Does Micro-Credit Empower Women?

Evidence from Bangladesh

by

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1. Introduction

In recent years, governmental and non-governmental organizations in many low income countries have introduced credit programs targeted at the poor. Many of these programs specifically target women based on the view that they are more likely than men to be credit constrained, have restricted access to the wage labor market, and have an inequitable share of power in household decision-making. The Grameen Bank of Bangladesh is perhaps the best-known example of these small-scale production credit programs for the poor, and over 90 percent of its clients are women. Earlier work (Pitt and Khandker (1998), Pitt, Khandker, McKernan, and Latif (1999), Pitt, Khandker, Choudhury, and Millimet (2003), Pitt (2001)) has found that the effects of program participation differ importantly by the gender of program participant. For example, Pitt and Khandker find that the flow of consumption expenditure increases 18 taka for every 100 taka borrowed by women, but only 11 taka for every 100 taka borrowed by men. Pitt, Khandker, Choudhury, and Millimet (2003), using a totally different approach to parameter identification, find that credit provided women importantly improves measures of health and nutrition for both boys and girls, while credit provided men has no significant effect.

What underlies these gender differences? There are essentially two different mechanisms that can result in different effects of credit program participation by gender: (i)"empowerment" effects, and (ii) standard income and substitution effects. Collective models of household decision-making provide one avenue of understanding "empowerment." In a simple version of collective decision-making, the household's social welfare is some function of the individual utility functions. Browning and Chiappori (1998) have shown that if behavior in the household is Pareto efficient, the household's objective function takes the form of a weighted sum of individual utilities, with weights t. The weight t can be thought of as representing the bargaining power of the female household member relative to the male household member in determining the intra-household allocation of resources. When t is zero, female preferences are given no weight and the household's social welfare function is identically that of the male. In much of the literature, t is presumed to be increasing in the relative value of female time and her money income. In addition, t may be altered through social pressure. The parameter t, which directly reflects women's power in household decision-making, is one index of "women's empowerment."

The differing credit effects by gender of participant reported by Pitt, Khandker and associates

do demonstrate that an empowerment effect as a consequence of credit program participation; they can, in principle, be only the result of standard income and substitution effects. In an economy in which women do not work in the wage labor market, participation in a group-based credit program increases the shadow value of female time by providing a complementary input for the production of goods for the market by the self-employed. In contrast, if men still provide time to the wage labor market, the shadow value of their time is unaffected by program participation. Consequently, the self-employment activities of women fostered by micro-credit may generate different demand effects than the self-employment activities of men fostered by micro-credit. If the preference weight t is unaffected by male participation, such participation does not alter the shadow price of women's time either. The only source of change in demand when men are the credit program participator arises from the income effect associated with the rental value of the capital endowment provided by the credit program. Note that although male participation identifies the income effect conditional on t, this information does not help disentangle the substitution effect from the bargaining (empowerment) effect induced by women's participation. Thus a finding that the effect of women's program participation on child health differs from the effect of men's program participation (as in Pitt *et. al.* (2003)) cannot be taken to necessarily imply that women have gained power in the household, even if women are assumed to prefer child quality more than their husbands.

A modeling strategy that seeks to separate out the income and substitution effects from the empowerment effect (on t) resulting from micro-credit program participation would make difficult demands on the data and require strong restrictions on the form of preferences. An alternative approach is to collect data on attitudes by and towards women, and on their decision-making autonomy. This data is necessarily self-reported and subjective, but econometric techniques, notably instrumental variables estimation, are available to correct for the possible confounding effects of systematic variation in subjective response. Note that self-reported measures of decision-making power, even if experimentally elicited, do not necessarily imply that women actually have more power (as measured by t), but they do add one more piece to the accumulated evidence pointing in that direction.

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This paper estimates the impact of participation in micro-credit programs on a large set of qualitative responses to questions that characterize women's autonomy and gender relations within the household. The data come from an extensive survey household survey collected in rural Bangladesh in 1999. We test the assertion that participating in micro-credit programs is an empowering experience for women whose life choices are otherwise restricted through poverty, patriarchy, and societal or religious norms. In addition, we examine the effect of men's credit program participation on these same measures of female empowerment.

2. Previous Studies

Over the past fifteen years or so, a substantial literature has been produced on various aspects of micro-credit programs in poor communities. A few studies of these studies have focused on the relationship between credit program participation and some notion of women's empowerment.

Goetz and Sengupta (1996) present a decidedly negative image of the effect of credit on women's empowerment. Using a five-level scale reflecting the degree of control that women have over the loans they take, they conclude that most women have a minimal level of control over their loans, and that when the time comes for loans to be repaid, this lack of control can have a damaging impact on the well-being of women. At best, they reason, women who have little or no control over their loans will also not be held responsible for repaying them and thus they will be left out of the process altogether and any special impact of lending to women rather than men is neutralized. In cases where men have appropriated loan funds and are subsequently unable or unwilling to repay the loans, women may suffer because they are forced to sell assets or go hungry in order to raise the money to repay. Furthermore, the authors suggest the potential for women's credit participation to worsen the degree of domestic abuse they suffer.

The focus of the study by Goetz and Sengupta is not on empowerment *per se*, but on women's managerial control over loan use. The authors find that, according to their criteria, less than 18% of women in the sample retained "full control" over the loans they took from credit programs. 39% of respondents were judged to have very little control or no control at all over their loans. The authors

make assertions that credit is fungible within the household, but do not support these assertions empirically.

Hashemi *et. al.* (1996) find that membership in Grameen Bank and BRAC have significant positive effects on empowerment even controlling for women's independent contributions to household income. They find that even in cases where credit program members do not contribute independently because their husbands appropriate their loan funds, because the loans they have taken are not generating income, or for various other reasons, just the experience of being a member of the program is beneficial for empowerment.

Hashemi *et. al.* acknowledge the problem of selection bias and the possibility that positive effects of credit program participation on empowerment are biased upwards. To remedy this, they control for the respondents' demographic and socio-economic characteristics, specifically age, education, relative wealth, religion, geographic division and surviving sons and daughters. Unfortunately, there is no effort to control for the significant unobserved heterogeneity that remains. This unobserved heterogeneity likely includes the unobserved attitudes and characteristics of husbands, wives and other family members, including pre-existing women's empowerment and autonomy. It seems quite possible, for example, that more empowered women are more likely to be able to join a micro-credit program.

Hashemi *et. al.* also include a variable representing duration of membership to test whether there is a change over time in the effect of credit on empowerment. They consider this variable as an additional means of controlling for selection bias because "a significant duration effect would strongly suggest that credit programs further empower the women who join them." In making this assertion, the authors fail to recognize that, just as the decision to join a credit program is endogenous and likely to be correlated with the unobservable empowerment endowment, so too are (1) how early one joins a program, and (2) whether (and when) one decides to discontinue membership in the program. Thus it is likely that unobservable heterogeneity in empowerment is correlated with duration of membership. It would be plausible to suggest, for example, that women who are initially *more* empowered might remain in credit programs while those who are relatively *less* empowered drop out due to family pressure, inability to use credit effectively, lack of confidence in one's own ability to invest wisely, or any number

of other (empowerment related) factors.

The methodology used by these authors contrasts program villages to a "comparison sample" of non-program villages based on region, population density, and village size. Due to the impossibility of finding two villages that are "identical" in all characteristics that might affect measures of empowerment, such an approach is inherently problematic because it neglects the potential for village-level unobservable characteristics to bias the results.[1].

Interestingly, Hashemi *et. al.* note that among non-participants, residence in villages with Grameen Bank programs has a positive and statistically significant effect on empowerment. They note that this could be the result of (1) non-random program placement and/or (2) spillover effects (such that the existence of a Grameen Bank program changes village society in such a way as to effect the empowerment of non-participants as well as participants) and that it is impossible to disentangle the two effects. It should be noted that whereas the former creates heterogeneity bias, the latter actually represents effects of the program, and thus contains information on the ability of programs to empower women (both members and non-members residing in the same villages). As described in Pitt and Khandker (1998), the existence of spillover effects does not affect the consistency of any estimate of the effect of credit on a dependent outcome, but it does alter the interpretation of the estimate.

Hashemi *et. al.* (1996) create an "index" of empowerment through a linear weighted combination of individual empowerment indicators. The authors do acknowledge the arbitrariness of this index approach. They establish a cutoff point at the 30th percentile (again, arbitrarily chosen) such that women who score above this cutoff are labeled *empowered* and those who score below it are labeled *unempowered* This system reduces the measure of empowerment, previously existing along a continuum, to a single binary outcome for each of eight categories. These eight categories are further

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[1] Indeed, as will be discussed below, we find strong evidence that village-level heterogeneity is an important source of bias exists in this sample. Hausman and Breusch-Pagan tests on all empowerment factors in this study reveal that a fixed-effects model at the thana (sub-district) level is insufficient to correct for this bias, implying that *village* level heterogeneity is a significant source of bias even controlling for all thana-level heterogeneity.

compacted into a "composite empowerment indicator" such that a woman was labeled *empowered* overall if she had been labeled "empowered" in at least three of the eight categories and was labeled *unempowered* otherwise. Again, the choice of five-out-of-eight as the cutoff mark by which to reduce the eight categorical binaries to one single binary represents an arbitrary choice on behalf of the researchers.

A study by Mizan (1993) uses a similar approach to that of Hashemi et al (1996). Mizan also uses an index, called the Household Decision Making (HHDM) Scale, which is computed from answers to questions regarding: decisions of food purchase, education and marriage of children, expenses on medication for self and husband, investment woman's earnings in business, purchase and sale of land, hiring of outside labor, purchase of agricultural inputs, providing financial support to husband's family, and purchase of clothes for self and other household members. The coding used is as follows: decision made by husband only=1, decision made jointly by husband and wife=2, and decision made by wife only=3. Thus, the DMS registers a higher value for a higher level of female bargaining power. Mizan's study uses a sample of 100 participating women chosen from two villages (50 women in each village) and 100 non-borrowers, without control for self-selection into the programs.

Mizan finds that the number of years a woman had borrowed from the Grameen Bank and the approximate monthly income from the Grameen Bank investment both had a positive and statistically significant effect on the HHDM score. The conclusion of the study is that Grameen Bank participation raises women's decision-making power within households because it increases women's employment and income earnings. The study also finds that participation has a significant effect on fertility control ability. The variables "Income" and "Years of loan" are both positively correlated with the HHDM score when the other is controlled for. Also, "Income" (from Grameen Bank) is significant when participation (dummy) is controlled. Mizan concludes that "this suggests that apart from the financial resources a woman gains, an effect of the experience with Grameen Bank is important by itself." (120)

3. Data

The data used in this paper come from a large household survey conducted in 1998/99, which is a

follow-up survey of an earlier survey conducted in 1991/92. Both household surveys were conducted by the Bangladesh Institute for Development Studies (BIDS) in collaboration with the World Bank. Only the follow-up survey (conducted in 1998/99) included a special module on women's empowerment.

