIs has had negative consequences on the microfinance sector in Bangladesh. Relative to commercial banks, microfinance institutions had a practice of investing a significant amount of time with the clients. This seemed to be an essential component for risk minimization especially in absence of a central credit bureau. Increased competition among the MFIs through exponential expansion of branches has led to larger portfolios for the MFIs. As a result, MFIs often do not have the information whether clients have any other outstanding loan (in some cases, even if it is from a different branch of the same MFI) (Matin, 1997; Chaudhury and Matin, 2002). This led to a downward spiral of information asymmetry and higher credit risk

[2] Chaudhary and Matin (2002), studying a sample of borrowers of BRAC with multiple MFI memberships, found that households borrowed from multiple NGOs. However, they had only one loan from each MFI.

[3] Bangladeshi Taka

(FinDev Gateway, 2011).

McIntos and Wydick (2005) found that competition among the MFIs reduced the interest rates for some borrowers in Bangladesh. However, the study also found that 32% of Grameen Bank's loan portfolio in northern Bangladesh was overdue by 2 or more years. CGAP (2011) suggests that rapid growth of MFIs or even an individual MFI branch expansion has the potential to saturate the market. This could lead to loan portfolio problem, as observed by McIntos and Wydick (2015), often overlooking the impact on the borrowers.

The next section provides the conceptual framework where the mechanisms through which multiple sources of credit can have an effect on borrowing are discussed.

4 Conceptual Framework

According to standard neo-classical theory of perfect knowledge and competition, an additional source of credit should not have an effect on borrowing. This is because of the assumption of perfect information between the MFIs and the borrowers, particularly in presence of strong competition. It is more so as, as mentioned earlier, the MFIs in Bangladesh often offer homogeneous loan contracts. However, in the market when information asymmetry in the sector this hypothesis would change.

A number of studies provide evidence that asymmetric information increases in presence of stiff competition among the MFIs. This happens more in a saturated market as information on borrowers is diluted across a larger group of lenders (Hoff and Stiglitz, 1998; McIntosh and Wydick, 2005; Gonzalez, 2008; Karim, 2011; Khandker, Khalily and Samad, 2016). However, the literature diverges in the findings. McIntosh and Wydick (2005) found that competition only helps the better-off borrowers as they can attain larger loans. However, in presence of strong competition, MFIs avoid ultra-poor borrowers due to higher monitoring costs of the poor borrowers and potential adverse selection problem (Zeller and Meyer, 2002). This leads to mission drift among MFIs contradicting the goal of the program (Copestake, 2007; Furthermore, information asymmetry also leads to borrowers taking up multiple loans. This is because of two reasons: (i) borrowers, often struggling with poverty, have high demand for credit and (ii) information asymmetry helps the borrowers to obtain larger sum of loans by borrowing from multiple sources. This creates overlapping debt problems for borrowers.

CGAP (2011) suggests rapid expansion of microcredit, leading to market saturation, is early indication of over-indebtedness. The authors define over-indebtedness to be the scenario when

the borrowers face serious problems in repaying their loans. It also implies that borrowers can be over-indebted even if they manage to repay loans. Recent microfinance literature also argues that borrowers often have present-biased preferences (Laibson, 1997; Fudenberg and Levine, 2006) and they consistently make choices that are detrimental to their own well-being (Barr, Mullainathan and Shafir, 2008; Mullainathan and Krishnan, 2008). The irrational borrowing behavior can also be generalized over the commercial credit market serving the richer population leading to an increase in over-indebtedness. However, it hurts the poor more due to their vulnerability to income shocks and coping mechanisms undertaken during the income shocks (Banerjee and Duflo, 2007).[4]

On the other hand, Khandker, Khalily and Samad (2016) using Credit Development Forum surveys in Bangladesh finds evidence that presence of multiple MFIs and increased borrowing has positive impact on women in terms of higher household income, higher investments in agricultural activities and better loan recovery rates. Given the existing evidence, I hypothesize in this analysis that, according to standard economic theory, multiple sources of credit should not affect borrowing levels for rational borrowers. The hypothesis in this paper relies on the fact that MFIs, particularly the three considered in this study, offer standard microcredit contracts across the institutions. Therefore, the loan contracts and repayment schedule is assumed to be similar, if not identical.[5] Furthermore, in this study, an additional source of credit is considered to be a branch of another MFI or a branch of the same MFI. Borrowers, if needed, could borrow additional loans, either in amount or number, from the first source of credit they have access to. Hence, a second MFI branch would not affect borrowing outcomes.

There is another strand of literature on effects of increased borrowing and effects on psychological health of borrowers. CGAP (2011) suggests that multiple borrowing leads to over-indebtedness. It might increase vulnerability and further impoverishment of borrowers. This could happen through multiple channels such as lower consumption and downward spiral of ever-increasing debt. Shicks (2013) uses a subjective measure of borrower sacrifices to examine costs of over-indebtedness. The author suggests that 30% of microfinance clients in Ghana are over-indebted and as a result are severely distressed. The borrowers had to make costly sacrifices, such as skipping meals, to meet their loan repayment obligations. Thus, I hypothesize in the study that increased borrowing, if any, due to additional source of credit would lead to a negative effect on the pyscho-social indicators of the women.

[4]There is a well-developed literature on credit card borrowing and debt trap among the rich (Stango and Zinman, 2009; Lusardi, Schneider and Tufano, 2011; Amar et al., 2011).

[5]MFIs offer differentiated services, such as micro-savings, across the institutions but the microcredit programs are often the replication of the Grameen Bank model, at least for the 3 largest MFIs.

The next section describes the data used in the analysis of the study.

5 Data

The empirical analysis of this paper uses two different datasets: the 2014 Women's Life Choices and Attitudes Survey (WiLCAS) and geo-referenced branch record of the three largest microfinance institutions in Bangladesh. The 2014 WiLCAS is a nationally representative survey of women in Bangladesh between the ages of 20 and 39. Asadullah and Wahhaj (2018) conducted the household survey for a project funded by AusAID.[6] I use this survey in my analysis as it includes geo-referenced current location of women and detailed record of their microfinance borrowing. The 2014 WiLCAS was conducted in two phases. The sample of the first phase of the survey was selected from the 2010 Bangladesh Household Income and Expenditure Survey (HIES) and includes all rural households in HIES with one or more female household members. In addition, a random sample of 1,500 sisters of the 6,293 women in the phase 1 sample were tracked and interviewed for a second phase of the survey. I use both phases of the survey giving me a total sample of 7,771 women.

