



5-2013

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Recommended Citation

White, Roger and Alam, Shamma Adeeb, "Asset Ownership and the Probability of Repayment: An Examination of Microcredit Data from Bangladesh" (2013). *Economics*. 26.

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Asset Ownership and Microloan Repayment: Examining Data from Bangladesh

Roger White and Shamma Adeb Alam*

Employing data for 34,255 loans made by the Bangladesh Rural Advancement Committee (BRAC) to 12,455 repeat borrowers during the 2002-6 period, this article examines the relationship between borrowers' asset holdings and microloan repayment. Estimating a series of binomial probit specifications, it finds a positive relationship between land ownership and loan repayment; however, taken collectively, ownership of non-land assets diminishes the likelihood of repayment. Influences of specific assets on repayment probabilities vary across asset types: ownership of land, corrugated tin houses, vans and rickshaws increases the likelihood of repayment, while ownership of sewing machines, televisions, radios and bicycles corresponds with a decreased repayment probability.

Key words: Bangladesh, BRAC, microfinance, probit, repayment

1 Introduction

As microfinance has emerged, in recent decades, as one of the most effective, flexible and innovative tools in the fight against poverty, loan recovery has remained vital for the sustainability of microfinance institutions (MFIs). When determining who is and is not creditworthy, MFIs regularly collect information on potential borrowers' asset holdings, the implication being that a borrower in possession of more assets is thought to be less risky relative to a comparable individual with fewer assets. Employing data collected from the Bangladesh Rural Advancement Committee (BRAC), this article considers the extent to which asset holdings matter for successful loan repayment. It also considers possible variations across asset types in terms of their respective influences on loan repayment.

Although the literature examines many aspects of microfinance, including the determinants of loan repayment or default, to our knowledge this is the first study that considers the holdings of specific asset types as determinants of microloan repayment.¹ Godquin (2004) examines the influences of productive and non-productive assets, generally, on loan repayment but does not consider the influences of specific asset types. In

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1. Godquin (2004) provides an excellent review of the related literature. A separate literature considers the impact of microcredit on borrowers. See, for example, Pitt and Khandker (1998), Morduch (1999), Zaman (1999), Mosley (2001), McKernan (2002), Madajewicz (2004) and Khandker (2005). Yet another strand of the literature concentrates on the properties of joint liability contracts and group behaviour: see Ghatak (1999), Paxton et al. (2000), Bisin and Guiatoli (2004), Katchova et al. (2006), Ahlin and Townsend (2007) and Karlan (2007).

evaluating the relationship between specific assets and loan repayment, we provide valuable information that adds to the collective knowledge regarding microloan repayment. Such information may increase lending efficiency and have a positive effect on repayment rates, thus promoting the sustainability and, potentially, the scale and scope of microcredit.

A common microfinance practice is for loan officers to speak with a potential borrower's neighbours, relatives and friends to help gauge the individual's creditworthiness. That applicants are also asked to report asset holdings suggests that lenders consider assets to be an important determinant of loan repayment. Higher asset values may indicate a borrower's past financial success or their productivity. Likewise, greater asset holdings may foster a higher likelihood of loan repayment if borrowers can liquidate their assets, if/when necessary, to meet repayment obligations. Finally, a borrower's assets may signal the wealth or income of extended family – a valuable potential source of funds for the borrower to draw upon, if necessary. However, higher asset holdings may also reflect a higher marginal propensity to consume and a diminished capacity to repay a loan. Similarly, loan repayment may be hindered if higher asset holdings are indicative of a high discount rate and corresponding low savings. As differences in the composition of assets held may reflect variation in entrepreneurial talents across borrowers and, thus, differences in borrowers' abilities to repay loans, the seemingly intuitive relationship between asset holdings and the probability of successful loan repayment may be less straightforward than one might expect and, accordingly, remains an open empirical question.

As well as inquiring about asset holdings, the BRAC membership application asks borrowers to divulge general household and demographic information. In surveying BRAC area offices, we collected data from the membership applications of a random sample of borrowers. In addition to information regarding asset holdings, the data include borrower demographics and household characteristics. To complete our data set, we matched these data to the corresponding borrowers' loan information and monthly repayment histories, which were obtained from BRAC's main office. Our data represent 34,255 loans taken by 12,455 repeat borrowers during the 2002–6 period. To discern the influence of asset holdings on repayment likelihoods, we estimate a series of binomial probit specifications: regressing a dichotomous dependent variable that represents successful loan repayment on a set of explanatory variables that includes measures of asset holdings as well as additional control variables. As our data include only loans made to those individuals who have been considered creditworthy, we effectively consider whether asset holdings affect the likelihood of repayment among borrowers who hold assets at or in excess of a threshold deemed acceptable by the lender.

Our analysis yields interesting results and relationships. We find that ownership of land is positively correlated with successful loan repayment; however, ownership of non-land assets, taken in total, is negatively related with the probability of repayment. In addition, we find considerable heterogeneity across asset types in terms of their influences on repayment probabilities. Broadly speaking, ownership of assets that signal wealth or status (specifically, land and houses) and of other assets that are likely to generate income (vans and rickshaws) corresponds with an increased probability of loan repayment. Ownership of assets that are less likely to generate income (televisions, radios and bicycles and furniture/household items) is negatively related with loan repayment. We also find that

a number of assets (cows, goats and lambs, and cow-pulled vehicles) are generally unrelated to the likelihood of loan repayment. While we report significant relationships between assets and repayment, we find that the overall influence of assets on loan repayment is not particularly great. When discussing our results in detail, we offer plausible explanations for our findings.

Considering that, in addition to asset holdings, personal and/or family characteristics may affect a borrower's repayment performance, we control for several related factors. We find the likelihood that a loan will be repaid is higher if the borrower has taken more loans in the past. As one may expect, borrowers who make advance payments during the repayment period are more likely to repay their loans, while loans taken by borrowers who periodically miss payments are more likely to end in default. Similarly, older borrowers and households with more income-earning members have higher repayment probabilities, while households with more members in total have lower repayment probabilities. Our findings have important policy implications for MFIs and can be used to improve the processes by which borrowers are screened and loans are approved.

This article proceeds as follows. Section 2 describes the data. Section 3 explains our empirical methodology and presents the specific hypotheses to be tested. Estimation results are presented and discussed in Section 4, and Section 5 concludes.

2 Data sources, borrower information and repayment histories

Before discussing the data in detail, it may be instructive to introduce BRAC and briefly summarise its lending process. BRAC employs more than 100,000 individuals who provide the poor with services related to education, health care, social development and legal assistance. As such, it is one of the largest non-governmental organisations in the world. The scale and scope of BRAC's lending are on a par with those of the Grameen Bank, making it one of the largest MFIs. BRAC's microfinance programme targets women, offers loans without requiring collateral, and uses a group lending mechanism to promote repayment.² While BRAC has three tiers in its microfinance programme, our data are from the programme that targets the poorest segment of the population. This programme, known as Dabi, comprises 89% of all BRAC borrowers and generally offers loans up to 30,000 Taka (BDT) – an amount roughly equivalent to US\$440.