The base household survey interviewed 1,798 households randomly drawn from 87 villages of 29 thanas in rural Bangladesh. Of these 29 thanas, 24 were program thanas (8 from each of the three programs: Grameen Bank, BRAC, and BRDB RD-12 project), and 5 were non-program thanas. Three villages in each program thana were randomly selected from a list of program villages in which a program had been in operation for at least three years. Three villages in each non-program thana were also randomly selected from the village census of the Government of Bangladesh.   From the village census list of households, 20 households from each village were drawn using stratified random sampling. Out of these households, 17 were target (owned land of one-half acre or less, and hence qualified for program participation) and 3 nontarget (owned land of more than one-half acre, and hence did not qualify for program participation). To ensure that a sufficient number of program participating households were included in the target households in program villages, participant households were overdrawn.[2] Of the 1,798 households selected, 1,538 were target and 260 were nontarget households. Among the target households, 905 (59 percent) participated in a credit program. The program villages surveyed had either male and female credit groups, or both: 40 had credit groups for both men and women, 22 had female-only groups, and 10 had male-only groups. The existence of villages with only female or only male groups is a key feature of the parameter identification method described below. A more detailed description of this survey can be found in Khandker (1998).

These households were revisited in 1998/99. The resurvey tried to include all households from the1991/92 survey, including splits, plus added some new households.[3] A sample of 2074 households

with married couples was administered the women's empowerment questionnaire. Table 1 shows the distribution of households across the eight categories of program credit, broken down by gender. Table 2 lists all of the empowerment questions asked. The name of the variable, the full (translated) text of the question, the coding of the variable ("Y" standing for a "yes" answer and "N" standing for a "no" answer), and an indicator of who was asked the question (husband or wife) are provided. Approximately 80 percent of the questions were asked only of wives.

The survey questions are grouped into the following headings:

a. Economic decision making

For each of four economic issues, women were asked how their households arrived at decisions and whether they themselves spent money on such projects. The issues were: (1) house repair and construction, (2) livestock sale and purchase, (3) borrowing money, and (4) transactions involving household equipment. For the last three issues, roughly half of respondents answered that they and their husbands jointly decided on the issue and implemented the action together (53, 54, and 47 percent, respectively). For the issue of housing repair/construction, the figure was about two-thirds. The two most common other answers for all four issues were that the husband decided the issue and implemented alone or that the couple decided jointly but the husband implemented alone. For all four issues, it was very rare for women to report either that they alone decided and implemented their decision or that they decided alone and implemented jointly with the husband. For each issue, less than 3 percent of respondents answered that they themselves decided on these issues alone. Similarly, for all four issues, almost all the respondents (98, 98, 97 and 98.5 percent, respectively) said that they themselves do not spend money in such matters, rather it is the husband that actually handled the money in the transaction.

b. Purchasing capacity

For seven categories of common household purchases (food, toiletries, candies for the children, cooking

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were added from old villages to compensate for the loss.

utensils, furniture, children's clothing, and own clothing) women were asked whether or not they (rather than someone else in the household) make the purchase and, if so, whether or not they make the purchase without their husbands' permission. The percentage of women who answered that they make purchases themselves varies widely by category, from less than five percent (for furniture) to more than sixty percent (for candies and household utensils). When husbands were asked about their wives' freedom to make purchases, 87% responded that their wives are not able to buy assets on their own without the husband's permission.

c. *Control Over Loans*

A growing literature in the field of micro-credit addresses the degree to which credit is fungible within the household.[4] Of central importance is whether or not women retain control over their loans and management power of the activities for which the loans are used. In cases where wives had taken small loans, from any source, 78% of husbands reported that they use their wives' loan money to spend on their own income generating projects. Among women who had taken loans for income- generating activities, only 5% reported having total autonomous control over the money. 56% reported that they share control over the loan money with their husbands, and 38% reported that their husbands have sole control over the proceeds of the loan.

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[4] See, for instance, Montgomery, Bhattacharya, and Hulme (1996), Goetz and Sengupta (1996), and Pitt and Khandker (1998).

d. Control over income and savings

Traditionally, women in Bangladesh have very little contact with the labor market and generally do not have significant cash incomes of their own. This reflects customary and religious restrictions on women's mobility outside the home. 62% of men reported that their wives have no independent source of income. Over 75% of women reported that they do not operate any income-generating activity of their own and 78% of women reported not having independent income that they could use at their own discretion (without consulting their husband). A sizeable number (42%) of women reported that they do have their own independent savings, and if they did, husbands were aware of these savings 91% of the time. Wives expressed having a low level of control over these savings, with 85% saying that they were not able to decide autonomously how to utilize them.

Only around 15% of women reported having received money from their parents, siblings, or other blood relatives in the past 12 months. Of these, 95% said that their husbands knew that they had received this money. Only 17% reported that they had full control over deciding the use of that money: 62% reported partial control and 21% reported having no control at all.

More the three quarters of women (78%) reported that they had at some point been forced to cede money to their husbands and 56% of women replied that their husbands had forced them not to work outside the home. 81% reported that they would not be able to give their own money away at will.

When asked if they would be able to get 500 taka in the case of an emergency, two-thirds of women predicted that they would be able to. The primary sources from which women predicted they would borrow such emergency money were from own relatives (32%), husbands (29%), and husband's relatives (28%). Less than 3% of women in the sample replied that they would borrow from moneylenders.

e. Mobility

In Bangladeshi society, the physical mobility of women is often restricted. Traditions and family-imposed restrictions may forbid women from leaving the family compound, or may regulate when, where, and

with whom they travel. Additionally, issues of safety often prevent women from traveling alone for even short distances. 83% of husbands reported that their wives never went alone to places such as the market, bank, health clinic, and so on. Of these, over half (55%) explained that they or their sons always accompanied the wives when going outside the home and another 18% explained that their wives were accompanied by neighbors or relatives. Wives responded similarly. 53% said that when they traveled outside the village they went with their husbands and/or sons, and 22% traveled in the company of other women. Almost 9% of women reported that they never left the village at all. 82% of women said that they had never visited their parents without their husband's permission.

f. Political awareness and activism

Women in the sample were asked a few specific questions relating to their involvement or awareness of local politics. Only 35% of women respondents knew the name of their member of parliament. While an impressive majority (86%) of women reported having voted in the last election, 74% also reported that their husbands had influenced or compelled them to vote for a certain candidate. Less than a quarter of women reported having ever publicly protested against incidences of wife-beating.

g. Networking and friendships

Marriage in Bangladesh is characterized by patrilocal residence and village exogamy -- when a woman marries, she leaves her home, family, and village and moves into the household of her new husband, in a new village. As a result, wives—and new wives in particular—may not have many close relationships outside the household. In this sample, however, women generally tended to express that they did have close friendships and relationships (possibly with their blood relatives) outside the household. 85% of women stated that there were people within their *bari* with whom they were close enough to share their feelings and 73% had such friends outside the *bari*.

h. *Family planning*

In this sample, women were more likely than men to be users of birth control. Among couples in their reproductive age, over 93% of men reported that they did not use any male birth control method. Among these men, 65% explained that the reason was that their wives used a female birth control method, and 16% responded that they simply did not like to use birth control. Women's responses were similar: over 91% of women reported that they had never been able to make their husbands use a male birth control method. Of these women, 68% explained that the responsibility of birth control was usually given to them.

i. *Attitudes*

The survey also included several questions for both husbands and wives regarding their opinions and attitudes on gender in society. More than two-thirds of men (68%) replied that they believe their wives to be less intelligent than themselves. 79% replied that they do not consider their wives capable of making decisions pertaining to purchase or sale of major household assets. An overwhelming majority of women (94%) stated that they believe that their husbands are superior to them "in qualities and education." When asked why, 59% of these women explained that the husband is the earning member of the household and that this makes him superior, and 34% stated that a woman's lot in life is to be inferior to her husband. When asked what kind of impact women's empowerment would have (or was having) on society, men were fairly evenly split between positive and negative reactions. Roughly half (47%) responded positively by claiming that the primary impact of women's empowerment would either be the creation of a better society or that it would be economic improvement for the family. The other 53% responded negatively, saying that women's empowerment would cause chaos in society, problems bringing up children, or a disruption of peace within the household.

When asked to describe what they perceived to be the greatest obstacles to achieving women's empowerment in Bangladeshi society, 46% of men cited lack of education as the primary obstacle, 23% cited lack of safety, and 17% cited religious restrictions. As secondary obstacles, men also cited religious restrictions (30%), lack of income generating activities (22%), lack of safety (21%) and the

social structure (18%). The main obstacles cited by women were lack of education (47%), lack of safety (21%), and religious restrictions (16%).

j. Spousal arguments and abuse

Women were also asked to describe the nature of arguments that tended to arise within the household. The most commonly cited topics of arguments were children, money, and household chores. More than a third of women reported that when such arguments occurred they were abused in some way: 20% reported verbal abuse and 16% reported physical abuse. Of those who reported physical abuse, 17% said that their injuries from the abuse had been severe enough to require medical attention.

4. Dealing with Heterogeneity Bias

As discussed above, most of the influential quantitative studies on the effects of micro-credit program participation on the empowerment of women suffer from an inattention to the problem of heterogeneity bias. This bias arises from the correlation between the credit variable(s) and person-specific or village-specific unobserved determinants of empowerment.

The econometric methods used in this analysis are essentially the same as those presented in Pitt and Khandker (1998) and hence only an abbreviated version is presented. This paper estimates the conditional demands for a set of empowerment indicators, conditioned on the household's program participation as measured by the quantity of credit borrowed.[5] Consider the reduced form equation (1) for the level of participation in one of the credit programs (C_{ij}), where level of participation will be taken to be the value of program credit that household i in village j borrows,

$$C_{ij} = X_{ij}\, \boldsymbol{b}_c + Z_{ij}\boldsymbol{p} + \boldsymbol{m}_j^c + \boldsymbol{e}_{ij}^c \tag{1}$$

where X_{ij} is a vector of household characteristics (e.g. age and education of household head), Z_{ij} is a set of household or village characteristics distinct from the X's in that they affect C_{ij} but not other household

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behaviors conditional on C_{ij} (see below), β_c, and p are unknown parameters, $\mathbf{m}_j^c$ is an unmeasured determinant of C_{ij} that is fixed within a village, and $\mathbf{e}_{ij}^c$ is a nonsystematic error that reflects unmeasured determinants that vary over households.

The conditional demand for women's empowerment outcome y_{ij} (such as ability to visit friends or make certain purchases) conditional on the level of program participation C_{ij} is

$$y_{ij} = X_{ij}\,\mathbf{b}_y + C_{ij}\,\mathbf{d} + \mathbf{m}_j^y + \mathbf{e}_{ij}^y \tag{2}$$

where β_y and d are unknown parameters, $\mathbf{m}_j^y$ is an unmeasured determinant of y_{ij} that is fixed within a village, and $\mathbf{e}_{ij}^y$ is a nonsystematic error reflecting, in part, unmeasured determinants of y_{ij} that vary over households. The estimation issue arises as a result of the possible correlation of $\mathbf{m}_j^c$ with $\mathbf{m}_j^y$, and of $\mathbf{e}_{ij}^c$ with $\mathbf{e}_{ij}^y$. Econometric estimation that does not take these correlations into account may yield biased estimates of the parameters of equation (2) due to the endogeneity of credit program participation C_{ij}.

The standard approach to the problem of estimating equations with endogenous regressors, such as equation (2), is to use instrumental variables. In the model set out above, the exogenous regressors Z_{ij} in equation (1) are the identifying instruments. Unfortunately, it is difficult to find any regressors Z_{ij} that can justifiably be used as identifying instrumental variables. Lacking identifying instruments Z_{ij}, the sample survey was constructed so as to provide identification through a quasi-experimental design.