It consists of individual interviews of adult women which include information on their background such as age, current residence, educational attainment and employment status. In addition, it has detailed record of microcredit borrowing of the women where they report their membership of MFIs, list of loans taken from the MFIs with respective years and whether they had repaid the loans at the time of the survey. Furthermore, the survey has information on the parental characteristics of the women such as parental education and landholdings. The survey also includes a module where the women were asked about their psychosocial wellbeing factors such as life satisfaction, health satisfaction, financial satisfaction and overall happiness.[7]

From the survey, the sources women had borrowed from can be observed. Table 1 reports their borrowing composition. 28.53% of the loans taken by the women were from Grameen Bank, 25.95% from ASA and 13.84% from BRAC. Only 3.46% of loans taken by the women were from other MFIs. Commercial bank loans accounted for only 0.70% of the loans. The remaining 26% of the loans where borrowed from informal sources such as family, friends, local usurers and mutual funds. Therefore, for the analysis in this paper I focus on the three MFIs which account for approximately 70% of the MFI loans: ASA, BRAC and Grameen Bank. Henceforth, all borrowing outcomes mentioned in the study represent loans taken from only these three MFIs in Bangladesh.

In order to determine each respondent's access to credit, I collected the geo-referenced branch

[6] More details about the survey can be obtained from the website www.integgra.org

[7] See Section 9.1 in the Appendix for further details about the indicators on psychosocial wellbeing.

location data at the union[8] level of all operating branches of each of these three MFIs across Bangladesh. I retrieved 2,886 branch locations of ASA, 2,364 branch locations of BRAC and 2,555 branch locations of Grameen Bank.[9] To identify the women's location, I use the geo-referenced location of residence at the village level of each respondent of the survey. The geo-referenced location of the MFIs at the union level have been spatially mapped with the geo-referenced location of the respondents at the village level to calculate the distance of each branch of the MFIs from the respective villages of women. The number of MFI branches each respondent has access to has been calculated in order to study the impact of access to an additional MFI branch. This will be discussed in detail in the next section.

5.1 Descriptive Statistics

Table 2 provides the descriptive statistics for the survey respondents. The mean age of the women is 29 years with a standard deviation of around 6 years. Average parental landholdings is 1.39 acres of land. The average monthly income of the sample is BDT 12,219 which is roughly around USD 157.56.[10] The survey has information on the loans that the women have taken and had not repaid at the time of the survey. All loans which were not repaid in full at the time of the survey are referred to as outstanding loans. The average amount of outstanding loans is BDT 4,279.91 and the average number of outstanding loans per respondent is 0.20. Loans which were defaulted for over a year are referred to as delinquent loans. The average amount of delinquent loans was BDT 997.46 and the average number of delinquent loans per respondent was 0.08. The survey follows the "Cantril's Ladder of Life Scale", as proposed by George (1981) and Ravallion and Lokshin (1999), for the happiness and satisfaction questions where the respondents are shown a ladder with steps numbered from 1 to 10 to demonstrate their satisfaction level. In the scale, 1 represents 'not happy at all' and 10 respresents 'extremely happy'. The mean for each of the four psycho-social wellbeing questions is approximately 5 with a standard deviation of around 2.

6 Empirical Methodology

While access to credit has been widely studied, it is not often measured in terms of bank branches due to the common endogeneity factors (Burgess and Pande, 2005). The identification concern is also valid for microfinance branch access. This is because MFIs like commercial banks select their operational regions taking into account the population density, geographical feasibility, demand of microfinance and other operational factors making it difficult to determine control and treatment groups. In this paper, I address the concern by using regression discontinuity design

[8] A union is the smallest rural administrative and local government unit in Bangladesh.
[9] See Appendix 9.2 for further details about the branch location data.
[10] The exchange rate is taken for 2014 at 1 USD =77.55 BDT.

through the exogenous operational rule of MFIs. A few studies have used regression discontinuity design to study the impact of microfinance in Bangladesh using an eligibility based on borrower's landholdings (Pitt and Khandker,1998; Morduch, 1998; Morduch and Roodman, 2005; Akhtaruzzaman and Farooq, 2016).

This study contributes to the literature by using a spatial regression discontinuity design where the discontinuity in treatment assignment is geographic to measure access to an additional source of credit. In this setup a geographic boundary splits households into treatment and control groups. MFIs in Bangladesh work within a certain radius to seek and serve borrowers. I take advantage of this exogeneous rule of operation of MFIs to act as a cut-off for the forcing variable in our empirical analysis to classify control and treatment groups. MFIs in Bangladesh have varying thresholds to determine servicing area. Grameen Bank and BRAC cover a radius of 4 kilometer of distance to give out loans to borrowers and ASA covers a radius of 5 kilometers to do so.

In order to measure access to multiple branches of credit, the control group is taken to be the households of respondents who have access to just one branch of a MFI, i.e. the respondents are located within the operational area of one MFI branch, and the treatment group is taken to be the households who have access to two branches, i.e. the respondents are located within the operational area of two MFI branches. The running variable of access to credit is constructed by mapping the geo-referenced locations of all the operating branches of these MFIs across Bangladesh and the location of the respondents to calculate the minimum distance of each respondent to each of the branches of the MFIs. Following this, the number of MFI branches each respondent has access to is derived to form the control and treatment groups accordingly. The respondents who are located within the operational area of only one MFI branch form our control group and the respondents who are located within the operational area of 2 MFI branches form our treatment group. In this study, I include only the respondents with access to either one or two MFI branches and exclude the respondents with no credit access or with access to more than 2 MFI branches. This helps to tap the effect of an additional branch of credit on respondents after their first branch access. To the best of my knowledge, this study is the first to use spatial discontinuity as the running variable to examine the impact of multiple sources of microcredit in Bangladesh.

Mathematically, the running variable is given by the following formula:

$$R^i_{1,2} = min_{b \neq b^i_{0,1}}(C_{o(b)} - d_{ib}) \tag{1}$$

$$b^i_{0,1} = argmin_b(C_{o(b)} - d_{ib}) \tag{2}$$

where $R_{1,2}$ denotes the running variable for the respondents who are the borrowers, the subscript $1, 2$ of $R_{1,2}$ shows that the control group has access to 1 MFI branch and the treatment group has access to 2 MFI branches, index i denotes the borrower and index b denotes the MFI branch, $o(b) \in$ indicates the organisation to which branch b belongs, either ASA, BRAC or Grameen Bank, d_{ib}= distance of household of the borrower i from branch b, and $C_{o(b)}$= distance threshold of the MFIs (4 km for BRAC and Grameen Bank; 5 km for ASA).