When beginning work in a new area, BRAC completes a series of village-specific household surveys. These identify the poorest one-half of households in each village. The members of these households, if not members of another MFI, are potential BRAC programme participants. As programme sustainability is very important, people with at least some minimum level of assets are considered for the microfinance programme, while the absolutely destitute – who tend to be landless – are considered for a development programme known as the Targeted Ultra Poor (TUP) programme. The TUP programme provides grants to eligible individuals until they have sufficient assets to become eligible for the microfinance programme. Therefore, since the landless are typically considered more risky as compared with borrowers who do own land and, thus, often are eligible for the TUP programme, a very small fraction of the individuals to whom BRAC lends are landless (only 5.5% in our sample).

2. For more detailed information relating to BRAC and its programmes, visit www.brac.net.

Once the microfinance members have been chosen from this population, BRAC creates village organisations (VOs) and assigns a loan officer to each. The VOs consist of three to eight micro-groups, each of which has a leader and four other members. Thus, each VO has 15 to 40 members. The VO structure is complete when members elect a management committee consisting of a chairwoman, a secretary, a commissioner and two to five ordinary members.

The process of taking a loan begins with a micro-group member informing her group leader of her desire to borrow. The group leader then proposes the loan at a VO meeting, and the proposal is either accepted or rejected through a voice vote. If accepted, then either the chairwoman or the secretary informs the BRAC loan officer of the decision. The loan officer then completes a loan request form and a loan contract and takes the signatures of the potential borrower, micro-group leader, and the chairwoman or secretary. The loan officer then reviews the loan proposal and request form and delivers a preliminary decision favouring or opposing the loan. If the loan officer is in favour of the proposal, he forwards it, along with the request form and contract, to a BRAC accountant who examines the borrower's request form and previous loan information before sending the forms to the BRAC area office manager for formal approval. The area office manager reviews the loan documents with his staff during their weekly office meeting and, if the loan is formally approved, decides when the funds will be disbursed. Following formal approval, the loan officer informs the borrower of the loan disbursement date. On the given date, the borrower visits the BRAC area office, signs the loan disbursement sheet and loan contract, and the loan is then disbursed by the accounting division.

2.1 Survey methodology

As already mentioned, loan-specific data, including complete monthly repayment histories, were obtained from the BRAC main office, plus data relating to borrower demographics, household characteristics and asset holdings through a survey of BRAC area offices.³ From the borrowers' membership applications, we collected detailed information on the asset holdings of each borrower's household. Specifically, we have information on land owned (in acres) and the number and total value of several non-land assets: corrugated tin houses; cows; goats and lambs; vans and rickshaws; cow-driven vehicles; sewing machines; televisions, radios and bicycles; and other miscellaneous assets (typically furniture and/or household items/appliances). It is important to note that, while household assets may be controlled jointly (perhaps by a husband and wife), or by another member of the household, the lender's expectation regarding loan repayment generally remains the same. If the borrower does not control the assets and default appears likely, then the loan officer may expect the person controlling the assets to come to the borrower's aid. The survey data also indicate the total number of individuals residing in each borrower's household, the number of income-earner members within the household, and the borrower's age and marital status. The monthly loan repayment histories include information on loan value and duration, interest rate, whether any payments were missed or paid in advance, the number of prior

3. The survey form constructed for this project, which was translated into Bengali and sent to BRAC area offices, is included in the Appendix.

loans that each borrower had taken from BRAC, and whether each prior loan was successfully repaid.

To ensure a random sample, data were collected for 50 randomly selected borrowers from each of 280 randomly selected BRAC area offices, thus yielding a sample containing 14,000 borrowers.⁴ The level of detail in the data permits examination of the extent to which commonly held assets affect loan repayment. Although a large literature has emerged regarding varying aspects of microfinance, to our knowledge our study is the first to examine asset holdings, in such a degree of detail/specificity, as determinants of microfinance loan repayment.

2.2 Descriptive statistics

Table A1 in the Appendix presents descriptive statistics for the full sample of loans and for two sub-samples: loans that were successfully repaid and loans that ended in default. While the loan repayment rate is 96.4%, it should be noted that 1,208 borrowers defaulted on 1,245 of the 33,255 loans in our sample. Thus, the borrower repayment rate is 90.3%. The typical loan value is equal to slightly more than one-half (50.7%) of the corresponding borrower's non-land asset holdings (BDT23,056 or about US\$340). Land is the most commonly-owned asset, with 94.5% of all borrowers holding some amount and the typical loan being taken by a borrower owning 1.04 acres. The most prominent non-land asset is corrugated tin houses, which account for 70% of the value of the typical borrower's non-land asset holdings. A closer inspection of the data reveals that 73.6% of loans are taken by borrowers for whom the value of their corrugated tin houses exceeds the combined value of all other non-land assets. This indicates that the typical loan is taken by a borrower who has low asset holdings relative to their loan value and who lacks diversity in the types of assets held. We also see that it is much more common for borrowers to make advance loan payments (77.8% of loans involved at least one advance payment) as compared with missing at least one payment (16.6%).

With respect to demographic characteristics, nearly all loans (99.4%) were taken by borrowers who were married. The typical loan was taken by a borrower who was 30.8 years old and, although the youngest and oldest borrowers were 15 and 55 years of age respectively, 67.1% of loans were given to borrowers between the ages of 25 and 35. In addition, the typical loan was taken by a member of a household comprising about 4.7 members; of whom roughly 1.2 were income-earners.

Given the high loan repayment rate, it is not surprising to find similarities between the characteristics of the full sample and those of successfully repaid loans. The only significant variations are that successfully repaid loans tend to be smaller in value and have lengthier repayment periods than the typical loan. Also, the borrowers who had taken these loans had taken relatively smaller loans in the past and were more likely to make at least one advance payment. In contrast, when considering loans that end in default, we find that borrowers tend to have non-land asset values and loan values that, on average, are greater than the typical loan. With respect to specific asset types, these loans are taken by borrowers who tend to have less land than the typical borrower and lower values, on

4. There are 1,381 area offices across Bangladesh; thus, our sample contains borrowers from roughly one-fifth (20.27%) of all area offices.

average, for goats and lambs and for vans and rickshaws, but higher values for sewing machines, televisions, radios and bicycles, and other miscellaneous assets. These borrowers also have borrowed more times in the past from BRAC, and their average household size is higher than the overall mean. Not surprisingly, these borrowers are more likely to miss payments and less likely to make advance payments.

Table A2 presents a correlation matrix that provides additional useful information. Values presented in column (a) indicate that, while land ownership is positively related to loan repayment, greater total non-land asset values correspond with a decreased likelihood of loan repayment. These relationships and the variation in correlation coefficients between certain non-land asset types and successful loan repayment – specifically that corrugated tin houses, sewing machines, televisions, radios and bicycles, and other miscellaneous assets are negatively correlated with successful loan repayment, while cows, goats and lambs, and vans and rickshaws are positively correlated – suggests that heterogeneity exists across asset types with respect to loan repayment. Further examination reveals that higher values for current and previous loans are strongly and negatively correlated with repayment and that borrowers who have taken more loans in the past are less likely to successfully repay a loan. This may be explained, at least in part, by the positive relationship between the number of prior BRAC loans (row (o)) and the values of current and previous loans (columns (l) and (m), respectively).