Our sample of households includes households in villages that do not have access to a group-based credit program. If credit program placement across the villages of Bangladesh is attentive to the village effects μ_j, identifying program effects by comparing households in nonprogram villages with households in program villages without controlling for the selectivity of program placement will generally result in biased estimates of program effects. Using a village fixed effects estimation technique may remove the source of correlation between program placement and the empowerment behavior of interest, however, without further exogenous variation in program availability, the credit effect is not

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identifiable from a sample of self-selected households.[6] The parameter of interest, d, the effect of participation in a credit program on the outcome y_{ij}, can be identified if the sample also includes households in villages with treatment choice (*program villages*) who are excluded from making a treatment choice by exogenous rule. That exogenous rule is the restriction that households owning more than 0.5 acres of <u>cultivable</u> land are precluded from joining any of the three credit programs.[7]

To illustrate the identification strategy, consider a sample drawn from two villages —village 1 does not have the program and village 2 does; and, two types of households, landed ($X_{ij}=1$) and landless ($X_{ij}=0$). Innocuously, we assume that landed status is the only observed household-specific determinant of some behavior y_{ij} in addition to any treatment effect from the program. The conditional demand equation is:

$$y_{ij} = C_{ij}\boldsymbol{d} + X_{ij}\boldsymbol{b}_y + \boldsymbol{m}_j^y + \boldsymbol{e}_{ij}^y \tag{3}$$

The exogeneity of land ownership is the assumption that $E(X_{ij}, \boldsymbol{e}_{ij}^y) = 0$, that is, that land ownership is uncorrelated with the unobserved household-specific effect. The expected value of y_{ij} for each household type in each village is:

$$E(y_{ij} \mid j=1, X_{ij}=0) = \boldsymbol{m}_1^y \tag{4a}$$

$$E(y_{ij} \mid j=1, X_{ij}=1) = \beta_y + \boldsymbol{m}_1^y \tag{4b}$$

$$E(y_{ij} \mid j=2, X_{ij}=1) = \beta_y + \boldsymbol{m}_2^y \tag{4c}$$

$$E(y_{ij} \mid j=2, X_{ij}=0) = ?d + \boldsymbol{m}_2^y \tag{4d}$$

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[6] In addition, the effect of any observed village characteristics that are thought to influence y_{ij}, such as prices and community infrastructure, are not identifiable.

[7] The validity of the assumption that landownership is exogenous is defended at length in Pitt and Khandker (1998). There are a number of households in our sample that were program participants and yet had more than 0.5 acres of land at the time of program entry, raising the possibility of mistargeting and potential bias in econometric results relying on this targeting rule. It appears that some of this excess land is either uncultivable or marginally so. Pitt (1999) demonstrates that the value per acre of land owned by program participating households who also own more than 0.5 acres of cultivable land at the time of joining is a small proportion of the value per acre of the cultivable land of program participants owning less than 0.5 acres of cultivable land at the time of joining. This suggests that program officers are using some notion of "effective" units of cultivable land in determining eligibility rather than of the type of mistargeting that would result in econometric bias. Pitt (1999) discusses this issue at length and demonstrates that treating the exogenous targeting rule to be greater than 0.5 acres provides a consistent estimator for certain types of mistargeting. He finds that application of targeting rules greater than 0.5 acres (up to 2.0 acres) actually slightly strengthens the qualitative results on the effect of credit by gender on household consumption.

where *?* is the proportion of landless households in village 2 who choose to participate in the program. It is clear that all the parameters, including the effect of the credit program, *d*, is identified from this design. In particular, the estimator of the program effect *d* is a variant of the differences-in-the-differences estimator widely applied in the general program evaluation literature. To see this, note that an estimate of *d* is obtained from the following difference-in-the-difference:[8]

$$[E(y_{ij} \mid j=2, X_{ij}=0) - E(y_{ij} \mid j=2, X_{ij}=1)] - [E(y_{ij} \mid j=1, X_{ij}=0) - E(y_{ij} \mid j=1, X_{ij}=1)] \quad (4e)$$

If landed status is a continuous measure of landholding, then the credit effect *d* is identified from variation in landholding within the program villages ($j=2$) and a sample of nonprogram villages is not required.

Even if land ownership is exogenous for the purposes of this analysis, it is necessary that the "landless" and the "landed" can be pooled in the estimation. In order to enhance the validity of this assumption, we restrict the set of nontarget households used in the estimation to those with less than 5 acres of owned land. In addition, we include the quantity of land owned as one of the regressors in the vector X_{ij} and include a dummy variable indicating the target/nontarget status of the household.

The exclusion restrictions that identify the effects of credit on the outcomes y_{ij} are the interactions of a dummy variable indicating if the household has the choice to join the credit program (which requires meeting the land ownership rule and residing in a village with a credit program) and all the exogenous variables of the model, X_{ij} and μ_j.[9] In the results reported below, these instrumental variable models are estimated by two-stage least squares.

An important question of this research is whether reported empowerment is affected differently by credit if the program participant is a woman or a man. For that reason, the reduced form credit equation is disaggregated by gender:

This insensitivity of results to the choice of targeting rule used in estimation to further demonstrated in Pitt (2001).
[8]However, as Pitt (1999) points out, since this is a quasi-experiment, not an actual experiment, the direct application of (4e) would most likely result in a downward biased estimate of d. The regression approach applied here is necessary to control for differences in other observed and unobserved variables across the four groups identified in equations (4a) though (4d).

[9]Consequently, the model is not nonparametrically identified. That is, if the linear indices $X_c ?$ and $(X_y \beta + dI_c)$ in (5) were replaced by nonparametric functions of the *X*'s, and I_c the model is not identified.

$$C_{ijf} = X_{ij}\, \boldsymbol{b}_{cf} + \boldsymbol{m}^c_{jf} + \boldsymbol{e}^c_{ijf} \tag{6}$$

$$C_{ijm} = X_{ij}\, \boldsymbol{b}_{cm} + \boldsymbol{m}^c_{jm} + \boldsymbol{e}^c_{ijm} \tag{7}$$

where the additional subscripts f and m refer to females and males respectively. The conditional household outcome equation is then:

$$y_{ijs} = X_{ij}\, \boldsymbol{b}_y + \boldsymbol{m}^y_j + \boldsymbol{a}_s + C_{ijf}\, D_{jf}\, \boldsymbol{d}_f + C_{ijm} D_{jm} \boldsymbol{d}_m + \boldsymbol{e}^y_{is} \tag{8}$$

where D_{jf} and D_{jm} are village specific indicator variables such that D_{jf} takes the value of one in village j if there is a female group in village j, and zero otherwise.

Additional identification restrictions are required when there are both male and female credit programs with possibly different effects on behavior. Identification of gender-specific credit is achieved by making use of another quasi-experimental attribute of these programs and the survey. All program groups are single-sex and not all villages have both a male and a female group. The sample includes some households from villages with only female credit groups, so that males in landless households are denied the choice of joining a credit program, and some households from villages with only male credit groups, so that landless females are denied program choice.

5. Multiple indicators of multiple types of latent empowerment: a factor analytic approach

Unlike many other measures of human behavior studied by economists, women's empowerment does not readily lend itself to measurement. The large number of empowerment indicators collected in the survey suggests not only that women's empowerment is multi-faceted, but also that drawing conclusions from a large number of regressions may be problematic. Some of the empirical research on credit and women's empowerment has used some variant on an index approach to address this problem. In this approach, answers to different questions are weighted and summed to form one universal "score" that represents empowerment. For example, a "yes" answer to each of ten questions may be coded as one and a "no" as zero; then these ones and zeros added to produce a 'scale' with a minimum of zero and a maximum of ten. Some studies have used only one scale, others construct multiple scales for various thematic groupings of questions. This approach is quite arbitrary because the researcher must choose the weights without reference to theory or data.

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This paper treats subsets of empowerment variables as containing an underlying latent factor, estimates index "weights" using the methods of factor analysis, and computes numerical estimates of the latent factor. Factor analysis is a set of statistical techniques often used when the number of true "underlying dimensions" that describe a condition (such as empowerment) is smaller than the number of observed variables. Factor analysis converts a large number of observed variables into a smaller number of hypothetical variables, called factors, each of which is a linear combination of several observed variables. The use of factor analysis implies that the relationships between certain types of observed variables are stronger than those between others, such that if observed variables are arranged into appropriate groups, the correlation among variables within groups will be higher than the correlation across groups.

The decision to employ factor analysis is based upon our prior belief about the nature of empowerment. At one extreme, we could postulate that all the variables in the study are causally determined by only one factor, which we could call "empowerment." An alternative approach, which we follow, is to postulate that there may be more than one type of underlying empowerment factor, but fewer than the number of observed variables. We think it sensible, for example, to expect that those questions that pertain to political activism measure a different type of underlying condition than do those questions that ask about reproductive control. Consequently questions are grouped into 10 thematic groups to produce factors representative of certain topics.

The women's empowerment survey provides discrete responses to all questions. The conditional densities of the responses of person i to question j given the latent empowerment variable of person i, u_i, depend on the linear index given by

$$\boldsymbol{h}_{ij} = \boldsymbol{b}_j + u_i \boldsymbol{l}_j \qquad (9)$$

where $?_{ij}$ is the (linear) index, β_j represents a question-specific threshold for a positive response, and $?_j$ represents the extent to which question j discriminates between persons having different levels of empowerment. The $?_j$ is the *factor-loading* of the latent variable in the linear index. This model is known as the two-parameter item-response model, and has been used to estimate latent ability using data from binary (true/false) test questions. Appending a non-systematic error e_{ij} such that the u_i are the

only source of stochastic covariation among responses of any person, and assuming normally distributed errors, this is essentially a random-effects probit model with varying error correlations. In particular, the error correlation between question j and question k is proportional to $?_j?_k$, as in Pitt (1997). In the typical random effects model it is assumed that $?_j = ?_k$ for all j and k, so that there is a single error correlation $? = ?^2$. Estimation of this model is accomplished by maximum likelihood using Gauss-Hermite quadrature for numerical integration. After estimating the parameters β_j and $?_j$, an empirical Bayes method is used to estimate the latent variable (random effect) for each person sampled. This estimation was carried out with the gllamm6 package of Rabe-Hesketh and Pickles (2000). This is fairly demanding computationally. The same estimation was also carried out using standard factor analysis for models with continuous responses. In every case the simple correlation coefficient between the probit random effects model and standard continuous variable factor analysis was above 0.95. The results reported below are based on standard factor analysis, which has the advantage of readily providing additional statistics on the "fit" of the approach.

Table 3 presents information on the construction of each of the ten factors and the results of the factor analysis. For each factor, the eigenvalue, which measures the degree to which the variance of variables is accounted for by the factor, is listed along with the names of all the observed variables (component variables) that were used to create the factor.[10] For each component variable, two values are presented. The first column of values presents the factor loading for each component variable, which is the simple correlation coefficient for this variable and the factor. The sign of each factor loading indicates the sign of this correlation. If all factor loadings are of the same sign, this confirms that all variables do indeed "fit" in the grouping used to produce the factor. The second column of values presents the uniqueness of each component variable, which is the portion of the observed variance unaccounted for by the common factor and hence unique to that variable. It is computed by dividing the eigenvalue for the individual variable by the sum of all eigenvalues for all variables.