As demonstrated by the formula, the running variable is centered at the threshold. For ease of interpretation, the running variable is such that a negative value in the x-axis of all the plots means that the individual would have to travel some distance to be within the catchment area of the second closest branch; while a positive value means that the individual is already within the catchment area of the second closest branch. In both cases, the magnitude of the value is the distance of the respondent from the boundary of the catchment area of the second-closest MFI branch.

To estimate the impact of multiple sources of credit on loans, the study employs a nonparametric local polynomial method using a fuzzy regression discontinuity design where the first stage represents the impact of access to credit on debt and monthly income. The first stage allows me to examine if an additional source of credit has an impact on outstanding debt and monthly income. Following this in the second stage, I estimate the impact of the outstanding debt on psycho-social wellbeing indicators of the borrowers.[11] I use a fuzzy regression discontinuity approach as I investigate the impact of the outstanding debt on psychosocial wellbeing instrumented through the running variable of access to credit. Empirically I estimate the following equations:

$$\textit{First Stage}: Y_i = \alpha + \tau D_i + \beta R^i_{1,2} + \delta X_i + u_i \tag{3}$$

$$\textit{Second Stage}: PsychosocialWellbeing_i = \nu + \eta Debt_i + \gamma R^i_{1,2} + \lambda X_i + \epsilon_i \tag{4}$$

where Y_i denotes the borrowing outcomes of interest for each borrower such as, i) outstanding debt (amount and number of outstanding loans) and ii) delinquent debt (amount and number of delinquent loans), and monthly income for each borrower for the first stage. For the second stage equation, $PsychosocialWellbeing_i$ represents the outcome of interest, such as the four psychosocial wellbeing indicators: overall happiness, life satisfaction, financial satisfaction and health satisfaction. $D_i \in \{0, 1\}$ indicates access to multiple sources of credit such that D_i = 1 if $R^i_{1,2} > 0$ and D = 0 if $R^i_{1,2} < 0$. τ is the coefficient of interest for borrowing and income outcomes measuring the effect of the discontinuity at the cut-off representing the local average

[11] In this study, I use the RD estimation package 'rdrobust' following Cattaneo et al (2017) which gives the bias corrected RD estimates using data-driven optimal bandwidth.

treatment effect. X_i is a set of covariates of borrowers including age, age-squared, parental education and parental landholdings and u_i and ϵ_i are the idiosyncratic errors.

Local linear regression is the most common form of nonparametric method in the RDD literature. This is because the non-parametric estimation is based on the observations closer to the cut-off on each side, making it intuitively appealing as the observations are valid counterfactuals of each other. This window of observations around the cut-off is key to estimation. The linear non-parametric specification reduces some bias that can result from using data farther away from the cutoff to estimate the discontinuity at the cutoff and uses an optimal bandwidth choice reflecting the variability of the data (Imbens and Kalyanaraman, 2012). However, in order for the estimation strategy to be internally valid, the continuity of observations around the cut-off for the running variable is important.

Before presenting the main estimation results, I check for manipulation of the running variable, i.e., self-selection into the treatment to see if the women have chosen to live in the areas where they would have access to multiple sources of credit. We do this by checking the density of households of respondents around the threshold. A discontinuity at the threshold of the running variable (with higher density in the treatment group) would indicate that the respondents have self-selected themselves into the treatment group. Figure 3.1 shows the plot for the McCrary density test of manipulation of the running variable for access to credit of respondents (McCrary, 2008). Figure 3.2 shows the plots for the McCrary test for the sample of Phase 1 and Phase 2 separately. The sample of Phase 1 includes a sample of respondents selected from the 2010 HIES and the sample of Phase 2 includes 1,500 sisters of the Phase 1 respondents randomly chosen to survey. The plots are continuous around the threshold. This provides evidence of internal validity of the emprical strategy showing that there was no sorting around the threshold of access to credit.

As robustness checks, I estimate our first equation with six pre-determined characteristics to test for discontinuity as proposed by Lee (2008) and Lee and Lemieux (2010). The pre-determined characteristics of the respondents that we test for discontinuity are age, education, mother's education, father's education, parental landholdings and religion. I check age and education for a discontinuity at the threshold as other studies have shown that these characteristics are correlated with multiple borrowing (Boiwa and Bwisa, 2014). In addition, I test parental landholdings for a discontinuity as landholdings (half an acre of land) is another eligibility criteria of the microfinance program and has been used as a forcing variable for a microfinance impact study (Pitt and Khandker, 1998). I also test parental characteristics for discontinuities as there is extensive evidence of parental education influencing social outcomes of children (Chevalier, 2004; Ermisch and Pronzato, 2010).

As proposed by Calonico (2015), we use a data-driven sequence to select number of bins for all plots. This method ensures that the plots represent the discontinuity taking into consideration the variability of data. The dots in the plots represent binned sample means of the outcomes of interest using the fourth polynomial and uniform kernel. The x-axis represents the running variable of access to two sources of credit for a range of 8 kilometers with 4 kilometers on each side of the threshold. A negative value indicates that the household is located outside of the catchment area of the second closest branch, while a positive value indicates that the household is located with the catchment area. In both areas, the magnitude of the variable represents the distance to the boundary of the catchment area. Figure 3.3 shows the series of plots of the pre-determined characteristics for a graphical analysis of the estimation. Other than the respondent's mother's education, I do not find evidence of discontinuity at the threshold for any of the pre-determined characteristics.

Table 3.3 shows the estimation results for pre-determined characteristics. I observe a positive discontinuity for religion only. I use a binary indicator for religion where the variable takes the value of 1 if the respondents are muslim and 0 otherwise. Therefore, a positive discontinuity means that respondents are 8.44 percentage points more likely to be muslim in the treatment. However, as I do not find any discontinuity for any other pre-determined characteristics, neither are the estimates statistically significant. Therefore, it is unlikely to affect our estimation. Nonetheless, I use the six pre-determined characteristics as controls in the regressions.

The next section reports the regression results.