3 Empirical methodology

To discern the relationships between our dependent variable, successful loan repayment, and our set of explanatory variables, we estimate a series of binomial probit specifications. We adopt the definition of loan default employed by BRAC and categorise a loan as having been successfully repaid if full payment is received either during the term of the loan or within a four-week grace period following the scheduled loan discharge date. To evaluate the relationships between holdings of specific assets and loan repayment, we employ a number of separate asset measures as explanatory variables: (i) total values, (ii) average values, (iii) unit values, and (iv) asset values as a share of total (non-land) assets. Total asset values are the values stated by the borrowers and confirmed by loan officers. Average asset values, a measure of asset quality, are derived by dividing total asset values by corresponding unit values. Unit values, a measure of asset quantity, are the numbers of each asset type held. Thus, the total asset value represents a combination of asset quality and asset quantity. Finally, we construct a variable that compares the total values of each asset type to the total value of all non-land assets. This variable allows us to consider the composition of each borrower's assets as a determinant of successful repayment.

Sharma and Zeller (1997) and Godquin (2004) report that higher loan values correspond with decreased probabilities of loan repayment. As loan values may be endogenously determined (that is, loan values and success of repayment may be determined by omitted variables observed by loan officers and BRAC but not available in our data), we follow Godquin (2004) and employ the main amount of each borrower's prior loan as an instrument variable for the current loan value. This necessitates censoring our data to include only repeat borrowers. We include the duration of the current loan in our specification, as lengthier repayment periods, all else being equal, may correspond with an

increased likelihood of repayment. We also include the loan interest rate as higher interest rates indicate a higher cost of borrowing and, hence, an expected increased likelihood that borrowers would face difficulty repaying loans.

Controlling for the number of previous BRAC loans serves two purposes. The number of prior loans taken indicates the number of loan cycles in which the borrower has interacted with her micro-group. Thus, it is a proxy for the effects of group dynamics on loan repayment. As anecdotal evidence suggests that the composition of groups is unlikely to change over time, the variable is an indirect measure of a group's age. This is similar to Godquin's (2004) explicit use of group age to represent social ties and the behaviour/characteristics of group members. Also, as Schreiner (2004) finds, the number of payments in arrears decreases as the number of past loans increases. Thus, the number of prior loans is a potential measure of borrower reliability. An individual who has successfully repaid prior loans may be more likely to repay an additional loan, as compared with a borrower who has yet to demonstrate the same degree of creditworthiness.

Finally, we include two loan-related dummy variables. The first variable is equal to one if the borrower missed at least one loan payment during the lifetime of the loan and zero if no payments were missed.⁵ The second variable is equal to one if any payments were made in advance during the repayment period and zero if no advance payments were made.

Equation (1) represents our baseline estimation equation in general form. Subscripts i and j correspond to loans and borrowers, respectively.

$$(\Pr \text{ Success}_{ij} = 1) = f(\text{land}_j, \text{non-land assets}_j, \text{prior loan value}_j, \text{loan duration}_i, \text{loan interest rate}_i, \text{missed payments}_i, \text{advance payments}_i, \text{prior BRAC loans}_j, \text{age}_j, \text{marital status}_j, \text{household members}_j, \text{income-earning members in household}_j) \quad (1)$$

With respect to borrower characteristics, Vogelgesang (2001a) finds that younger borrowers have higher likelihoods of loan default. This may indicate that more mature borrowers typically have greater financial solvency/wherewithal and, perhaps, more experience in conducting business. In addition, age may correspond with a more prominent reputation within the local society and/or connections that may bias a loan officer's decision to approve or refuse a loan. We include both the borrower's age and its squared value as separate explanatory variables to capture potential non-linearity in the age-repayment relationship. Copestake et al. (2001) and Vogelgesang (2001a) both report that married borrowers are more likely to repay loans. This is thought to result from married borrowers tending to be more stable, perhaps older and less likely to engage in risky projects because of the impact a negative outcome may have on their families. Even though nearly all borrowers in our sample are married, we include a dummy variable which is equal to one if the borrower is married and equal to zero otherwise.

5. Because repayment history data are reported monthly, a borrower could miss a payment early in a month, make up the payment before the month's end and have a repayment history reflecting that all payments were made on time.

To provide some indication of how household composition may affect repayment, we include two variables: the total number of household members and the number of income-earning members within the household. Based on the findings of Sharma and Zeller (1998), we anticipate that more total members within a household will decrease the likelihood of repayment, while more income-earning members within a household increases the likelihood of repayment.

3.1 Hypotheses to be tested and estimation strategy

Our examination is predicated on the notion that, since assets are an important part of the decision-making process by which borrowers are considered for loans, it is reasonable to expect assets to be important and significant determinants of repayment probabilities. The fact that lenders commonly base evaluations of borrowers' creditworthiness, in part, on asset holdings underscores the notion that asset holdings are viewed as an indicator of income and/or financial or business acumen or perhaps of associated family wealth, all of which are thought to correspond with a greater ability to repay a loan. We posit that, in addition to the level of assets being important for loan repayment, different asset types may affect the likelihood of repayment differently. For example, more productive assets may be expected to affect the likelihood of repayment differently from less productive assets. Thus, we arrive at our first two hypotheses:

H1: Asset holdings are positively correlated with a greater likelihood of loan repayment.

H2: Different asset types (land, vans and rickshaws, cow-pulled vehicles, and so forth) affect the likelihood of loan repayment in distinct ways.

Employment of alternative measures of asset holdings (total asset values, asset quantities, average asset values, and individual asset values as a share of total (non-land) asset values) in our estimations may convey additional and more detailed information about the corresponding relationships to loan repayment. For example, for some assets, quality (as inferred from average asset values) might have a more pronounced influence on repayment probabilities relative to total asset value or the quantity of assets held. This leads to our third hypothesis:

H3: Employing different asset measures (for example, total asset values or average asset values) will reveal different relationships regarding the likelihood of loan repayment.

We begin our analysis seeking to discern a general relationship between total asset values and loan repayment. To this end, we employ land, which is reported in acres owned rather than as a monetary value, and the value of total non-land assets to represent borrowers' asset holdings. We then proceed by substituting, in turn, vectors containing more detailed asset measures (discussed earlier) for the total non-land assets value and, finally, we consider the relationships between repayment and holdings of productive (or likely income-generating) assets and non-productive (less likely to generate income) assets. Although categorisation of assets is difficult, we base our characterisation of assets as

productive or non-productive on whether the asset can likely be used by the borrower to generate income or not. Certainly, for some borrowers, exceptions to this categorisation do occur. We proceed cautiously with this caveat in place and in mind.

To control for seasonality in repayment, we append vectors of dummy variables to our empirical specification. These include variables that indicate the month and the year during which the loan is scheduled to be discharged. Khandker et al. (1995) consider the extent to which loan default is influenced by area characteristics. Using Grameen Bank data, the authors find that area characteristics influence loan repayment. Similarly, Paxton (1996) reports that proximity to urban locations is positively related with loan repayment. Since our borrower information is reported at the area office level, we control for potential geographical variation in borrowers' abilities to successfully repay their loans. Accordingly, we categorise each loan observation, based on the location of the borrower's area, into one of 13 regions.⁶

Equation (2) presents our estimation equation, complete with individual asset measures and seasonal and geographical fixed effects.