Those variables having at least 1800 observations (out of a potential sample of

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[10] The component variables for the tenth factor are not listed, for the sake of brevity. All the variables in table 2 are component variables for this factor.

2074) were used in factor analysis. 101 out of 132 variables met this criterion and were thus eligible for use. The main reason for lack of observations among the remaining 31 variables was that the associated survey questions were answered contingent on the response to a previous question. For example, the question "Do you buy household food?" was answered by all 2074 women in the sample, but the follow-up question "If so, do you buy this food without your husband's permission?" was only answered by the 372 women who responded affirmatively to the first question.

The selection of variables in the 10 categories of empowerment was based on our prior belief about which variables contain similar types of information. Out of the 101 eligible variables, only 75 were actually used in factor analysis (most were used only once, but some were used to create several different factors). The other variables were not used since it was felt that they were not directly relevant to any of the factor themes.

Since our prior beliefs about which empowerment variables should be grouped together may not be universally shared, regression analysis was performed not only on the ten factors but also on all of the observed variables, including those that were not included in any factor grouping. Throughout the paper, the ten hypothetical variables created through factor analysis are referred to as "factors" and the observed variables from the women's empowerment questionnaire are referred to as "individual variables."

Estimation of the determinants of the binary responses to individual empowerment questions is complicated for some variables for which there is little or no variation within villages. The problem is that the village fixed effect perfectly predicts the outcomes for the village. The village fixed effect goes to plus infinity if all responses are '1' and negative infinity if all responses are '0'. This identification problem can be cured with the additional sample variation resulting by using thana rather than village fixed effects. There are three or four sample villages in each sample thana. However, it is first important to determine whether a thana fixed effect/village random effects models eliminates location-specific heterogeneity bias. Hausman and Breusch-Pagan tests were conducted, comparing a village fixed effects estimate to thana fixed effect/village random effects. For all factors, the null hypothesis that village random effects conditional on thana fixed effects provide consistent estimates was rejected. This means that significant

correlated heterogeneity exists *across* villages *within* thanas than results in bias in the thana fixed effects model. Consequently, all fixed effects estimates presented in this paper are at the village level rather than the thana level. It should also be noted that this finding provides strong evidence of the need for the use of fixed-effects in the model to control for non-random program placement across locations. Indeed, the finding can be interpreted to conclude that heterogeneity bias could arise from non-random program placement *across villages and within thana*s, not only across thanas themselves, suggesting that program placement in this sample is highly non-random. This further demonstrates the problematic nature of any methodology (such as that used by Hashemi et. al.) that simply uses nearby non-program villages as controls for program villages.

For each of the ten factors created to encompass thematic information on empowerment, a Wu-Hausman test was conducted to determine whether male and/or female credit could be treated as exogenous, that is, whether credit is uncorrelated with the residuals of the factor regression. The results of these tests are presented in Table 4. For each factor, the results (P-value and t-statistic) are presented for the three tests: for female credit exogeneity, male credit exogeneity, and joint (male-female) credit exogeneity. Based on these results, the appropriate model is listed for each factor.

a. For six of the ten factors, the null hypothesis could not be rejected at the .05 level for a Wu test of joint exogeneity of male and female credit. Thus the model adopted for these six factors was one of exogenous male credit and exogenous female credit. For these six factors, both male and female credit is treated as exogenous and the appropriate model is village fixed effects regressions with no instrumental variables.

b. For three of the ten factors, the null hypothesis under the Wu test for joint exogeneity of male and female credit could be rejected at the .05 level. This model is consistent with a scenario in which person-specific unobservables are correlated with credit use, suggesting some degree of self selection into credit programs based on unobserved traits which also affect empowerment as measured by the factors. For these three factors, both male and female credit is treated as endogenous and the model is village fixed effects with instrumental variables for both male and female credit.

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c. For one of the factors, the null hypothesis for the Wu test of joint exogeneity of male and female credit could not be rejected; however, the null hypothesis for the test of male credit only could be rejected at the .05 level. For this factor, male credit is treated as endogenous while female credit is treated as exogenous, and the model is village-fixed effects with instrumental variables for male credit only.

In order to determine the appropriate regression model for the set of individual empowerment variables, a set of Wu tests was also conducted. For each empowerment variable, tests were conducted of male credit exogeneity, female credit exogeneity, and joint male and female credit exogeneity.[11] Those variables for which the null hypothesis for all three tests could not be rejected at the .05 level are treated as being fully exogenous: meaning that no instrumental variables are used at all, and the specified model is village fixed effect with instrumental variables.

In cases where the null hypothesis in the test of female credit exogeneity could be rejected at the .05 level but the null for the test of male credit exogeneity could not be, a model of female-credit endogeneity is used. In this model, instrumental variables are used to correct for endogeneity of the female credit variable but not of the male credit variable. Likewise for those variables in which the null hypothesis for the test of male credit exogeneity could be rejected at the .05 level but the it could not for the test of female credit exogeneity.

Finally, some variables are treated under a model of endogeneity for both male and female credit, and instrumental variables are used for both. This model is applied to those empowerment variables for which, either (1) the null hypothesis for the Wu test of joint exogeneity of male and female credit could be rejected at the .05 level; or (2) both null hypotheses—for the test of male credit exogeneity and the test of female credit exogeneity—could be rejected at the .05 level.

In all cases, estimated village fixed effects from the model with the corresponding factor are included as independent variables to correct for heterogeneity bias resulting from non-random program placement across villages. Several questions in the women's empowerment questionnaire are only asked

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[11] For the sake of brevity, the statistics of all these tests (numbering more than 300) are not presented to the reader. Instead, the presentation of final results for the individual variables in Table 6 indicates which model was employed.

conditional upon the response of a prior question. For example, one question asks women "Do you have your own savings?" and the next question asks "If so, do you control these savings yourself?" Only those respondents who answer affirmatively to the first question respond to the second question.

In cases such as this, the question was recoded to apply to the full sample. Using the example above, the recoded question now asks "Do you have any savings which you yourself control?" Respondents who have no savings and those who have savings that they do not control are both coded as answering "no". The only respondents with savings they control are coded as answering "yes".

There were three conditional questions in the questionnaire for which this was not possible because the conditionality of these questions did not rely on any other question in the questionnaire but rather on some other (unmeasured) endogenous condition. These questions were the following: (1) "If your wife has a loan, do you spend this money yourself?" (asked of men); (2) "If you have a loan, who controls this money?" (asked of women), and (3) "If you have received any remittance from your relatives in the past 12 months, do you yourself have control over this money?" (asked of women).

In order for a respondent to be in the sample for questions (1) and (2) it is necessary that the wife have taken some loan. The determinants of whether this event occurs (and thus, whether respondents are in the sample for questions (1) and (2)) are likely to be correlated with the determinants of credit program participation. By definition, the determinants of "having a loan (from any source)" must overlap with those of "having a loan (from a formal credit program)" because any woman who "has a loan (from a credit program)" also "has a loan (from any source)". For question (3), respondents are only present in the sample if they received remittances in the past 12 months from their relatives. The economic literature on transfer behavior suggests that it is highly unlikely that receiving family remittances is orthogonal to credit program participation.[12]

The problem of potential bias for these three questions was resolved by using a two-stage-ordered-probit model (similar to that used to correct for self-selection bias) in which a the inverse Mill

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The choice of the model was based on the Wu tests described and was conducted along the same lines as for the factors.

[12] The results of this paper demonstrate that female credit program participation has a statistically significant negative effect on the likelihood that a respondent has received family remittances. Pitt and McKernan (2000) have also shown that credit use causes a fall in net remittances from relatives of program participants to the participants.

ration corresponding to "being present in the sample" was predicted from a first stage probit and added as a regressor in the second stage. Accordingly, the results from these three items may be interpreted as "the likelihood of answering "yes" to question X, *conditional upon* being eligible to answer question X." Thus, for example, the results for question (1) should be interpreted as "the likelihood of a husband spending his wife's loan *conditional upon* the wife having a loan."

6. Results

Below, the affects on latent empowerment factors of the male and female credit variables are presented in Table 5 and on the response of individual questions within each factor are presented in Table 6. The first column of both tables presents the effects of female and male credit under the assumption of exogeneity (as in the work of Hashemi and others), that is, without instruments or fixed effects. Table 5 also present estimates with village fixed effects but without instruments. The last column of Table 5 imposes exogeneity wherever warranted by the Wu-Hausman tests presented in Table 4. Table 6 presents estimates without imposing exogeneity, when warranted, in its second column. The results of these Wu-Hausman tests are indicated next to the parameter estimates.

All variables (factor 10)

Female credit had a positive and highly significant (t= 6.00) effect on the factor encompassing all the questions in the questionnaire (thus a representation of the "general level of empowerment") and it had a significantly positive effect on nine out of the ten factors (the exception being the factor representing power in family-planning and child-rearing activities). Female credit had a positive and significant effect on roughly half of the individual empowerment variables. Male credit significantly reduced the overall empowerment factor (t=-2.99), had a significant negative effect on six of the other empowerment factors and did not have a positive effect on any of them.

Purchasing

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Female credit use positively and significantly (t=3.15) affects the latent empowerment factor describing women's autonomy with purchasing. In addition, female credit significantly augments women's ability to purchase all seven questionnaire items in this category. Female credit also increases the likelihood both that a husband states that his wife could buy assets on her own and that she could buy them without his permission. In contrast, husbands credit program participation has a statistically significant (t=-3.55) negative effect on the women's purchasing autonomy factor.

Resources

Female credit significantly (t=10.24) increases the latent factor representing a woman's access to and control over economic resources. It also affects several individual indicators, including the likelihood that a man says his wife has her own income, the likelihood that a wife reported having her own income, and the likelihood of her reporting having her own savings (it did not, incidentally, affect the likelihood that a woman had savings which she herself could control). In addition, female credit increases the likelihood that a woman responds that she would be able to raise emergency funds from any source, and that she would be able to raise them specifically from (1) selling off assets, (2) getting money from her husband, and (3) borrowing from other people. Female credit decreases the chances that a household reports that it fights about money. In contrast, male credit is significantly (t=-3.25) associated with lower latent resource empowerment, and with reduced likelihood that wives have independent savings and access to emergency funds.

Finance

Women's credit significantly increases (t=5.84) the latent empowerment factor associated with finance. In contract, men's credit reduces this factor (t=-2.63).

Transaction Management

Female credit significantly (t=5.11) increases the factor representing a woman's power to oversee and conduct major household economic transactions, and male credit reduces this factor (t=-2.53). Data from the questionnaire describes decision-making and implementation arrangements

(ranging from full power in the wife's hands to full power in the husband's) and the likelihood that a wife spends money, for four major categories: housing repair, livestock purchase, household loans, and land/equipment transactions. In all four categories, female credit affects women's autonomy regarding decision-making and project implementation. The same is true for the likelihood that a woman spends money in every category except land/equipment transactions. Notably, the t-statistics for female credit effects on women's autonomy in deciding and implementing household finance decisions are especially high. Male credit had a negative effect on wives implementing housing repair projects, livestock purchase projects, and land/equipment purchase or sale projects.