7 Results

The results are divided into two parts. The first shows the results of impact of access to an additional source of credit on borrowing and income of the respondents. The second presents the results of borrowing on subsequent impact on psycho-social wellbeing of the respondents. I present the graphical plots of the outcomes of interest in Figures 3.4-3.6. In tables 3.4-3.6, I report RD estimates of the effect of multiple branches of credit on outstanding and delinquent loans and its subsequent effect on psycho-social wellbeing. In the even-numbered columns, I report estimates from regressions where I control for the pre-determined characteristics of the women including age, age-squared, education, religion, parental characteristics.

The outcomes of interest related to borrowing are:(i) outstanding debt; (ii) number of outstanding loans; (iii) amount of delinquent debt; (iv) number of delinquent loans. Outstanding debt is defined as the sum of loans which had not been repaid at the time of the survey. Delin-

quent debt is defined as the sum of loans that were still outstanding one year or more after the end of the repayment schedule. In addition to borrowing, I examine monthly income of borrowers. Outcomes for the psyscho-social wellbeing indicators of the women include overall happiness, life satisfaction, financial satisfaction and health satisfaction of individuals.

Figure 3.4 shows the RD plots for outstanding amount and number of loans. Both figure 3.4 (a) and 3.4 (b) show small negative discontinuities at the threshold indicating a decrease in outstanding debt when women have access to a second MFI branch.

The formal estimation results are presented in Table 3.4. The amount of outstanding loans decreases by approximately BDT 3470 for the women with access to 2 MFI branches when the specification includes controls for the covariates (significant at the 1% level). This estimate is approximately 81% of the average amount of outstanding loans of the sample. The effect is also In addition, the number of outstanding loans decreases by 0.07 (significant at the 10% level) when the specification includes controls for the covariates.[12] The estimate is approximately 35% of the average number of outstanding loans of the sample. These estimates imply that access to a second MFI branch leads to a substantial reduction in the amount of outstanding loans and a small reduction in the number of outstanding loans. Amount of outstanding loans decline by 28% of the average monthly income of the sample when the respondents have access to a second MFI branch.

Figure 3.5 shows the plots for amount and number of delinquent loans. There appears to be small discontinuities in both Figure 3.5 (a) and Figure 3.5 (b). Table 3.5 presents the formal results. I obtain positive estimates for the amount and number of delinquent loans. But they are statistically insignificant in both cases.

Figure 3.6 shows the plot for monthly income of borrowers. There appears to be no discontinuity at the cut-off. The formal estimation result is reported in Table 3.6. I do see any effect of an additional source of credit on monthly income of borrowers.

Next, I look at the psycho-social indicators to examine the effect of amount of outstanding loans instrumented by an additional source of credit on wellbeing of the women. The psychosocial indicators include overall happiness, financial satisfaction, life satisfaction and health satisfaction. Figure 3.7 shows the plots for the four psychosocial wellbeing indicators. There appears to be no discontinuity at the threshold in the plots. Formal estimation results are reported in Table 3.7. I find no effect on the psychosocial wellbeing indicators of women when they have outstanding debt. The effect estimated is quite close to zero for all four indicators.

[12]The estimates are significant over a wide range of bandwidth including the optimal data-driven bandwidth based on data variability. The estimates have been tested for a range of 0.2 kilometers - 1.5 kilometeres range of bandwidth.

8 Discussion

Financial inclusion is advocated for bridging the poor to the formal credit market. Over the past four decades, it has been established that the poor are capable of banking through the growing microfinance institutions around the world. Recently, several microfinance markets have faced instability and borrowers have increasingly experienced over-indebtedness in various forms. In light of the emerging literature, this paper empirically estimates the impact of multiple sources of credit on borrowing. I find that an additional source of credit lowers outstanding debt by BDT 3470 which is approximately 81% of the average outstanding debt for the sample. When the borrowers have access to a second branch of MFI their amount of outstanding debt decline by about 28% of their average monthly income. It also reduces the number the loan outstanding of borrowers by 0.07 which is approximately 35% of the number of outstanding loans for the sample.

The existing literature has argued that MFI clients borrow from multiple sources because the MFIs are unwilling to provide loans of sufficient size (Mpogole et al. 2012). Therefore, the MFI clients borrow from multiple institutions to obtain the desired amount of credit. There are two ways in which the additional loans may be used. First, they allow the borrower to extend the overall loan duration (by using new loans to repay previous ones). Karim (2011) in her enthnographic case studies in Bangladesh found that in presence of multiple MFIs the clients borrowed from multiple sources to repay existing loans. The study found that prevailing social norms led women to give away the loans to male family members. Therefore, the women were compelled to borrow from multiple sources to repay the existing loans.[13] This is also consistent with Krishnaswamy (2007) where the author found better repayment record with multiple loans among clients in India. This was because 75% of the clients had taken multiple loans to repay existing loans.

Second, additional loans enable the borrower to undertake larger investments than what would otherwise be feasible, raise household income and improve the household's capacity to repay existing debt (Field et al. 2012). In both cases, the addtional source of credit would lead to lower debt. Intuitively, there could be a few more possible reasons leading borrowers to have lower debt when the borrow from multiple sources. Borrowers could choose to borrow from multiple sources to pay-off exisitng debt because repayment failure leads to harsher future loan terms or a loss in future prospect of borrowing from the MFI. However, I find no effect of an additional source of credit on loan delinquency. This may be because the mean number and amount of delinquent loans in the sample is quite small. The findings of this study are interesting as,

[13] Her study also suggests that MFIs promote multiple borrowing to capture a larger client base.

according to the standard neo-classical economic theory, an additional source of credit should not have any effect on debt. This is because in presence of perfect information and competition among MFIs, an additional source of credit would not give the borrowers the opportunity to obtain larger sum of loans from multiple sources or re-shuffle loan repayments. However, I do not find any effect of an additional source of credit on monthly income of borrowers.

In addition, I find no effect of lower debt on psycho-social wellbeing of borrowers. There is limited causal evidence on impact of outstanding debt on wellbeing of microfinance clients. However, these results are in line with the evidence of Angelucci, Karlan and Zinman (2013). The authors in their randomized trial in Mexico found no effect of group-liability loans on life satisfaction or economic status of borrowers. Reflecting on the existing literature on borrower welfare of microfinance clients, I provide evidence that an increase in access to credit does not necessarily lead to over-indebtedness among MFI clients. It rather leads to a decline in debt. In addition, an increased debt does not have a negative effect on borrower welfare, in terms of psychosocial wellbeing of borrowers. The findings of this paper have important policy implications on access to credit among poor households in developing countries particularly amidst the current COVID-19 pandemic. In light of the emerging literature, this paper provides empirical evidence that access to multiple sources has a positve effect on borrowers as it allows borrowers to lower their debt level. Furthermore, amidst the growing concern among policymakers regarding over-indebtedness of MFI clients, the results of our study indicate that increased debt is not necessarily detrimental to borrower welfare. We find no impact of increased debt on psychosocial indicators of borrowers. It is particularly interesting to observe that lower debt has no impact on psychosocial wellbeing of borrowers.