$$\begin{aligned}
 (\text{Pr } Success_{ij} = 1) = & \alpha_0 + \beta_1 land_j + \beta_2 corrugated\ tin\ houses_j + \beta_3 cows_j \quad (2) \\
 & + \beta_4 goats\ and\ lambs_j + \beta_5 sewing\ machines_j \\
 & + \beta_6 televisions,\ radios\ and\ bicycles_j + \beta_7 vans\ and\ rickshaws_j \\
 & + \beta_8 cow-pulled\ vehicles_j + \beta_9 other\ miscellaneous\ assets_j \\
 & + \gamma_1 previous\ loan\ value_i + \gamma_2 loan\ duration_i + \gamma_3 loan\ interest\ rate_i \\
 & + \gamma_4 missed\ payments_i + \gamma_5 advance\ payments_i + \delta_1 prior\ BRAC\ loans_j \\
 & + \delta_2 borrower's\ age_j + \delta_3 borrower's\ age^2_j + \delta_4 household\ members_j \\
 & + \delta_5 income\ earners\ in\ household_j + \delta_6 married_j + \zeta_m month \\
 & + \eta_y year + \theta_r region + \varepsilon_{ij}
 \end{aligned}$$

4 Results and analysis

Marginal effects obtained when estimating equation (2) and its variants using the binomial probit technique are presented in Tables A3 to A6. As mentioned, we begin our analysis using a measure of the total value of non-land assets. Since we only have information on the amount (in acres) of land owned, land is included in our estimation equation as a separate variable. We then substitute variables that represent individual asset types for the total non-land asset variable so that we may consider their respective influences. As before, we employ measures of total asset values, average asset values, number of assets (units),

6. Regions and corresponding shares of all loans within the sample are as follows: Barisal (24.21%), Bogra (16.32%), Chandpur (16.21%), Chittagong (17.21%), Comilla (8.12%), Cox's Bazar (3.28%), Dhaka Urban (0.78%), Dinajpur 4.81%), Jatrabari (0.99%), Jessore (3.31%), Khulna (2.88%), Kishoregonj (1.12%), Sylhet (0.75%).

and assets as a share of total non-land assets. We discuss each asset type/measure and corresponding set of results in turn, placing particular focus on the previously-stated hypotheses.

Beginning with the results presented in Table A3, we report a consistently positive and significant influence of land holdings on loan repayment. The marginal effects for the total (non-land) assets variables indicate that a borrower's asset holdings exert a small but significant and negative influence on the likelihood of loan repayment. Two things are important to note at this point. First, as mentioned at the outset, since our data represent only those who have been deemed creditworthy by loan officers, we are effectively considering whether asset holdings matter for repayment among borrowers who are in the bottom one-half of households, based on income, but who hold assets at or in excess of an acceptable threshold. In other words, it may be that what we are finding is an indication that a borrower's holdings of non-land assets, above some threshold, have only a minor effect on repayment likelihoods. Secondly, while the coefficient on the total non-land assets variable is negative, greater asset holdings correspond to a higher probability of loan repayment if the borrower's land holdings are sufficiently large relative to total non-land asset holdings.

Marginal effects reported for the remaining variables in Table A3 provide additional interesting information. Higher loan values and interest rates correspond to decreased likelihoods of loan repayment, while lengthier repayment periods correspond to an increased likelihood of loan repayment. As one might expect, loans for which borrowers missed at least one payment were more likely to end in default, and loans for which borrowers made at least one advance payment were more likely to be successfully repaid. Loans taken by borrowers who had taken a greater number of prior BRAC loans were more likely to end in successful repayment. Older borrowers and those in households that had more income-earning members and/or fewer total members were more likely to successfully repay their loans. While the specifications presented in columns (a) to (c) are similar, they do vary in terms of controlling for time and region fixed effects. The consistency in the magnitudes and signs of marginal effects, across specifications, is taken as an indication of the robustness of our preliminary findings.

Results obtained when substituting the holdings of specific asset types into our specification for total non-land assets are presented in Table A4. As before, the marginal effects indicate a positive relationship between land and successful loan repayment. Across all estimations, corresponding marginal effects are significant and of similar magnitudes. Ownership of sewing machines; televisions, radio and bicycles; cow-pulled vehicles and other assets (primarily furniture and other household items/appliances) – as measured by total value (column (a)), average value (column (b)), units (column (c)), or by each asset as a share of total non-land assets (column (d)) – correspond with decreased likelihoods of loan repayment. In addition to land holdings, ownership of vans and rickshaws and of corrugated tin houses is positively related to successful loan repayment. Coefficients on variables representing ownership of livestock (cows, goats and lambs) are consistently positive, although insignificant.

A possible explanation for the observed pattern of variation in terms of the signs and significance of marginal effects across asset types may be tied to the ability of assets to generate income. This would correspond with the findings of Godquin (2004) who reports

that households with higher values of productive asset holdings are more likely to repay loans. Several studies report a positive relationship between borrower profits, which one may expect is positively correlated with the ownership of productive assets and loan repayment.⁷ Conversely, non-productive assets would generally not provide a stream of revenue and, thus, may be less likely to contribute positively to loan repayment. Similarly, productive assets may be more easily liquidated and, if so, more capable of providing the borrower with funds to meet payment obligations.

In Table A5, we present results obtained when re-estimating our empirical specification after clustering non-land assets as either likely income-generating, or productive, assets (i.e., corrugated tin houses; cows; goats and lambs; sewing machines; vans/rickshaws; and cow-pulled vehicles) or as likely non-income-generating, or non-productive, assets (i.e., televisions, radios and bicycles and other assets). The reasoning behind our categorisation is as follows. Owning a house allows rental payments to be avoided and can provide rental income if the individual owns more than one house. Somewhat similarly, ownership of cows, goats or lambs can generate income since these animals provide foodstuffs that reduce a borrower's consumption expenditure. In addition, the animals may have offspring that can be sold, and/or they can provide revenue from the sale of related dairy products. Sewing machines can generate income since many women in rural Bangladesh engage in sewing for domestic consumption and sometimes this involves offering output for commercial sale. Vans/rickshaws are the most common form of transportation in Bangladesh. Typically, a male member of the borrower's family drives the van/rickshaw and sells the service to commuters. An alternative arrangement involves the borrower renting the rickshaw to a driver who then sells transportation services to commuters. Similarly, cow-pulled vehicles are widely used in rural areas to carry passengers or heavy goods. As with vans/rickshaws, the sale of this transportation service can generate income. Finally, we categorise televisions, radio and bicycles and furniture and household items (i.e., other assets) as non-income-generating assets, since we do not expect ownership of such assets to directly affect income. There may, of course, be some indirect effect on repayment performance, for example better information on prices through radio or television or easier means of transportation using bicycles, but we do not expect these assets to have significant influences on borrowers' incomes.

As reported in Tables A3 and A 4, the marginal effects on the land variables presented in Table A5 are positive and significant. Marginal effects for productive assets are positive in all specifications; however, statistical significance is lacking. In contrast, marginal effects reported for non-productive assets are negative and significant in all specifications. Considering the ad hoc nature of our categorisation of assets as probably productive or non-productive and, more specifically, acknowledging that corrugated tin houses may or may not generate income, we re-estimate the specifications for which results are presented in Table A5 while employing two alternative categorisations. The corresponding results are presented in Table A6. Columns (a) to (d) include results obtained when corrugated tin houses, regardless of the number a borrower owns, are categorised as likely non-productive assets. Columns (e) to (h) contain results obtained when corrugated tin houses are categorised as likely non-productive assets if the borrower owns only one house and as likely productive assets if the borrower owns multiple houses.