Mobility and networks

Female credit significantly (t=7.83) affects the factor representing mobility/networking and also affects several individual measures of mobility, including the odds that a husband will report that his wife travels alone outside the house, the odds that a woman reports traveling outside the house at all and that she reports traveling outside alone. It also has an effect in reducing the odds that a household will argue about the wife traveling outside and also the odds that a husband will cite a general ban on women leaving the household (as opposed to other reasons such as perceived lack of safety) as the reason his wife does not leave the house. Female credit has a positive effect on several measures of women's physical mobility in the questionnaire and the t-statistics for these variables are remarkably high. Male credit reduces the mobility and network latent factor (t=–4.22), the level of a wife's physical mobility, and the likelihood that she ever travels outside the house (even if accompanied).

Activism

Female credit positively affects the factor relating to women's awareness and activism (t=3.20). Female credit affects the odds that a woman will be informed of (meaning able to list) the ways in which *kabinnama* (a pre-marital bridal contract) can be used to help a woman in the event of divorce. Female credit also affects the probability that a woman knows the name of the Member of Parliament in her

area, the probability that she voted in the last election, and the probability that she voted independently (rather than under advice/pressure from her husband).

Male credit reduces this factor, although not significantly (t=–1.14), and reduces the probability that his wife will vote independently.

Attitudes and husband's behavior

Female credit significantly (t=4.21) increases the factor relating to household attitudes and the factor relating to husbands' opinions and actions (t=3.93). Male credit has no significant effect on either of these latent empowerment factors. Female credit affects the likelihood that a man will describe his wife as intelligent and the probability that a woman will say that she does not view her husband as superior to herself. In the questionnaire, men were given the chance to cite positive and/or negative impacts of women's empowerment. Female credit increases the odds that a man listed a positive impact of women's empowerment and decreases the odds that he a negative impact. Specifically, female credit affects the odds that a man would cite the creation of a "better society" and "economic improvements for the family" as results from women's empowerment.

Male credit had a negative effect on the odds that a husband would say "My wife is smarter than me" or that he would say "My wife is as intelligent as me." Male credit increased the odds that a man would say "My wife is not as smart as me." While male credit had no effect on the variable describing the general severity of spousal arguments (ranging from mild arguments to loud arguments to verbal abuse to physical abuse), male credit did have a significant effect (t=–2.15), which with our coding, indicates that male credit increases the occurrence of physical spousal abuse.

Family Planning and Parenting Issues

Women were asked whether they initiated discussion on a range of family planning and parenting issues, and whether their husbands initiated discussion (wife initiation and husband initiation were not mutually exclusive: answers could be one, the other, both, or neither). Female credit significantly (t=2.97) increases the fertility and parenting latent factor. In contrast, male credit significantly (t=–2.38) reduces

this factor. Female credit increases the likelihood that a woman initiates discussions with her husband about birth control use, birth control methods, and birth numbers. In addition, female credit increases the likelihood both that husbands will initiate discussion and that wives will initiate the same discussion for issues of birth control use and children's education (implying a positive effect on the total likelihood of spousal communication on these two issues). Male credit had a negative effect on both the odds that a wife initiated discussion regarding birth control use with her husband and on the odds that she initiated discussion about birth control methods.

Other results and discussion

Female credit affects the chances that a woman has at least one close friend living o*utside* her *bari* (family compound) "with whom [she is] intimate enough to share [her] feelings." In addition, female credit affects the frequency with which women have contact with such friends (meaning they are more likely to say they have daily contact and less likely to say that this contact is only monthly). However, for friendships within the *bar*i, female credit had no effect.

A possible explanation for these findings has to do with the nature of intra-*bari* versus extra-*bari* relationships. One conjecture that explains this finding is that in the absence of credit program participation, women still tend to have friends within their *baris* (85% of women in the sample had such friends), and thus there is little room for credit program participation to increase the rate of friendships. Typically, the members of a *bari* are related patrilineally: a *bari* frequently consists of several brothers, their parents, and their wives and children. Thus, any given woman's friendships within her *bari* are likely to be limited to those to whom she is related by marriage (for example, a sister-in-law).

Friendship outside the *bari* is, in general, more rare, and thus credit program participation can have a real effect in increasing the tendency for women to have extra-*bari* friends. Since most women within a savings and lending group are typically *not* from the same *bar*i, participation in a credit program is likely to widen the scope of social contact for these women.

While female credit had a very significant positive effect on the likelihood that a woman had independent savings, it did not have an effect on the likelihood that a woman had savings that *she*

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herself could control. Unfortunately, because of the way the question on the questionnaire was phrased, we have no way of knowing who controlled this savings in cases where the respondent herself did not. It is possible, then, that a lack of respondents' control over their savings *does not imply* that the respondents' husbands controlled the savings, but rather that someone else (a third party) had control. This is plausible in the context of the credit programs in question, which require women to make periodic savings (thus, just as one would predict, highly increasing the odds that a woman has her own savings) but which do not allow women complete control over their savings. This is because savings become working capital within credit groups and are lent out to other members. As a result, it is quite plausible that a woman would have her own savings as a result of joining a credit program, but would not have savings that she herself (solely) controls.

Female credit has a negative effect on the odds that a woman reports having "received money from parents/brothers/sisters or other relatives outside the household in last 12 months." These results are in agreement with Pitt and McKernan's (2000) evidence that net remittances from participants in credit programs to their relatives (meaning the excess of remittance from participants to families over the remittance from families to participants) fall as a result of program participation. This result is actually not overly surprising, and should not necessarily be interpreted as being "bad for empowerment." Although receiving remittances from her own relatives can be financially beneficial to a woman (and thus "empowering"), the *need* to accept money from one's kin (rather than, say, earning it oneself) may actually be a sign of a low degree of command over economic resources. Thus, the explanation for these results could be that participation in a credit program allows a woman to earn her own income and thus reduce her dependency on her own family in order to get money. When the story is told in this way, this result suggests an empowering rather than a disempowering effect of credit. It is also possible that it is not women's need for parental remittances that declines as a result of credit program participation, but rather the willingness of the parents to remit money to the daughter. Since we do not have the necessary data to discern whether the decrease in kin remittances caused by female credit are the result of decreased demand or decreased supply, the result is best described as "ambiguous" in terms of its potential effects on women's empowerment or well-being.

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Female credit use positively affects the chances that a woman cited "household chores" as a subject over which members of her household argue. The question was phrased in such a way that in order to answer the question, the respondent had to pick one argument topic out of a list, and "not arguing about anything" was not an option. Thus, the female credit effect on "arguing about household chores" is more appropriately interpreted as the effect on "arguing about household chores *as opposed to the other argument topics on the list of possibilitie*s," and thus is not an unambiguous measure of empowerment.

7. Summary

This paper examines the effects of men's and women's participation in group-based micro-credit programs on various indicators of women's empowerment using data from a special survey carried out in rural Bangladesh in 1998/99. The results are consistent with the view that women's participation in micro-credit programs helps to increase women's empowerment. Credit program participation leads to women taking a greater role in household decision making, having greater access to financial and economic resources, having greater social networks, having greater bargaining power vis-à-vis their husbands, and having greater freedom of mobility. Female credit also tended to increase spousal communication in general about family planning and parenting concerns. The effects of male credit on women's empowerment were, at best, neutral and at worst, decidedly negative. Male credit had a negative effect on several arenas of women's empowerment, including physical mobility, access to savings and economic resources, and power to manage some household transactions.

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Table 1. Number of households borrowing from credit programs, by gender of borrower*

	BRAC	BRDB	GB	ASA	PROSHIKA	GSS	Youth Dev.	Other NGO
Male	16	54	121	4	9	2	0	35
Female	273	72	545	105	29	3	1	183

* In some households, both men and women borrowed. Also, some women borrowed from more than one program

Table 2. Legend for full text and coding of individual empowerment variables

Name of variable	Full text from questionnaire	Coding*	Asked of:
Food purchase	Do you buy the family's daily consumable food items?	Y=1, N=0	Wife
Cosmetics purchase	Do you buy toiletries and cosmetics for your own use?	Y=1, N=0	Wife
Candy purchase	Do you buy ice-creams, candies, or cookies for your children?	Y=1, N=0	Wife
Utensils purchase	Do you buy utensils, pots and pans for the household?	Y=1, N=0	Wife
Furniture purchase	Do you buy household furniture?	Y=1, N=0	Wife
Children's clothing purchase	Do you buy clothing for your children?	Y=1, N=0	Wife
Own clothing purchase	Do you buy clothing for yourself?	Y=1, N=0	Wife
Wife initiates discussion (birth control methods)	Do you initiate discussion of birth control methods?	Y=1, N=0	Wife
Husband initiates discussion (birth control methods)	Does your husband initiate discussion of birth control methods?	Y=1, N=0	Wife
Wife initiates discussion (birth control use)	Do you initiate discussion of birth control use?	Y=1, N=0	Wife
Husband initiates discussion (birth control use)	Does your husband initiate discussion of birth control use?	Y=1, N=0	Wife
Wife initiates discussion (kids' marriage)	Do you initiate discussion of son's or daughter's marriage?	Y=1, N=0	Wife
Husband initiates discussion (kids' marriage)	Does your husband initiate discussion of son's or daughter's marriage?	Y=1, N=0	Wife

Table 2. Legend for full text and coding of individual empowerment variables (continued)

Name of variable	Full text from questionnaire	Coding*	Asked of:
Wife initiates discussion (children's education)	Do you initiate discussion of children's education?	Y=1, N=0	Wife
Husband initiates discussion (children's education)	Does your husband initiate discussion of children's education?	Y=1, N=0	Wife
Wife initiates discussion (birth timing)	Do you initiate discussion of birth timing?	Y=1, N=0	Wife
Husband initiates discussion (birth timing)	Does your husband initiate discussion of birth timing?	Y=1, N=0	Wife
Wife initiates discussion (birth numbers)	Do you initiate discussion of birth numbers?	Y=1, N=0	Wife
Husband initiates discussion (birth numbers)	Does your husband initiate discussion of birth numbers?	Y=1, N=0	Wife
House repair decision	Who decides issues of repair/construction of the house?	Husband alone=0, Husband and wife together=1, Wife alone=2	Wife
House repair implementation	Who implements issues of repair/ construction of the house?		Wife
House repair spending	Do you spend on repair/construction of the house?	Y=1, N=0	Wife
Livestock purchase decision	Who decides issues of sale/purchase of livestock?	Husband alone=0, Husband and wife together=1, Wife alone=2	Wife
Livestock purchase implementation	Who implements issues of sale/purchase of livestock?		Wife
Livestock spending	Do you spend on sale/purchase of livestock?	Y=1, N=0	Wife
Household loans decision	Who decides issues of borrowing money?	Husband alone=0, Husband and wife together=1, Wife alone=2	Wife

Household loans implementation	Who implements issues of borrowing money?		Wife

Table 2. Legend for full text and coding of individual empowerment variables (continued)