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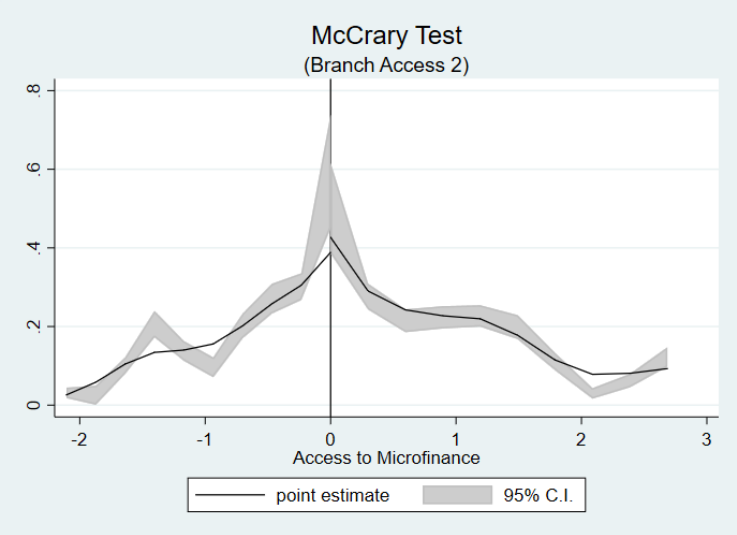
List of Figures

List of Tables

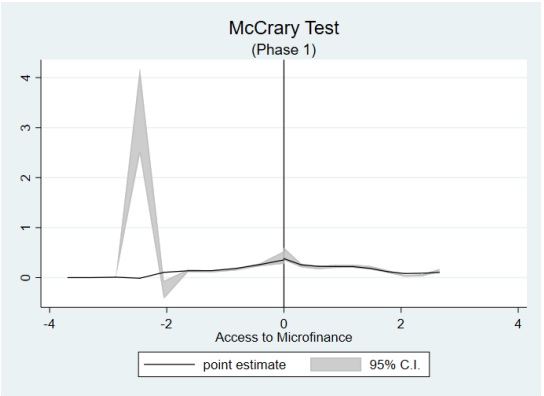
Figure 1: McCrary Test of Running Variable for Full Sample



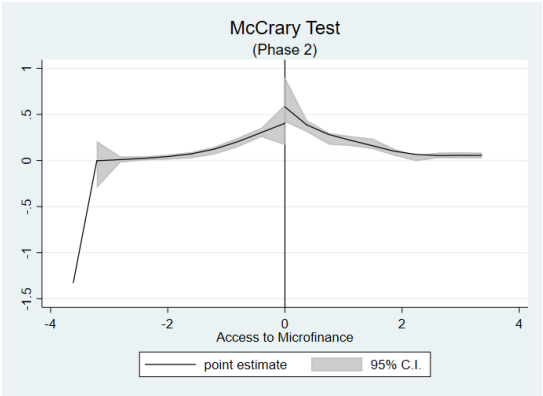
(a) Full Sample

Note: The figure above demonstrate the McCrary test for the running variable. The plots shown here and all the figures below have the running variable 'access to microfinance' normalized at the centre in the x-axis. The centre shows the cut-off of operational rule with the negative value in the x-axis means that the individuals would have to travel some distance to be with the servicing area of the second closest branch. The positive value in the x-axis means that the individual is already within the servicing area of the second closest branch. The control group, with the negative distance, has access to a single branch of MFI and the treatment group, with the positive distance, has access to 2 MFI branches.

Figure 2: McCrary Test of Running Variable for Phase 1 and Phase 2



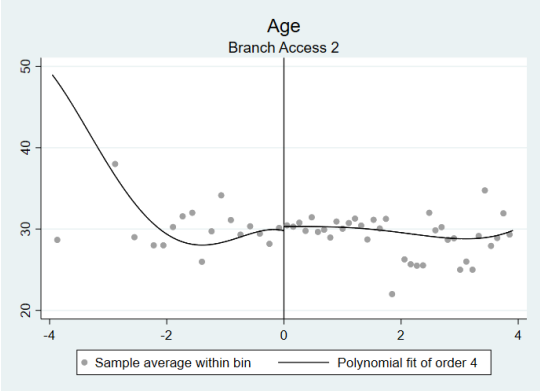
(a) Phase 1



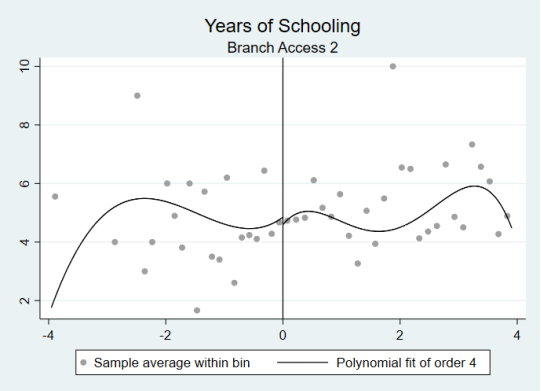
(b) Phase 2 //

Note: The figures above demonstrate the McCrary density test results for the running variable to check for manipulation of treatment with the sample split into Phase 1 and Phase 2. Figure 2 (a) shows the plot for the sample of respondents interviewed during the first phase of the survey. Figure 2 (b) shows the plot for the sample of sisters of respondents of the first phase of the survey interviewed for the second phase of the survey. The centre shows the cut-off of operational rule with the negative value in the x-axis means that the individuals would have to travel some distance to be with the servicing area of the second closest branch. The positive value in the x-axis means that the individual is already within the servicing area of the second closest branch. The control group, with the negative distance, has access to a single branch of MFI and the treatment group, with the positive distance, has access to 2 MFI branches.