7. See, for example, Copestake et al. (2001), Vogelgesang (2001b), and McKernan (2002).

Buttressing the results presented in Tables A3 to A5, we find the estimated marginal effects for the land variables are positive and significant in all estimations. Likewise, the marginal effects of the productive assets variables are consistently positive but insignificant. Finally, the marginal effects of non-productive assets are negative and significant when the total value of assets (columns (a) and (e)) and the number of assets (units) are considered (columns (c) and (g)). However, contrary to the results presented in Table A5, we report no significant relationship between non-productive assets and loan repayment when average asset values (columns (b) and (f)) or shares of total (non-land) assets (columns (d) and (h)) are considered. This variation underscores the importance of asset categorisation for our empirical results; however, the consistency of results, in sign and statistical significance, is indicative of the extent to which our results are, generally speaking, robust to changes in categorisation schemes.

4.1 Discussion of results

Revisiting our hypotheses, we expected asset holdings to be positively associated with higher repayment probabilities. This is true to some extent. We report a significant, positive and robust relationship between land ownership and loan repayment. However, taken collectively, non-land assets are found to diminish the likelihood of loan repayment. We can say that certain asset types correspond with either increased or decreased repayment probabilities, yet for some other assets, no significant relationship is observed. Results obtained after grouping assets by their likely abilities to generate income suggest a possible positive relationship between loan repayment and productive assets, while non-productive assets are found to correspond to diminished repayment probabilities.

The finding that land ownership is positively related to loan repayment could stem from a prevalence of borrowers within our sample being engaged in rural agriculture. One would expect that a borrower who owns land could benefit from agricultural production or, although perhaps a less likely occurrence, by renting a portion of their land to tenant farmers. Similarly, a borrower having difficulty in repaying a loan may be able, depending on the amount of land owned, to sell a portion of their land holdings to raise sufficient revenue to repay their loan. Marginal effects for the vans and rickshaws variables are also positive and significant. This relationship may follow from vans and rickshaws often being the main means of transportation in both rural areas and towns and, thus, potentially capable of providing a consistent source of income. Somewhat similarly, borrowers who own more corrugated tin houses are more likely to successfully repay their loans. This relationship seems very reasonable if house ownership is reflective of a borrower being relatively well-off or financially solvent. In addition, as noted earlier, owning a house(s) allows rental payments to be avoided and may provide rental income if the individual owns more than one house.

The negative relationship between loan repayment and the ownership of sewing machines may be attributable to most sewing machines being owned by households that do not use them for commercial purposes. Loan officers might consider the sewing machines as possible income-generating assets, even though they do not contribute directly to the repayment of a loan. Similarly, the negative relationship between loan repayment and ownership of televisions, radios and bicycles could be related to such assets being used

infrequently for productive purposes. Ownership of such assets, particularly of televisions and radios, may be interpreted as a signal of wealth within a village community, since such technologies are less common in rural areas. While televisions and radios may be used to collect information on prices, it is unlikely that they have much other productive value and, hence, are limited in terms of income-generation. If so, it is possible that ownership of these assets may be misinterpreted by loan officers. As the average value of television, radio and bicycle holdings is not very high (only 8.6% of the typical loan value), liquidation of these assets would provide little assistance to a borrower in need of funds to repay a loan. As suggested at the outset, an alternative explanation would be that higher asset holdings could reflect an increased marginal propensity to consume and thus a diminished ability to repay the loan. Similarly, higher asset holdings, by lowering savings, may reflect borrowers having relatively high discount rates. Another explanation may be that borrowers owning these assets are, in general, more affluent and, thus, have less motivation to maintain future access to BRAC loans. In each case, it is plausible that asset ownership could be negatively related to loan repayment.

Common intuition may lead some to think that asset ownership is very important for loan repayment, but our results suggest that the relationship between asset ownership and loan repayment is much more complicated. Generally speaking, we find that, although ownership of some assets significantly affects the probability of repayment, the presence or absence of such assets does little to change the likelihood of a loan being repaid. Other factors appear to explain a large proportion of the probability of repayment. A short, but non-exhaustive, list would probably include: general efficiency in the initial processing of borrower applications; individual borrower's behaviour and non-quantifiable borrower-specific attributes (ability, drive, ambition, and so forth); use of leased/rented assets (including land); individual borrower's income and savings; group monitoring; asset ownership of parents, friends and relatives; debt owed by other family members; and the quality of the loan officer. This being said, assets are not irrelevant for loan repayment and loan officers should not dismiss asset holdings when evaluating potential borrowers. Much to the contrary, MFIs may wish to discount a borrower's likely ability to repay a loan based on ownership of non-productive assets or to place a greater weight on the assets that we have categorised as productive.

5 Conclusion

Using data for 34,255 BRAC microloans taken by 12,455 borrowers during the 2002-6 period, we have estimated a series of binomial probit specifications to consider whether and to what extent assets and other non-asset variables determine the probability of successful loan repayment. In doing so, we extend the literature by revealing the relationships between various types of asset holdings and loan repayment. Heterogeneity is reported across asset types with respect to their influences on loan repayment. Broadly defined, borrower's holdings of productive assets are positively related to loan repayment, while ownership of non-productive assets is found to significantly decrease the probability of repayment.

Although different types of assets affect the probability of repayment in significant yet contrary ways, in the bigger picture the collective influence of asset holdings on loan repayment is relatively minor. Since MFIs routinely assess potential borrowers' asset holdings prior to extending credit, our findings may suggest that MFIs weigh assets too

heavily when determining the creditworthiness of borrowers. Loan officers may wish to consider the borrower's use of certain assets on a case-by-case basis to determine whether they are likely to generate income and, hence, to aid in loan repayment. Assets such as sewing machines and bicycles may or may not be used for productive purposes and assets such as televisions and radios, while perhaps not likely to generate income, may be used to gather information on prices that increase the borrower's real income. Furthermore, loan officers may wish to give more importance to the quality of assets, in terms of their values and potential productivity, rather than their quantity.

As one would expect, we find that borrowers who make advanced payments during the repayment period have a higher likelihood of successful loan repayment and borrowers who periodically miss payments are more likely to default. A greater number of income-earning members in a borrower's household increases the probability of repayment; however, as the number of members in the family increases, the probability of repayment decreases. When evaluating repeat borrowers, it may be useful for MFIs to seek borrowers who sometimes make advance payments, since such borrowers usually repay their loans. MFIs should also encourage loans to households with many income-earning members and might discourage providing loans to large families or those with relatively fewer income-earning members. Finally, MFIs should be cautious about giving high-value loans as such loans tend to have a higher default rate.