Name of variable	Full text from questionnaire	Coding*	Asked of:
Household loans spending	Do you spend on issues of borrowing money?	Y=1, N=0	Wife
Land/equipment decision	Who decides issues of sale/purchase/mortgage of land/transport or household equipment/irrigation equipment?	Husband alone=0, Husband and wife together=1, Wife alone=2	Wife
Land/equipment implementation	Who implements issues of sale/purchase/mortgage of land/transport or household equipment/irrigation equipment??		Wife
Land/equipment spending	Do you spend on issues of sale/purchase/mortgage of land/transport or household equipment/irrigation equipment?	Y=1, N=0	Wife
Husband says wife is intelligent	Do you think that your wife is as intelligent as you are?	Less=0, 1=Same, 2=More	Husband
Wife can buy an asset	Do you think your wife can take decisions in selling/buying of major household assets?	Y=1, N=0	Husband
Wife can buy an asset (without husband's permission)	Can your wife buy any asset on her own without your permission?	Y=1, N=0	Husband
Wife has own income	Does your wife have her own income?	Y=1, N=0	Husband
Husband spends wife's loan money	If your wife has a small loan, do you (or have you) spend (spent) that yourself in any income generating activities?	Y=0, N=1	Husband
Husband says wife travels alone	Does your wife go to market/bank/doctor's chambers, and so on alone? If not…	Y=1, N=0	Husband
Reason: women not allowed outside	… why? Because women are not allowed to go outside?	Y=0, N=1	Husband
Reason: lack of safety	… why? Because of lack of safety?	Y=1, N=0	Husband
Reason: wife goes with husband/son	… why? Because she goes with husband or son?	Y=1, N=0	Husband
Reason: wife goes with neighbor	… why? Because she goes with a neighbor or relative?	Y=1, N=0	Husband
Wife has independent income	Do you have your own income, which you can spend without your husband's permission?	Y=1, N=0	Wife

	can spend without your husband's permission?		
Wife has independent savings	Do you have your own savings?	Y=1, N=0	Wife

Table 2. Legend for full text and coding of individual empowerment variables (continued)

Name of variable	Full text from questionnaire	Coding*	Asked of:
Wife has independent savings which she herself controls	Do you have your own savings which you can decide how to utilize?	Y=1, N=0	Wife
Emergency funds access	If you needed 500 taka in an emergency, could you get it (from any source)?	Y=1, N=0	Wife
Emergency funds access (asset sale)	If you needed 500 taka in an emergency, could you get it by selling own assets?	Y=1, N=0	Wife
Emergency funds access (from husband)	If you needed 500 taka in an emergency, could you get it from your husband?	Y=1, N=0	Wife
Emergency funds access (husband's relatives)	If you needed 500 taka in an emergency, could you get it by borrowing from your husband's relatives?	Y=1, N=0	Wife
Emergency funds access (own relatives)	If you needed 500 taka in an emergency, could you get it by borrowing from your own relatives?	Y=1, N=0	Wife
Emergency funds access (moneylenders)	If you needed 500 taka in an emergency, could you get it by borrowing from moneylenders?	Y=1, N=0	Wife
Emergency funds access (other people)	If you needed 500 taka in an emergency, could you get it by borrowing from other people?	Y=1, N=0	Wife
Wife's control over loans	If you have income generating loans in your name, who has control over that?	Husband alone=0, Wife & husband (or another male) together=1, Wife & another female=2, Wife alone=3	Wife
Remittance	Have you received money from parents/brothers/sisters or other relatives outside the household in the last 12 months?	Y=1, N=0	Wife
Wife can decide how to use remittance	Can you decide yourself how to use that remittance?	N=0, Partially=1, Y=2	Wife

Money seizure by husband	Has your husband ever compelled you to give him money/asset if you don't want to?	Y=0, N=1	Wife

Table 2. Legend for full text and coding of individual empowerment variables (continued)

Name of variable	Full text from questionnaire	Coding*	Asked of:
Freedom to remit	Can you give away your money/asset at will to somebody?	Y=1, N=0	Wife
Husband forbids work outside home	Has your husband ever forced you not to work outside home even if you want to?	Y=0, N=1	Wife
Visits relatives (without husband's permission)	Have you ever visited your parents or other relatives without your husband's permission?	Y=1, N=0	Wife
Marriage has kabinnama	Does your marriage have any kabinnama (prenuptial bride price agreement)?	Y=1, N=0	Wife
Awareness of kabinnama	Can kabinnama help a woman in the event of a divorce?	Y=1, N=0	Wife
Awareness of inheritance laws	Can a widow establish her legal claim over her dead husband's property?	Y=1, N=0	Wife
Has prevented husband remarrying	Have you ever been successful in stopping your husband from remarrying?	Y=1, N=0	Wife
Voted (at all)	Did you vote in the last election?	Y=1, N=0	Wife
Voted independently	Did you vote in the last election without your husband telling you who to vote for?	Y=1, N=0	Wife
Protested against domestic abuse	Did you ever protest against any incidents of wife-beating?	Y=1, N=0	Wife
Thinks dowry is good	Do you think dowry is good?	Y=0, N=1	Wife
Protested against corruption	Did you ever protest against any favoritism by a chairman or a member who distributes government relief?	Y=1, N=0	Wife
Confidant within bari	With anybody outside your immediate family/household, but within your bari, are you close enough to share your feelings?	Y=1, N=0	Wife
Interval of contact within bari	With anybody outside your immediate family/household, but within your bari, how often do you interact with this person?	Monthly=0, Weekly=1, Daily=2	Wife
Confidant outside bari	With anybody outside your bari, are you close enough to share your feelings?	Y=1, N=0	Wife
Interval of contact outside bari	With anybody outside your bari, how often do you interact with this person?	Monthly=0, Weekly=1, Daily=2	Wife

Table 2. Legend for full text and coding of individual empowerment variables (continued)

Name of variable	Full text from questionnaire	Coding*	Asked of:
Severity of spousal arguments	When you and your husband argue, how bad does the argument get?	Physical abuse=0, Verbal abuse=1, Loud arguments=2, Mild Arguments=3	Wife
Occurrence of physical spousal abuse	When you and your husband argue, does physical abuse occur?	Y=0, N=1	Wife
Own relatives in same village	Do your parents or any sibling live in the same village as you do with your husband?	Y=1, N=0	Wife
Wife thinks husband is superior	Is your husband superior to you in qualities and education?	Y=0, N=1	Wife
Husband uses male birth control	Do you yourself use any male birth control method?	Y=1, N=0	Husband
Husband says women's empowerment leads to better society	Does women's empowerment lead to a better society?	Y=1, N=0	Husband
Husband says women's empowerment leads to chaos in society	Does women's empowerment lead to chaos in society?	Y=0, N=1	Husband
Husband says women's empowerment leads to problems with kids	Does women's empowerment lead to problems bringing up the children?	Y=0, N=1	Husband
Husband says women's empowerment leads to loss of peace	Does women's empowerment lead to loss of family peace?	Y=0, N=1	Husband
Husband says women's empowerment leads to better economically	Does women's empowerment lead to the family being better off economically?	Y=1, N=0	Husband
Husband cites positive impact of women's empowerment	Does women's empowerment have a good impact?	Y=1, N=0	Husband
Husband cites negative impact of women's empowerment	Does women's empowerment have a bad impact?	Y=0, N=1	Husband

Husband's assessment of women's empowerment	What is your general assessment of women's empowerment	Only negative=0, Mixed=1, Only positive=2	Husband
Husband views lack of education as obstacle	Is lack of education an obstacle to women's empowerment?	Y=1, N=0	Husband

Table 2. Legend for full text and coding of individual empowerment variables (continued)

Name of variable	Full text from questionnaire	Coding*	Asked of:
Husband views lack of safety as obstacle	Is lack of safety an obstacle to women's empowerment?	Y=1, N=0	Husband
Husband views lack of IGA as obstacle	Is lack of Income Generating Activities an obstacle to women's empowerment?	Y=1, N=0	Husband
Husband views social structure as obstacle	Is the social structure an obstacle to women's empowerment?	Y=1, N=0	Husband
Husband views law as obstacle	Is inheritance law an obstacle to women's empowerment?	Y=1, N=0	Husband
Wife has made husband use birth control	Have you ever succeeded in making your husband adopt a male birth-control method?	Y=1, N=0	Wife
Wife has Income Generating Activity	Do you have any Income Generating Activity?	Y=1, N=0	Wife
Wife has Income Generating Activity which she herself operates	Do you have any Income Generating Activity which you yourself operate?	Y=1, N=0	Wife
Degree of mobility	How do you go to banks, markets, health centers or places outside the village (except for your parent's place)?	Doesn't go at all=0, Goes with husband or son=1, Goes with women=2, Goes alone=3	Wife
Wife ever travels	Do you ever go to these places at all?	Y=1, N=0	Wife
Wife ever travels alone	Do you ever go to these places alone?	Y=1, N=0	Wife
Prevent remarriage (threaten divorce)	How can a wife prevent her husband from remarrying…by threatening divorce?	Y=1, N=0	Wife
Prevent remarriage (family pressure)	How can a wife prevent her husband from remarrying…by creating family pressure?	Y=1, N=0	Wife
Prevent remarriage (local govt)	How can a wife prevent her husband from remarrying…by pressing change in the local administration?	Y=1, N=0	Wife

Prevent remarriage (parishad)	How can a wife prevent her husband from remarrying… by pressing change in the Union Parishad?	Y=1, N=0	Wife
Prevent remarriage (deny permission)	How can a wife prevent her husband from remarrying…By not giving permission?	Y=1, N=0	Wife

Table 2. Legend for full text and coding of individual empowerment variables (continued)

Name of variable	Full text from questionnaire	Coding*	Asked of:
Household fights about kids	Does your household argue about the children?	Y=0, N=1	Wife
Household fights about money	Does your household argue about money?	Y=0, N=1	Wife
Household fights about in-laws	Does your household argue about your in-laws?	Y=0, N=1	Wife
Household fights about going outside	Does your household argue about going outside?	Y=0, N=1	Wife
Household fights about loans	Does your household argue about loans?	Y=0, N=1	Wife
Household fights about chores	Does your household argue about household chores?	Y=0, N=1	Wife
Wife views lack of ed as obstacle	Is lack of education an obstacle to women's empowerment?	Y=1, N=0	Wife
Wife views lack of safety as obstacle	Is lack of safety an obstacle to women's empowerment?	Y=1, N=0	Wife
Wife views lack of jobs as obstacle	Is lack of jobs an obstacle to women's empowerment?	Y=1, N=0	Wife
Wife views social structure as obstacle	Is the social structure an obstacle to women's empowerment?	Y=1, N=0	Wife
Wife views laws as obstacle	Is inheritance law an obstacle to women's empowerment?	Y=1, N=0	Wife
Wife views religion as obstacle	Is religion an obstacle to women's empowerment?	Y=1, N=0	Wife

*Most variables are coded with 0=No and 1=Yes. Those variables which are coded differently are shaded.