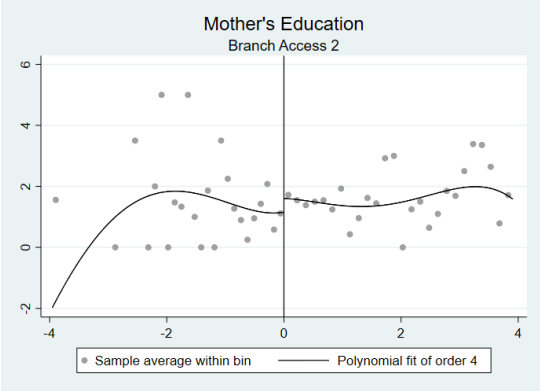
Figure 4: Pre-determined Characteristics Plots



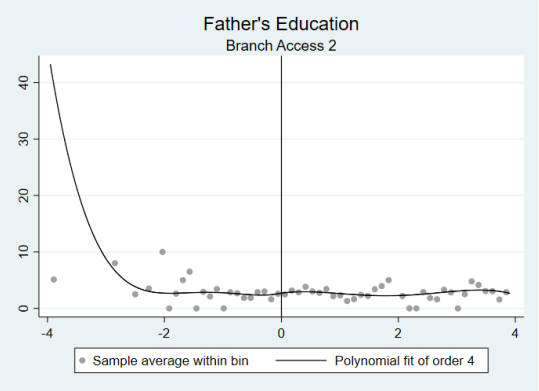
(a) Age



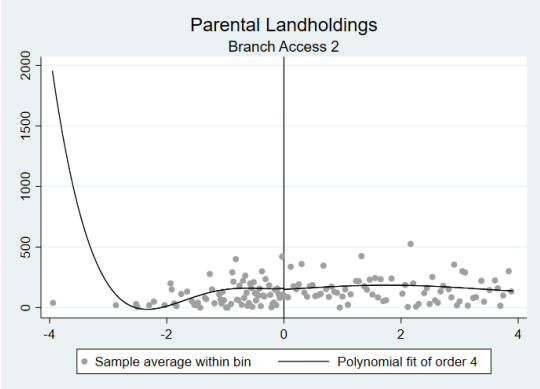
(b) Education



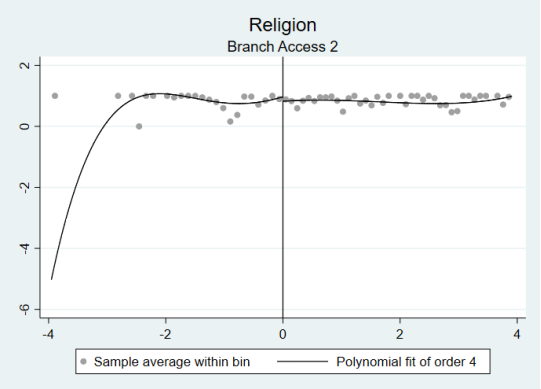
(c) Mother's Education



(d) Father's Education



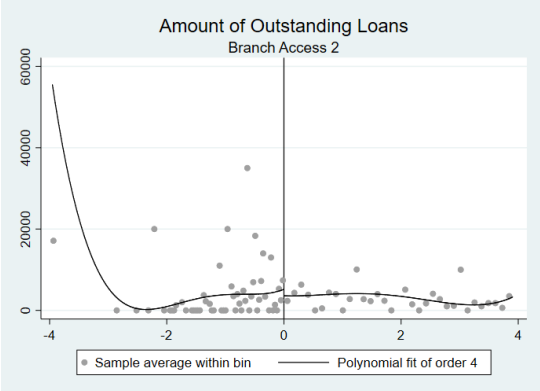
(e) Parental Landholdings



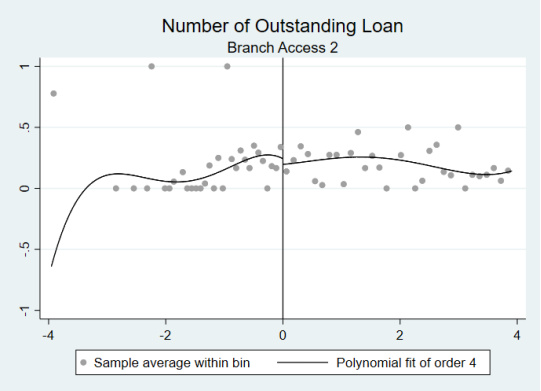
(f) Religion

Note: The figures above demonstrate the RD plots for pre-determined characteristics of borrowers. The plots shown here and all the figures below have the running variable 'access to microfinance' normalized at the centre in the x-axis and use a fourth polynomial and uniform kernel. The centre shows the cut-off of operational rule with the negative value in the x-axis means that the individuals would have to travel some distance to be with the servicing area of the second closest branch. The positive value in the x-axis means that the individual is already within the servicing area of the second closest branch. The control group, with the negative distance, has access to a single branch of MFI and the treatment group, with the positive distance, has access to 2 MFI branches.

Figure 5: Amount and Number of Outstanding Loans: RD Plots



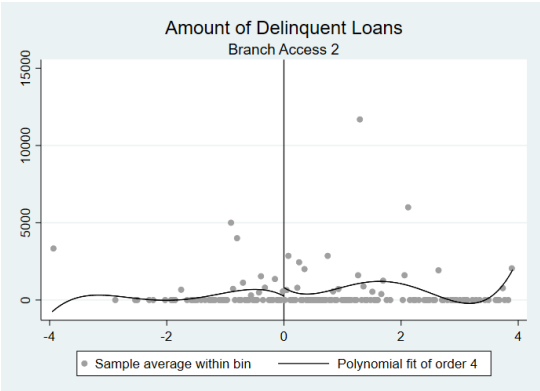
(a) Branch Access 2



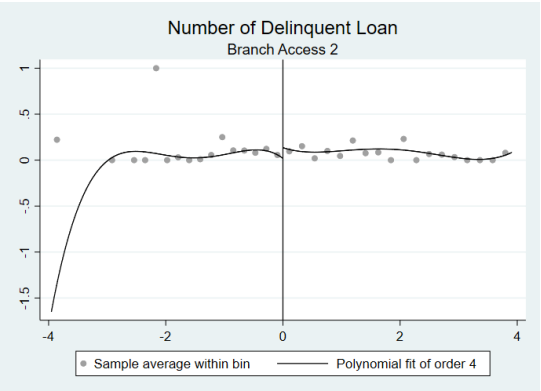
(b) Branch Access 2

Note: The figures above show the plots for amounts and number of outstanding loans for Branch Access 2. Figure 4 (a) demonstrates the plots for outstanding amounts of loans of clients and Figure 4 (b) for outstanding number of loans. Branch Access 2 in the table above denotes that clients have access to two MFI branches. The dots represent binned sample means of amounts of outstanding loans and number of outstanding loans using a fourth order polynomial and uniform kernel. The centre shows the cut-off of operational rule with the negative value in the x-axis means that the individuals would have to travel some distance to be with the servicing area of the second closest branch. The positive value in the x-axis means that the individual is already within the servicing area of the second closest branch. The control group, with the negative distance, has access to a single branch of MFI and the treatment group, with the positive distance, has access to 2 MFI branches.