While our findings have policy implications for MFIs that may contribute to better targeting of borrowers and, hence, higher loan repayment rates, there remains considerable room for additional research. For example, related research may include examination of the importance of asset holdings as a means of screening potential defaulters, as a determinant of borrower's defaulting on their first loans, or as indicative of the timing of defaults over the repayment period or with respect to the ordering of loans taken by individuals.

first submitted Sept 2010

final revision accepted May 2012

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Appendix

Table A1: Descriptive statistics

Variable	All loans N = 34,255		Loans successfully repaid N = 33,010		Loans ending in default N = 1,245	
Land (acres)	1.0380	(5.5227)	1.0523	(5.5841)	0.6596***	(3.5054)
Total (non-land) assets	23,055.78	(38,821.38)	22,883.05	(38,654.34)	27,635.71***	(42,777.55)
Corrugated tin houses - total value	16,138.19	(29,976.68)	16,092.30	(30,065.74)	17,354.99	(27,493.57)
" " - average value	13,017.44	(18,160.58)	12,954.53	(17,830.81)	14,685.64**	(25,339.92)
" " - units	1.1143	(0.6862)	1.1177	(0.685)	1.0249***	(0.7106)
" " - share	0.6987	(0.3394)	0.7007	(0.3381)	0.646***	(0.3694)
Cows - total value	3,273.76	(8,380.679)	3,286.45	(8,267.56)	2,937.47	(10,961.09)
" " - average value	1,876.25	(3,683.549)	1,888.82	(3,694.235)	1,543.01***	(3,372.25)
" " - units	0.5442	(1.076)	0.5467	(1.0672)	0.4787*	(1.2871)
" " - share	0.1251	(0.2215)	0.1259	(0.2221)	0.1031***	(0.2035)
Goats and lambs - total value	330.56	(1,367.54)	333.88	(1,381.476)	242.39***	(920.3635)
" " - average value	164.75	(614.7508)	166.32	(620.4461)	123.24***	(435.6221)
" " - units	0.3742	(0.9882)	0.3775	(0.9907)	0.2859***	(0.9171)
" " - share	0.0255	(0.0986)	0.0258	(0.099)	0.0179***	(0.0855)
Sewing machines - total value	123.76	(789.1513)	119.51	(780.8378)	236.47***	(977.9582)
" " - average value	116.73	(723.2582)	112.69	(714.3415)	223.82***	(922.9028)
" " - units	0.0340	(0.2015)	0.0328	(0.1984)	0.0667***	(0.2682)
" " - share	0.0059	(0.046)	0.0057	(0.0452)	0.0118***	(0.0635)
Televisions, radios and bicycles - total value	1,010.19	(3,457.241)	978.90	(3,416.199)	1,839.76***	(4,328.138)
" " - average value	835.55	(2,673.995)	805.88	(2,619.856)	1,622.04***	(3,757.464)
" " - units	0.2468	(0.5452)	0.2436	(0.5438)	0.3317***	(0.5769)

" " " - share	0.0360	(0.1122)	0.0350	(0.1096)	0.0639***	(0.1636)
Vans/rickshaws - total value	400.20	(3,277.202)	407.58	(3,331.481)	204.58***	(1,091.167)
" " " - average value	329.95	(2,621.913)	335.59	(2,664.888)	180.48***	(910.0262)
" " " - units	0.0838	(0.3888)	0.0850	(0.393)	0.0506***	(0.2469)
" " " - share	0.0203	(0.0946)	0.0205	(0.0953)	0.0134***	(0.0749)
Vehicles (cow-pulled) - total value	12.28	(416.6216)	12.13	(409.892)	16.06	(566.8202)
" " " - average value	12.20	(416.5198)	12.05	(409.7847)	16.06	(566.8202)
" " " - units	0.0023	(0.1009)	0.0024	(0.1026)	0.0008	(0.0283)
" " " - share	0.0003	(0.009)	0.0003	(0.0091)	0.0001**	(0.0026)
Other miscellaneous assets - total value	1,766.85	(12,303.06)	1,652.30	(11,510.48)	4,803.99***	(25,351.97)
" " " - share	0.0504	(0.1853)	0.0484	(0.1814)	0.1044***	(0.2628)
Loan value	11,685.55	(6,079.351)	11,488.26***	(5,896.333)	16,916.6***	(8,168.673)
Prior loan principle	8,597.97	(4,302.507)	8,467.43***	(4,194.62)	12,059.04***	(5,514.59)
Duration of loan (in weeks)	11.5945	(1.9096)	11.6926***	(1.279)	8.9936***	(7.0695)
Loan interest rate	0.1440	(0.3338)	0.1434	(0.3289)	0.1619	(0.4443)
Number of prior BRAC loans	6.5092	(1.8196)	6.5035	(1.8129)	6.6627***	(1.9839)
Missed any payment (dummy)	0.1657	(0.3718)	0.1641	(0.3703)	0.2088***	(0.4066)
Made any payment in advance (dummy)	0.7777	(0.4158)	0.7904***	(0.4071)	0.4418***	(0.4968)
Age of borrower	30.79	(6.6986)	30.80	(6.6903)	30.57	(6.9156)
Household members, total	4.6980	(1.6371)	4.6933	(1.6343)	4.8217**	(1.7045)
Income-earners in household	1.2107	(0.5236)	1.2114	(0.5243)	1.1928	(0.5054)
Married (dummy)	0.9938	(0.0782)	0.9939	(0.0782)	0.9936	(0.0799)

Notes: Standard deviations in parentheses. All monetary amounts are in Bangladeshi Taka. '***', '**', and '*' denote statistical significance from mean values for the full sample at 1%, 5% and 10% levels, respectively.

Table A2: Correlation matrix

Variables	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
(a) Successful loan repayment (dummy)	1									
(b) Total (non-land) assets	-0.02	1								
(c) Corrugated tin houses	-0.01	0.91	1							
(d) Cows	0.01	0.38	0.16	1						
(e) Goats and lambs	0.01	0.15	0.07	0.17	1					
(f) Sewing machines	-0.03	0.12	0.06	-0.01	0.00	1				
(g) Televisions, radios and bicycles	-0.05	0.43	0.33	0.12	0.07	0.14	1			
(h) Vans/rickshaws	0.01	0.14	0.04	0.07	0.05	0.00	0.07	1		
(i) Vehicles (cow-pulled)	0.00	0.08	0.02	0.05	0.15	0.02	0.04	0.00	1	
(j) Other miscellaneous assets	-0.05	0.50	0.20	0.06	0.03	0.13	0.16	0.01	0.10	1
(k) Land	0.01	0.06	0.06	0.05	0.01	-0.01	0.02	0.01	0.03	-0.02
(l) Loan value	-0.17	0.10	0.07	-0.03	-0.04	0.07	0.12	0.01	-0.01	0.11
(m) Previous loan principle	-0.16	0.08	0.06	-0.02	-0.03	0.04	0.10	0.01	-0.01	0.08
(n) Duration of loan	0.26	-0.03	-0.02	0.00	0.00	-0.02	-0.03	0.01	0.00	-0.02
(o) Loan interest rate	-0.01	0.00	-0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
(p) Number of prior BRAC loans	-0.02	-0.02	0.00	0.00	0.01	-0.04	-0.01	0.01	0.00	-0.05
(q) Missed any payment (dummy)	-0.02	-0.02	-0.01	0.00	0.00	-0.03	-0.04	0.00	-0.01	-0.03
(r) Made any payment in advance (dummy)	0.16	0.00	0.00	0.00	0.00	0.01	-0.02	0.00	0.00	-0.01
(s) Age of borrower	0.01	0.14	0.12	0.14	0.07	-0.01	0.09	0.04	0.01	0.01
(t) Household members, total	-0.01	0.09	0.07	0.09	0.02	0.03	0.05	0.00	0.02	0.02
(u) Income-earners in household	0.01	0.16	0.13	0.15	0.05	0.04	0.11	0.04	0.03	0.03
(v) Married (dummy)	0.00	-0.01	0.00	0.00	-0.01	-0.01	0.00	-0.01	0.00	-0.02