Table 3. Factor analysis components and statistics

Factor 1: Purchasing   **Eigenvalue: 3.51571**
Ability to spend money independently and to make household purchases

Component Variable	Factor Loading	Uniqueness
Food purchase	0.47093	0.77823
Cosmetics purchase	0.44616	0.80094
Candy purchase	0.33099	0.89045
Utensils purchase	0.32841	0.89214
Furniture purchase	0.40664	0.83464
Children's clothing purchase	0.44740	0.79983
Own clothing puchase	0.42120	0.82259
House repair spending	0.78301	0.38689
Livestock spending	0.68433	0.53169
Household loans spending	0.59525	0.64568
Land/equipment spending	0.77725	0.39589
Wife can buy an asset	0.33546	0.88747
Wife can buy an asset (without husband's permission)	0.42678	0.81786

Factor 2: Resources   **Eigenvalue: 1.90442**
General economic power and access to funds

Component Variable	Factor Loading	Uniqueness
Wife has own income	0.71615	0.48713
Independent income	0.71341	0.49105
Independent savings	0.38232	0.85383
Emergency funds access	0.25763	0.93363
Emergency funds access (asset sale)	0.27284	0.92556
Has independent IGA	0.69996	0.51005
Remittance	0.07094	0.99497
Money seizure by husband	0.05176	0.99732
Freedom to remit	0.31299	0.90203

Table 3. Factor analysis components and statistics (continued)

Factor 3: Finance   **Eigenvalue: 1.00728**

Power regarding household borrowing and ability to borrow from informal sources

Component Variable	Factor Loading	Uniqueness
Household loans decision	0.63768	0.59336
Household loans implementation	0.64487	0.58414
Household loans spending	0.37709	0.8578
Emergency funds access (husband's relatives)	0.03309	0.9989
Emergency funds access (own relatives)	0.05422	0.99706
Emergency funds access (moneylenders)	0.04844	0.99765
Emergency funds access (other people)	0.28783	0.96472
Household fights about loans	0.03039	0.99908

Factor 4: Transaction Management   **Eigenvalue: 4.60413**

Balance of power relating to decision, implementation, and spending for household transactions

Component Variable	Factor Loading	Uniqueness
House repair decision	0.70035	0.50952
House repair implementation	0.61364	0.62345
House repair spending	0.53234	0.71662
Livestock purchase decision	0.71466	0.48926
Livestock purchase implementation	0.64324	0.58625
Livestock spending	0.46068	0.78778
Household loans decision	0.70648	0.50088
Household loans implementation	0.66957	0.55167
Household loans spending	0.42276	0.82128
Land/equipment decision	0.6637	0.5595
Land/equipment implementation	0.69162	0.52167
Land/equipment spending	0.52152	0.72802

Table 3. Factor analysis components and statistics (continued)

Factor 5: Mobility and Networks   **Eigenvalue: 1.05988**

Freedom of movement, development of networks, relationships with blood kin and in-laws

Component Variable	Factor Loading	Uniqueness
Husband says wife travels alone	0.64691	0.58151
Emergency funds access (husband's relatives)	0.01562	0.9976
Emergency funds access (own relatives)	0.11682	0.98635
Emergency funds access (other people)	0.09009	0.99188
Degree of mobility	0.63217	0.60036
Remittance	0.0976	0.99047
Visits relatives without permission	0.3588	0.87126
Confidant within *bari*	0.01468	0.99978
Confidant outside *bari*	0.14334	0.97945
Own relatives in same village	0.24641	0.93928

Factor 6: Activism   **Eigenvalue: .80907**

Awareness of law and politics, autonous action on public and private matters

Component Variable	Factor Loading	Uniqueness
Marriage has kabinnama	0.2943	0.91339
Awareness of kabinnama	0.36751	0.86494
Awareness of inheritance laws	0.33478	0.88792
Prevent remarriage (local govt)	0.08528	0.99273
Prevent remarriage (parishad)	0.11016	0.98786
Has prevented husband remarrying	0.18111	0.9672
Knows MP's name	0.38016	0.85548
Voted (at all)	0.27893	0.9222
Voted independently	0.20425	0.95828
Protested against domestic abuse	0.25028	0.93736
Thinks dowry is good	0.13026	0.98303
Protested against corruption	0.20753	0.95693
Views social structure as obstacle	0.18723	0.96494
Views laws as obstacle	0.02443	0.9994
Views religion as obstacle	0.02703	0.99927

Table 3. Factor analysis components and statistics (continued)

Factor 7: Household Attitudes   **Eigenvalue: 2.22182**

Attitudes on women's empowerment, dowry, and status within household

Component Variable	Factor Loading	Uniqueness
Thinks dowry is good	0.03584	0.99872
Wife thinks husband is superior	0.14373	0.97934
Husband says wife is intelligent	0.18998	0.96391
Husband says wife can make decisions	0.16573	0.97253
Husband says w.e.=better society	0.82516	0.31911
Husband says w.e.=chaos in society	0.77915	0.39292
Husband says w.e.=problems with kids	0.24824	0.93838
Husband says w.e.=loss of peace	0.52887	0.72029
Husband says w.e.=better economically	0.71205	0.49298

Factor 8: Husband's Behavior   **Eigenvalue: 1.60615**

Husband's actions and opinions pertaining to women's status

Component Variable	Factor Loading	Uniqueness
Husband says wife is intelligent	0.24312	0.94089
Husband says wife can make decisions	0.20698	0.95716
Husband cites positive impact of w.e.	0.84668	0.28313
Husband cites negative impact of w.e.	0.86215	0.2567
Emergency funds access (from husband)	0.0237	0.99944
Husband confiscates money	-0.11345	0.98713
Husband forbids work outside home	-0.17274	0.97016
Degree of spousal abuse	0.02765	0.99924

Table 3. Factor analysis components and statistics (continued)

Factor 9: Fertility and Parenting   **Eigenvalue: 2.62338**

Decisions and action for family planning and child-rearing

Component Variable	Factor Loading	Uniqueness
Candy purchase	0.07674	0.98991
Children's clothing purchase	0.077	0.9838
Initiates discussion (birth control methods)	0.84	0.28867
Initiates discussion (birth control use)	0.87054	0.23427
Initiates discussion (children's education)	0.32892	0.87778
Initiates discussion (birth timing)	0.69096	0.52243
Initiates discussion (birth numbers)	0.71566	0.48526
Husband uses male birth control	0.15726	0.48812
Wife has made husb use birth control	0.16003	0.48499

Factor 10: All Variables   **Eigenvalue: 9.08115**

This factor could be referred to loosely as "general women's empowerment"

This factor could be referred to loosely as "general women's empowerment"	

Table 4. Wu Tests for Exogeneity of Female and Male Credit Variables

Factor	Test for female credit exogeneity	Test for male credit exogeneity	Test for joint exogeneity	Appropriate model
Purchasing	t = -0.210 P-val = 0.835	t = -0.480 P-val = 0.632	F =0.350 P-val = 0.7016	Exogenous female credit Exogenous male credit
Resources	t = 0.600 P-val = 0.552	t = -2.250 P-val = 0.024	F =2.760 P-val = 0.0634	Exogenous female credit ***Endogenous male credit***
Finance	t = -1.270 P-val = 0.205	t = -1.390 P-val = 0.164	F =3.930 P-val = 0.0198	***Endogenous female credit*** ***Endogenous male credit***
Transaction	t = -1.260 P-val = 0.207	t = -1.450 P-val = 0.147	F =4.800 P-val = 0.0083	***Endogenous female credit*** ***Endogenous male credit***
Mobility and networks	t = 0.760 P-val = 0.446	t = -0.790 P-val = 0.431	F =0.390 P-val = 0.6783	Exogenous female credit Exogenous male credit
Activism	t = 0.870 P-val = 0.382	t = -0.180 P-val = 0.859	F =0.420 P-val = 0.6569	Exogenous female credit Exogenous male credit
Household attitudes	t = -0.940 P-val = 0.346	t = -0.580 P-val = 0.559	F =1.000 P-val = 0.3686	Exogenous female credit Exogenous male credit
Husband's behavior	t = -1.030 P-val = 0.302	t = -0.030 P-val = 0.975	F =0.580 P-val = 0.5604	Exogenous female credit Exogenous male credit
Fertility and parenting	t = 0.590 P-val = 0.553	t = 1.870 P-val = 0.062	F =3.300 P-val = 0.0371	***Endogenous female credit*** ***Endogenous male credit***
All Variables	t = 0.270 P-val = 0.791	t = -0.820 P-val = 0.415	F =0.330 P-val = 0.7160	Exogenous female credit Exogenous male credit

Table 5. Male and female effects on factors

Factor	Female/male credit	Naïve estimate 1 No fixed effects No instrumental variables	Naïve estimate 2 Village fixed effects No instrumental variables	Appropriate estimate
Factor 1: Purchasing	Female credit	0.0788 (3.20)	0.0744 (3.15)	-
	Male credit	-0.0222 (-2.48)	-0.0287 (-3.55)	-
Factor 2: Resources	Female credit	0.1202 (7.97)	.1301 (10.24)	.1060 (6.31)

| | Male credit | -.0177 | -.0301 | .0163 |
| | | (-1.74) | (-3.25) | (0.69) |

Table 5. Male and female effects on factors (continued)

Factor	Female/male credit	Naïve estimate 1 No fixed effects No instrumental variables	Naïve estimate 2 Village fixed effects No instrumental variables	Appropriate estimate
Factor 3: Finance	Female credit	.1003 (7.59)	.0752 (5.84)	.1098 (3.26)
	Male credit	-.0189 (-2.28)	-.0206 (-2.63)	.00047 (0.21)
Factor 4: Transaction management	Female credit	.1163 (6.12)	.0917 (5.11)	.1379 (3.09)
	Male credit	-.0238 (-2.56)	-.0247 (-2.53)	.0035 (0.14)
Factor 5: Mobility and networks	Female credit	.0991 (7.12)	.1028 (7.83)	-
	Male credit	-.0309 (-3.34)	-.0372 (-4.22)	-
Factor 6: Activism	Female credit	.0618 (4.95)	.0376 (3.20)	-
	Male credit	-.0119 (-1.33)	-.0094 (-1.35)	-
Factor 7: Household attitudes	Female credit	.0526 (3.20)	.0639 (4.21)	-
	Male credit	.0004 (0.04)	-.0034 (-0.35)	-
Factor 8: Husband's behavior	Female credit	.0546 (3.25)	.0601 (3.93)	-
	Male credit	-.0071 (-0.65)	-.0116 (-1.14)	-
Factor 9: Fertility an d parenting	Female credit	.0552 (3.20)	.0488 (2.97)	.0178 (0.38)
	Male credit	-.0225 (-2.27)	-.0252 (-2.38)	-.0668 (-2.17)
Factor 10: All variables	Female credit	.1284 (5.45)	.1165 (6.00)	-

		-.0308 (-1.78)	-.0446 (-2.99)	-

Table 6. Male and Female Credit Effects on Individual Empowerment Questions

Name of variable	Female/male credit	Exogenous credit model	Appropriate model
Food purchase	Female credit	.04776041 (2.2032317)	.
	Male credit	.00141589 (.11540183)	.
Cosmetics purchase	Female credit	.05860924 (3.0890573)	.
	Male credit	-.00085887(-.07842965)	.
Candy purchase	Female credit	.06361531 (3.3796502)	.
	Male credit	.00238608 (.21357556)	.
Utensils purchase	Female credit	.06462877 (3.3973055)	.
	Male credit	-.01015248(-.91474276)	.
Furniture purchase	Female credit	.11399304 (3.3408784)	.09450988 (2.7854132) [a]
	Male credit	-.04055258(-1.7362839)	.10037581 (.78000203) [a]
Children's clothing purchase	Female credit	.06593455 (3.0208841)	.06310113 (2.9080015) [a]
	Male credit	-.01710887(-1.3094382)	-.06799148(-.96363801) [a]
Own clothing purchase	Female credit	.06782688 (3.2403093)	.05868075 (2.8275366) [a]
	Male credit	-.0324938 (-2.541223)	-.07790267(-1.2072677) [a]
Wife initiates discussion (birth control methods)	Female credit	.0912055 (4.3732557)	.
	Male credit	-.03085828(-2.4979816)	.
Husband initiates discussion (birth control methods)	Female credit	.02865999 (1.5042031)	.
	Male credit	.01073733 (.92167669)	.
Wife initiates discussion (birth control use)	Female credit	.12275242 (5.6980881)	.
	Male credit	-.04567825(-3.6508717)	.
Husband initiates discussion (birth control use)	Female credit	.06501086 (3.3148577)	.
	Male credit	.00328392 (.27138652)	.
Wife initiates discussion (kids' marriage)	Female credit	.0733686 (3.0038177)	.12523773 (1.0536146) [c]
	Male credit	-.01647947(-1.1171852)	-.07355644(-.59684847) [c]
Husband initiates discussion (kids' marriage)	Female credit	.05491004 (2.2773254)	.
	Male credit	-.01561035(-1.0662414)	.
Wife initiates discussion (children's education)	Female credit	.12380831 (5.2159512)	.11924787 (5.1578818) [a]
	Male credit	-.00700765(-.47441271)	.02058241 (.25726957) [a]