Figure 6: Amount and Number of Delinquent Loans: RD Plot



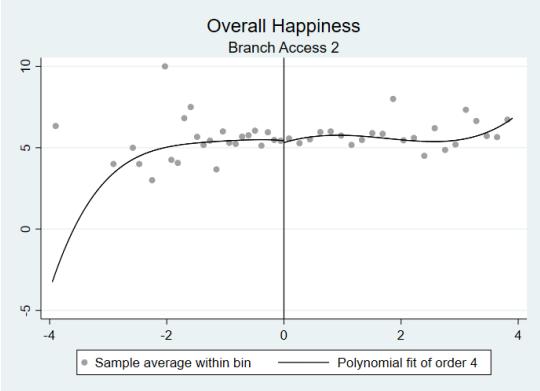
(a) Branch Access 2



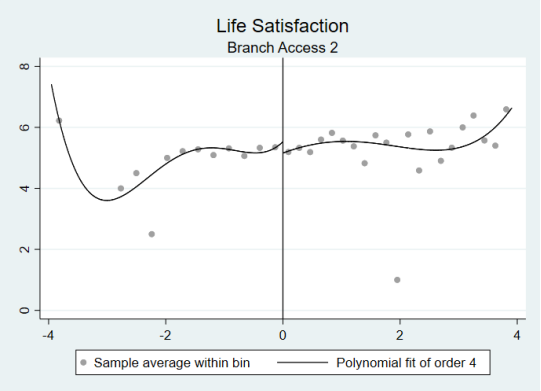
(b) Branch Access 2

Note: The figures above show the plots for amount and number of delinquent loans for Branch Access 2. Figure 5 (a) demonstrates the plots for amounts of delinquent loans of borrowers and Figure 5 (b) for number of delinquent loans. Branch Access 2 in the table above denotes that clients have access to two MFI branches. The dots represent binned sample means of amounts of delinquent loans and number of delinquent loans using a fourth order polynomial and uniform kernel. The centre shows the cut-off of operational rule with the negative value in the x-axis means that the individuals would have to travel some distance to be with the servicing area of the second closest branch. The positive value in the x-axis means that the individual is already within the servicing area of the second closest branch. The control group, with the negative distance, has access to a single branch of MFI and the treatment group, with the positive distance, has access to 2 MFI branches.

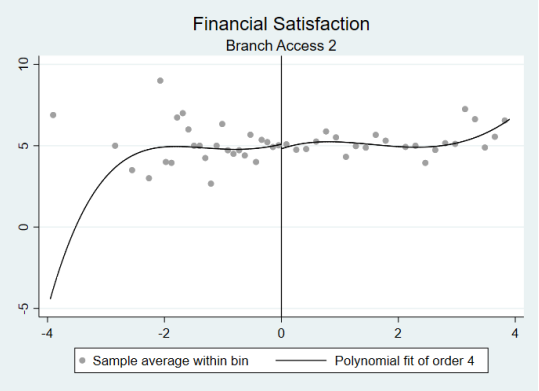
Figure 7: Psychosocial Wellbeing Indicators: RD Plots



(a) Overall Happiness



(b) Life Satisfaction



(c) Financial Satisfaction

(d) Health Satisfaction

Note: The figures above show the plots for psycho-social indicators for Branch Access 2. Figure 6 (a) shows the plots for overall happiness, Figure 6 (b) for life satisfaction, Figure 6 (c) for financial satisfaction and Figure 6 (d) for health satisfaction. Branch Access 2 in the table above denotes that clients have access to two MFI branches. The dots represent binned sample means of the respective pyscho-social wellbeing indicators using a fourth order polynomial and uniform kernel. The centre shows the cut-off of operational rule with the negative value in the x-axis means that the individuals would have to travel some distance to be with the servicing area of the second closest branch. The positive value in the x-axis means that the individual is already within the servicing area of the second closest branch. The control group, with the negative distance, has access to a single branch of MFI and the treatment group, with the positive distance, has access to 2 MFI branches.

Table 1: **Sources of Loan**

Loan Composition	%
Loan from ASA	27.10
Loan from BRAC	13.51
Loan from Grameen Bank	28.42
Loan from Other MFIs	4.06
Loan from Commercial Bank	0.75
Loan from Informal Sources	26.18

Source: WiLCAS 2014 and Authors' Calculations

Note: The table above shows the percentage of loans borrowed from different sources in our sample. The three MFIs (ASA, BRAC and Grameen Bank) account for approximately 70% of the loans taken. Informal sources include family, friends, moneylenders, employer, shop owners.

Table 2: **Descriptive Statistics**

	Mean	Sd	Min	Max	N
Borrower Features					
Age	29.15	5.70	19	39	7,771
Monthly Income (in BDT)	12,218.94	63,089.77	0	5,000,000	7,771
Education (years of schooling)	5.27	3.79	0	13	7,771
Parental Landholdings (in acres)	1.39	2.77	0	60	7,771
Father's Education	2.97	3.88	0	13	7,771
Mother's Education	1.61	2.76	0	13	7,771
Religion (muslim)			0	1	7,771
Borrowing Profile					
Amount of Outstanding Loan from ASA, BRAC and Grameen Bank	4279.91	19547.68	0	900,000	7,771
Amount of Delinquent Loan from ASA, BRAC and Grameen Bank	997.46	11548.69	0	800,000	7,771
Number of Outstanding Loans from ASA, BRAC and Grameen Bank	0.2040	0.47	0	5	7,771
Number of Delinquent Loans from ASA, BRAC and Grameen Bank	0.0779	0.31	0	5	7,771
Psychosocial Wellbeing Indicators					
Overall Happiness	5.586	2.12	1	10	7,771
Financial Satisfaction	5.156	2.10	1	10	7,771
Life Satisfaction	5.405	2.065	1	10	7,771
Health Satisfaction	5.463	2.116	1	10	7,771