Variables	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)
(a) Successful loan repayment (dummy)											
(b) Total (non-land) assets											
(c) Corrugated tin houses											
(d) Cows											
(e) Goats and lambs											
(f) Sewing machines											
(g) Televisions, radios and bicycles											
(h) Vans/rickshaws											
(i) Vehicles (cow-pulled)											
(j) Other miscellaneous assets											
(k) Land	1										
(l) Loan value	0.01	1									
(m) Previous loan principle	0.01	0.75	1								
(n) Duration of loan	0.00	-0.05	-0.08	1							
(o) Loan interest rate	0.00	0.02	0.03	-0.01	1						
(p) Number of prior BRAC loans	-0.05	0.17	0.22	-0.03	0.01	1					
(q) Missed any payment (dummy)	-0.01	-0.08	-0.05	0.23	0.00	-0.01	1				
(r) Made any payment in advance (dummy)	-0.01	-0.07	-0.07	-0.05	0.01	-0.06	0.13	1			
(s) Age of borrower	0.05	0.01	0.02	-0.01	-0.01	0.06	-0.01	-0.01	1		
(t) Household members, total	0.03	0.04	0.05	-0.01	-0.01	0.02	0.01	0.01	0.23	1	
(u) Income-earners in household	0.04	0.01	0.02	-0.01	-0.01	0.05	0.01	0.00	0.19	0.34	1
(v) Married (dummy)	0.01	0.00	0.01	0.00	-0.01	0.00	0.01	0.00	0.04	0.01	-0.01

Note: N = 34,255.

Table A3: Asset holdings and loan repayment likelihoods

Variable:	(a)	(b)	(c)
Land (in acres)	0.0006** (0.0002)	0.0005*** (0.0002)	0.0005** (0.0002)
Value of total (non-land) assets	-2.6E-08** (0.0000)	-2.4E-08*** (0.0000)	-2.2E-08** (0.0000)
Previous loan principle	-3.3E-06*** (0.0000)	-2.4E-06*** (0.0000)	-2.3E-06*** (0.0000)
Duration of loan (in weeks)	0.0056*** (0.0014)	0.0034*** (0.0013)	0.0031*** (0.0009)
Loan interest rate	-0.0018** (0.0009)	-0.0002 (0.0005)	-0.0001 (0.0004)
Missed any payment (dummy)	-0.0516*** (0.0037)	-0.0616* (0.0332)	-0.07* (0.0382)
Made any payment in advance (dummy)	0.056*** (0.0069)	0.0397*** (0.0062)	0.0382*** (0.0036)
Number of prior BRAC loans	0.0024** (0.0012)	0.0019** (0.001)	0.0016 (0.001)
Age of borrower	0.0027*** (0.0008)	0.0023*** (0.0006)	0.002*** (0.0004)
Age of borrower squared	-0.000038*** (0.00001)	-3.4E-05*** (0.00001)	-2.8E-05*** (0.00001)
Household members, total	-0.0014** (0.0006)	-0.0012** (0.0005)	-0.001*** (0.0002)
Income-earners in household	0.004*** (0.0009)	0.0036*** (0.0008)	0.0027*** (0.0009)
Married (dummy)	-0.0009 (0.0086)	-0.0004 (0.0081)	0.0011 (0.0088)
Time (month/year) dummies	No	Yes	Yes
Geographic (region) dummies	No	No	Yes
N	34,255	34,255	34,255
Pseudo R ²	0.1938	0.248	0.2607
Log likelihood full model	-4,312.49	-4,022.22	-3,954.32
Count R ²	0.965	0.967	0.966

Notes: Marginal effects reported with standard errors in parentheses. '***', '**', and '*' denotes significance from zero at the 1%, 5%, and 10% levels, respectively.

Table A4: Decomposed asset holdings and loan repayment likelihoods

Variables:	Asset measure:	Total value of assets (a)	Average asset value (b)	Number of assets (units) (c)	Share of total (non- land) assets (d)
Land (in acres)		0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)
Corrugated tin houses		3.5E-08 (0.0000)	1.3E-08 (0.0000)	0.0033* (0.0019)	0.0042 (0.0029)
Cows		3.2E-08 (0.0000)	2.1E-07 (0.0000)	-0.0001 (0.0005)	0.0033 (0.0032)
Goats and lambs		7.4E-07 (0.0000)	1.3E-06 (0.0000)	0.0006 (0.0008)	0.0046 (0.0094)
Sewing machines		-1.3E-06* (0.0000)	-1.6E-06** (0.0000)	-0.0067*** (0.0019)	-0.022*** (0.0085)
Televisions, radios and bicycles		-6.4E-07*** (0.0000)	-9.3E-07*** (0.0000)	-0.0045*** (0.0016)	-0.018*** (0.0039)
Vans/rickshaws		8.7E-07*** (0.0000)	1.2E-06*** (0.0000)	0.0044*** (0.0013)	0.0113 (0.0069)
Vehicles (cow-pulled)		-1.4E-06* (0.0000)	-1.7E-06** (0.0000)	0.0002 (0.0038)	0.0167 (0.0423)
Other miscellaneous assets		-1.0E-07*** (0.0000)	---- ----	---- ----	-0.0124*** (0.0026)
Previous loan principle		-2.2E-06*** (0.0000)	-2.2E-06*** (0.0000)	-2.2E-06*** (0.0000)	-2.1E-06*** (0.0000)
Duration of loan (in weeks)		0.003*** (0.0009)	0.003*** (0.0009)	0.003*** (0.0009)	0.003*** (0.0009)
Loan interest rate		-0.0002 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0005)	-0.0002 (0.0005)
Missed any payment (dummy)		-0.0715* (0.0376)	-0.0717* (0.0376)	-0.0714* (0.0377)	-0.0743** (0.0377)
Made any payment in advance (dummy)		0.0375*** (0.0037)	0.0374*** (0.0037)	0.0378*** (0.0036)	0.0375*** (0.0038)
Number of prior BRAC loans		0.0014* (0.0008)	0.0014* (0.0008)	0.0014* (0.0008)	0.0011* (0.0007)
Age of borrower		0.002*** (0.0004)	0.002*** (0.0004)	0.002*** (0.0004)	0.0019*** (0.0004)
Age of borrower squared		-2.8E-05*** (0.00001)	-2.7E-05*** (0.00001)	-2.8E-05*** (0.00001)	-2.7E-05*** (0.00001)
Household members, total		-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)

Table A4: Cont'd

Variables:	Asset measure:	Total value of assets (a)	Average asset value (b)	Number of assets (units) (c)	Share of total (non-land) assets (d)
Income-earners in household		0.0027*** (0.0009)	0.0028*** (0.0009)	0.0025** (0.0011)	0.0026*** (0.0009)
Married (dummy)		0.0005 (0.0086)	0.0004 (0.0086)	0.0007 (0.009)	-0.0011 (0.0088)
Constant		-0.1278 (0.628)	-0.1125 (0.6321)	-0.1621 (0.665)	-0.07 (0.6359)
N		34,255	34,255	34,255	34,255
Pseudo R ²		0.2608	0.2651	0.265	0.2648
Log likelihood full model		-3,953.99	-3,930.97	-3,931.19	-3,932.53
Count R ²		0.966	0.966	0.966	0.966

Notes: See Table A3. Time (month and year) and geographic region dummy variables included in all estimations; however, coefficients are not reported here.

Table A5: Productive asset holdings and loan repayment likelihoods

Variables:	Asset measure:	Total value of assets (a)	Average asset value (b)	Number of assets (units) (c)	Share of total (non- land) assets (d)
Land (in acres)		0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)
Income-generating assets		1.8E-08 (0.0000)	-7.7E-09 (0.0000)	0.0008 (0.0008)	0.004 (0.0029)
Non-income-generating assets		-1.5E-07*** (0.0000)	-9.5E-07*** (0.0000)	-0.0046*** (0.0017)	-0.0143*** (0.003)
Previous loan principle		-2.3E-06*** (0.0000)	-2.2E-06*** (0.0000)	-2.2E-06*** (0.0000)	-2.1E-06*** (0.0000)
Duration of loan (in weeks)		0.0031*** (0.0009)	0.0031*** (0.0009)	0.0031*** (0.0009)	0.003*** (0.0009)
Loan interest rate		-0.0002 (0.0004)	-0.0001 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0005)
Missed any payment (dummy)		-0.0709* (0.0384)	-0.0716* (0.0381)	-0.0703* (0.0379)	-0.074* (0.0381)
Made any payment in advance (dummy)		0.0379*** (0.0037)	0.0375*** (0.0036)	0.0377*** (0.0036)	0.0376*** (0.0038)
Number of prior BRAC loans		0.0015 (0.0009)	0.0014 (0.0009)	0.0014* (0.0009)	0.0011* (0.0007)
Age of borrower		0.002*** (0.0004)	0.002*** (0.0004)	0.002*** (0.0004)	0.0019*** (0.0004)
Age of borrower squared		-2.8E-05*** (0.00001)	-2.7E-05*** (0.00001)	-2.7E-05*** (0.00001)	-2.7E-05*** (0.00001)
Household members, total		-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)
Income-earners in household		0.0026*** (0.0009)	0.003*** (0.0009)	0.0026*** (0.001)	0.0025*** (0.0009)
Married (dummy)		0.0005 (0.0087)	0.0012 (0.0087)	0.0015 (0.0088)	-0.0009 (0.009)
N		34,255	34,255	34,255	34,255
Pseudo R ²		0.267	0.2625	0.2633	0.2626
Log likelihood full model		-3,920.99	-3,944.98	-3,940.45	-3,944.24
Count R ²		0.967	0.966	0.966	0.966

Notes: See Table A4.

Table A6: Productive/non-productive asset holdings and loan repayment likelihoods, alternative asset classifications

Variables:	<i>All Corrugated Tin Houses considered "non-income-generating assets"...</i>				<i>First Corrugated Tin House considered "non-income-generating"; Additional houses considered "income-generating"...</i>			
	Total value of assets (a)	Average asset value (b)	Number of assets (units) (c)	Share of total (non-land) assets (d)	Total value of assets (e)	Average asset value (f)	Number of assets (units) (g)	Share of total (non-land) assets (h)
Land (in acres)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)
Income-generating assets	5.3E-08 (0.0000)	2.9E-07 (0.0000)	0.0002 (0.0005)	0.0031 (0.0033)	3.6E-08 (0.0000)	1.3E-07 (0.0000)	0.0001 (0.0005)	0.003 (0.0038)
Non-income-generating assets	-2.6E-08*** (0.0000)	3.5E-08 (0.0000)	-0.0001*** (0.00003)	0.0012 (0.0017)	-8.3E-08*** (0.0000)	1.7E-08 (0.0000)	-0.0001*** (0.00003)	0.001 (0.0014)
Previous loan principle	-2.3E-06*** (0.0000)	-2.3E-06*** (0.0000)	-2.2E-06*** (0.0000)	-2.3E-06*** (0.0000)	-2.2E-06*** (0.0000)	-2.3E-06*** (0.0000)	-2.2E-06*** (0.0000)	-2.3E-06*** (0.0000)
Duration of loan (in weeks)	0.0031*** (0.0009)	0.0031*** (0.0009)	0.0031*** (0.0009)	0.0031*** (0.0009)	0.0031*** (0.0009)	0.0031*** (0.0009)	0.0031*** (0.0009)	0.0031*** (0.0009)
Loan interest rate	-0.0002 (0.0004)	-0.0001 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0004)	-0.0001 (0.0004)	-0.0002 (0.0005)	-0.0002 (0.0004)
Missed any payment (dummy)	-0.07* (0.0393)	-0.0699* (0.0392)	-0.0717* (0.0388)	-0.0697* (0.0393)	-0.0702* (0.0394)	-0.0698* (0.0393)	-0.0719* (0.0388)	-0.0698* (0.0393)
Made any payment in advance (dummy)	0.0381*** (0.0031)	0.0382*** (0.0031)	0.0379*** (0.0032)	0.0382*** (0.0031)	0.0379*** (0.003)	0.0381*** (0.0031)	0.0379*** (0.0032)	0.0382*** (0.0031)
Number of prior BRAC loans	0.0016 (0.001)	0.0016* (0.001)	0.0013* (0.0008)	0.0016 (0.001)	0.0014 (0.0009)	0.0016 (0.001)	0.0013* (0.0008)	0.0016* (0.0009)

Age of borrower	0.002*** (0.0004)	0.002*** (0.0004)	0.0019*** (0.0004)	0.002*** (0.0004)	0.002*** (0.0004)	0.0019*** (0.0004)	0.002*** (0.0004)	0.002*** (0.0004)
Age of borrower squared	-0.00003*** (0.00001)	-2.8E-05*** (0.00001)	-0.00003*** (0.00001)	-0.00003*** (0.00001)	-0.00003*** (0.00001)	-0.00003*** (0.00001)	-0.00003*** (0.00001)	-0.00003*** (0.00001)
Household members, total	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001*** (0.0002)
Income-examers in household	0.0026*** (0.001)	0.0022*** (0.0009)	0.0025*** (0.0008)	0.0024*** (0.0009)	0.0024*** (0.001)	0.0023*** (0.0009)	0.0022*** (0.001)	0.0022*** (0.001)
Married (dummy)	0.001 (0.0088)	0.0009 (0.0089)	0.0004 (0.0092)	0.0009 (0.0088)	0.001 (0.0088)	0.0002 (0.0092)	0.0009 (0.0088)	0.0009 (0.0088)
N	34,255	34,255	34,255	34,255	34,255	34,255	34,255	34,255
Pseudo R ²	0.2609	0.2607	0.2635	0.2605	0.2622	0.2636	0.2606	0.2606
Log likelihood full model	-3,953.50	-3,954.30	-3,939.33	-3,955.48	-3,946.38	-3,939.01	-3,954.76	-3,954.98
Count R ²	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966

Notes: See Table A4.

Survey form (translated from English to Bengali and) sent to BRAC area offices

LOAN #1
 Member No: _____ Name: _____ Occupation: _____ Age: _____
 Village Organisation No: _____
 Marital Condition: _____ No. of members in the family: _____ No. of male: _____ No. of female: _____

No. of family members who earn an income: _____ Total acres of land including houses: _____
 Assets: _____
 Houses made of corrugated tin: _____ Cows: _____ Goats/Lambs: _____ TV, Radio, Cycle: _____ Van, Rickshaw: _____ Sewing machine: _____ Vehicle pulled by cow: _____
 Number: _____ Value: _____ Others: _____

No. of Loans taken from BRAC before _____

Loan Description	Loan application approval date	Amount borrowed	Type of loan: ordinary/programme/housing	Loan code no.	Duration of the loan	Installment amount	Total savings
No. 1							
No. 2							
No. 3							
No. 4							
No. 5							