Source: WiLCAS 2014 and Authors' Calculations

Table 3: **Pre-determined Characteristics**

	Branch Access 2
Age	0.1896
	(0.914)
h	0.657
Obs around cutoff	[544, 888]
Education	0.0929
	(0.544)
h	0.722
Obs around cutoff	[544, 888]
Mother's Education	0.5124
	(0.325)
h	1.099
Obs around cutoff	[544, 888]
Father's Education	-0.0317
	(0.554)
h	0.685
Obs around cutoff	[544, 888]
Parental Landholding	-43.627
	(42.571)
h	0.572
Obs around cutoff	[544, 888]
Religion	0.0844*
	(0.058)
h	0.329
Obs around cutoff	[544, 888]
N	1432

Note: The table presents the local linear regression estimates for the pre-determined covariates of the borrowers. Religion is a binary variable which takes the value of 1 if the respondents are muslim and 0 otherwise. Branch Access 2 in the table above denotes that clients have access to two MFI branches. h is the data-driven bandwidth in kilometers taken around the threshold for estimation. Standard errors are given in parantheses. Statistical significance is denoted by robust p-values * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: **Amount and Number of Outstanding Loans**

	Branch Access 2	
	(1)	(2)
Amount of Outstanding Loan	-2978.70*	-3469.60***
	(1804.10)	(1803.00)
h	0.629	0.629
Obs around cut-off	[544, 888]	[544, 888]
Number of Outstanding Loan	-0.0560	-0.0669*
	(0.058)	(0.058)
h	1.223	1.223
Obs around cutoff	[544, 888]	[544, 888]
N	1432	1432
Controls	No	Yes

Note: The table presents the local linear estimates for amount and number of outstanding loans of borrowers. Outstanding loans are defined as the loans that the women had not repaid in full at the time of the survey. The estimates in column (2) include age, age-sq, education, religion, parental landholdings and parental education as controls. Branch Access 2 in the table above denotes that clients have access to two MFI branches.h is the data-driven bandwidth in kilometres taken around the threshold for estimation. Standard errors are given in parantheses. Statistical significance is denoted by robust p-values * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: **Amount and Number of Delinquent Loans**

	Branch Access 2	
	(1)	(2)
Amount of Delinquent Loan	216.53	214.66
	(508.80)	(505.63)
h	0.807	0.807
Obs around cutoff	[544, 888]	[544, 888]
Number of Delinquent Loan	0.0791*	0.0782
	(0.046)	(0.046)
h	0.732	0.732
Obs around cutoff	[544, 888]	[544, 888]
N	1432	1432
Controls	No	Yes

Note: The table presents the local linear estimates for amount and number of delinquent loans of borrowers. Delinquent loans are defined as the total loans that the women had failed to repay within the period of repayment schedule. The estimates in column (2) include age, age-sq, education, religion, parental landholdings and parental education of the women as controls. Branch Access 2 in the table above denotes that clients have access to two MFI branches. h is the data-driven bandwidth in kilometers taken around the threshold for estimation. Standard errors are given in parantheses. Statistical significance is denoted by robust p-values * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: **Psychosocial Wellbeing Indicators**

	Branch Access 2	
	(1)	(2)
Overall Happiness	0.0001	0.0000
	(0.000)	(0.000)
h	1.049	1.049
Obs around cutoff	[544, 887]	[544, 887]
Life Satisfaction	0.0002	0.0002
	(0.000)	(0.000)
h	1.014	1.014
Obs around cutoff	[544, 887]	[544, 887]
Financial Satisfaction	0.0002	0.0001
	(0.000)	(0.000)
h	1.039	1.039
Obs around cutoff	[544, 887]	[544, 887]
Health Satisfaction	-0.0001	0.0001
	(0.000)	(0.000)
h	0.637	0.637
Obs around cutoff	[544, 887]	[544, 887]
N	1431	1431
Controls	No	Yes

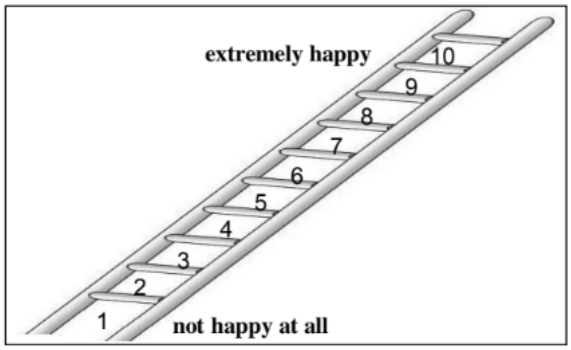
Note: The table presents the local linear estimates for the four pyschosocial wellbeing indicators when the borrowers have amounts of loans outstanding, where access to a second branch acts as an instrument. The psycho-social wellbeing indicators include overall happiness, life satisfaction, financial satisfaction and health satisfaction of the women. The estimates in column (2) include age, age-sq, education, religion, parental landholdings and parental education of the women as controls. Branch Access 2 in the table above denotes that clients have access to two MFI branches.*h* is the data-driven bandwidth in kilometers taken around the threshold for estimation. Standard errors are given in parantheses. Statistical significance is denoted by robust p-values * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

9 Appendix

9.1 Psycho-social Wellbeing Indicators

The survey has a module on subjective wellbeing which has questions complying with Centre of Epidemiological Studies- Depression (CES-D) scale where the respondents were presented a 'Cantril Ladder Scale'. The survey respondents were asked how happy they were with their lives at the time, how satisfied were they with their household economic situation, how satisfied were they with their health situation and how satisfied were they with their lives in general considering the socio-economic factors. The Cantril Ladder Scale shown to the respondents had 10 steps where the respondents were asked to choose a step according to their wellbeing status subject to health, family and economic conditions. The 1st step meant that she was not happy at all and the 10th step meant that she was extremely happy. The ladder is shown in the figure below.

Figure 8: Cantril Ladder Scale



9.2 Branch Location Data: ASA, BRAC and Grameen Bank

We collected the branch location data of all operating branches of these three MFIs in Bangladesh in terms of district, upazila and union. For ASA and Grameen Bank that was the lowest administration classification available for the address of the branches. From the given classification, we have derived the geo-coordinates of the branches for this paper. We could not find the geo-coordinates for 25 branches of Grameen Bank and 38 branches of ASA. Hence we dropped the branches from our analysis. For BRAC, the institution had the geo-coordinated of the street-level address of all of its branches available.

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