Husband initiates discussion (children's education)	Female credit	.14298343 (6.100405)	.1306935 (5.7529255) [a]
	Male credit	-.01911873(-1.3296468)	.05740227 (.71737438) [a]
Wife initiates discussion (birth timing)	Female credit	.01643459 (.83961744)	.00608107 (.06797522) [c]
	Male credit	.00820515 (.68634246)	-.02811081(-.31096221) [c]
Husband initiates discussion (birth timing)	Female credit	.03155623 (1.6648596)	.04205182 (2.2494966) [a]
	Male credit	.02181647 (1.8607394)	-.00796965(-.12990483) [a]
Wife initiates discussion (birth numbers)	Female credit	.08293512 (4.0749984)	.08064387 (4.0464672) [a]
	Male credit	-.0060319 (-.49479264)	-.00941715(-.15586521) [a]

Table 6. Male and female credit effects on individual empowerment questions (continued)

Name of variable	Female/male credit	Exogenous credit model	Appropriate model
Husband initiates discussion (birth numbers)	Female credit	.08366957 (4.298626)	.0851692 (4.4497355) [a]
	Male credit	.01287064 (1.0768375)	.06302056 (1.076337) [a]
House repair decision	Female credit	.08907876 (4.2620781)	.
	Male credit	-.00975032(-.78694676)	.
House repair implementation	Female credit	.07207265 (3.3856953)	.05257216 (2.5858211) [a]
	Male credit	-.05098127(-4.2001659)	-.14109895(-2.0796276) [a]
House repair spending	Female credit	.13213097 (2.2869854)	.
	Male credit	-.02265464(-1.044386)	.
Livestock purchase decision	Female credit	.12567333 (5.7735449)	.2069053 (3.4762615) [b]
	Male credit	-.01387871(-1.087525)	.00368387 (.30344242) [b]
Livestock purchase implementation	Female credit	.06872113 (3.5365616)	.23198282 (2.7099889) [c]
	Male credit	-.03405356(-2.9825091)	-.20707802(-2.4045442) [c]
Livestock spending	Female credit	.11883032 (2.4274332)	.10569635 (2.1319242) [a]
	Male credit	-.00371256(-.20287309)	-.15139041(-.86006726) [a]
Household loans decision	Female credit	.16210609 (7.6887465)	.13218476 (6.5662884) [a]
	Male credit	-.04490973(-3.8469249)	.03424304 (.59350472) [a]
Household loans implementation	Female credit	.14057259 (7.1552867)	.11475915 (6.0827791) [a]
	Male credit	-.06104301(-5.4802638)	-.11736821(-1.9679329) [a]
Household loans spending	Female credit	.12991344 (3.3276476)	.12176248 (3.067932) [a]
	Male credit	-.08472108(-2.2018748)	-.17656793(-1.1678715) [a]
Land/equipment decision	Female credit	.12638888 (6.2372212)	.17103918 (2.0082311) [c]
	Male credit	-.02497008(-2.1609634)	.03367202 (.40901592) [c]

Land/equipment implementation	Female credit	.09766105 (5.1815832)	.24828216 (2.8976129) [c]
	Male credit	-.03660103(-3.3099373)	-.22945787(-2.7228374) [c]
Land/equipment spending	Female credit	.08693242 (1.5483862)	.
	Male credit	-.03123732(-.76965112)	.
Husband says wife is intelligent	Female credit	.09782371 (5.1313304)	.
	Male credit	-.0359709 (-3.1449831)	.
Wife can buy an asset	Female credit	.07018261 (3.3838999)	.
	Male credit	-.0128851 (-1.0876201)	.
Wife can buy an asset (without husband's permission)	Female credit	.06747569 (2.8552021)	.
	Male credit	-.00803558(-.60671635)	.
Wife has own income	Female credit	.12659167 (6.4359697)	.
	Male credit	-.01102797(-.99794156)	.
Husband spends wife's loan money	Female credit	-.35438 (-9.711638)	-4.8942583 (-1.2032126) [c]
	Male credit	-.01802366 (-.68702186)	.79614351 (.66056197) [c]

Table 6. Male and female credit effects on individual empowerment questions (continued)

Name of variable	Female/male credit	Exogenous credit model	Appropriate model
Husband says wife travels alone	Female credit	.12570957 (5.7274842)	.
	Male credit	-.01651619(-1.3198174)	.
Wife has independent income	Female credit	.08544579 (4.1829839)	.07855306 (3.9046027) [a]
	Male credit	-.00230439(-.20117939)	.07392437 (1.2128377) [a]
Wife has independent savings	Female credit	.4468341 (21.264715)	.55937315 (8.1383188) [b]
	Male credit	-.1220153 (-10.70441)	-.05553827(-5.2213782) [b]
Wife has independent savings which she herself controls	Female credit	.04887458 (1.6630768)	.
	Male credit	.00488506 (.29625473)	.
Emergency funds access	Female credit	.17599848 (8.8439957)	.
	Male credit	-.04927985(-4.3592823)	.
Emergency funds access (asset sale)	Female credit	.15163642 (3.7263403)	.
	Male credit	-.05101663(-2.0145894)	.
Emergency funds access (from husband)	Female credit	.05816154 (2.7675279)	.
	Male credit	.00836456 (.69821613)	.
Emergency funds access (husband's relatives)	Female credit	.11225464 (5.3892888)	-.07767567(-.86277973) [c]
	Male credit	-.02625655(-2.1466454)	.00908476 (.10431222) [c]
Emergency funds	Female credit	-.0035531 (-.17016661)	.

access (own relatives)	Male credit	-.02508447(-2.0300173)	.
Emergency funds access (moneylenders)	Female credit	-.03163719(-.65054464)	.
	Male credit	.01068736 (.36908294)	.
Emergency funds access (other people)	Female credit	.08425008 (2.4472459)	.
	Male credit	-.00779705(-.37519001)	.
Wife's control over loans	Female credit	-.01703254 (-.60133783)	-.01808199 (-.63718212) [a]
	Male credit	-.0205718 (-1.1283077)	-.04399091 (-.61355432) [a]
Remittance	Female credit	-.05035626(-2.1274473)	.
	Male credit	.00549734 (.41368397)	.
Wife can decide how to use remittance	Female credit	-.02334331 (-.36612289)	.
	Male credit	.01616041 (.43267576)	.
Money seizure by husband	Female credit	-.01399654(-.68291502)	.
	Male credit	.01176347 (1.0159757)	.
Freedom to remit	Female credit	.07680612 (3.554106)	.1398961 (1.4727807) [c]
	Male credit	-.01941725(-1.596456)	-.0340874 (-.39708405) [c]
Husband forbids work outside home	Female credit	-.08583542(-4.4739977)	-.13334304(-1.5430302) [c]
	Male credit	.03820209 (3.3884507)	.10593927 (1.2860949)

Table 6. Male and female credit effects on individual empowerment questions (continued)

Name of variable	Female/male credit	Exogenous credit model	Appropriate model
Visits relatives (without husband's permission)	Female credit	.01911277 (.91810268)	.
	Male credit	-.04657823(-3.3794914)	.
Marriage has *kabinnama*	Female credit	.02275705 (1.1305345)	.
	Male credit	-.00044701(-.03591271)	.
Awareness of *kabinnama*	Female credit	.05771666 (1.8559487)	.06718893 (2.2116211) [a]
	Male credit	.0066104 (.33847749)	-.08635385(-.89016727) [a]
Awareness of inheritance laws	Female credit	.02878196 (.91363229)	.0196325 (.64003634) [a]
	Male credit	-.01984606(-1.0841944)	-.01026009(-.09996157) [a]
Has prevented husband remarrying	Female credit	.00728302 (.19819264)	.
	Male credit	.00616823 (.29205465)	.
Knows MP's name	Female credit	.08391138 (4.3870888)	.
	Male credit	-.00768854(-.68322894)	.

Voted (at all)	Female credit	.13131678 (5.1633827)	.
	Male credit	-.00194159(-.12746871)	.
Voted independently	Female credit	.0414437 (2.0471695)	.
	Male credit	-.02997352(-2.3834331)	.
Protested against domestic abuse	Female credit	.03678351 (1.8633071)	.
	Male credit	.01145688 (1.027746)	.
Thinks dowry is good	Female credit	.01067717 (.51269369)	.
	Male credit	.00030867 (.02543997)	.
Protested against corruption	Female credit	.04417861 (1.2452415)	.20041202 (1.256096) [b]
	Male credit	-.00056154(-.02879464)	.00308572 (.16340061) [b]
Confidant within *bari*	Female credit	-.03205397(-1.4444465)	-.03157462(-1.4481029) [b]
	Male credit	.00007672 (.00579186)	-.00698016(-.09440991) [b]
Interval of contact within *bari*	Female credit	-.03091528 (-1.3888953)	.
	Male credit	-.00121859 (-.09191732)	.
Confidant outside *bari*	Female credit	.06783766 (3.4223935)	.07555079 (3.887994) [a]
	Male credit	.01653874 (1.314044)	.00009649 (.00159348) [a]
Interval of contact outside *bari*	Female credit	.07150086 (3.6184072)	
	Male credit	.01697922 (1.3522985)	
Severity of spousal arguments	Female credit	-.0394947 (-1.6873243)	
	Male credit	.01730603 (1.2730856)	
Occurrence of physical spousal abuse	Female credit	-.03443847 (-1.5268851)	.11238656 (.99327696) [c]
	Male credit	.00547143 (.42907311)	-.24067036 (-2.1450465) [c]
Own relatives in same village	Female credit	.08333928 (4.0508622)	-.05111895(-.80978534) [b]
	Male credit	-.06561099(-4.6359715)	-.05101128(-3.6657848) [b]

Table 6. Male and female credit effects on individual empowerment questions (continued)

Name of variable	Female/male credit	Exogenous credit model	Appropriate model
Wife thinks husband is superior	Female credit	.1450791 (4.872342)	.
	Male credit	-.01446311(-.87795812)	.
Husband uses male birth control	Female credit	.02956166 (.93340601)	.
	Male credit	-.00821234(-.44513926)	.
Reason = women not allowed outside	Female credit	.14900052 (5.0660569)	.
	Male credit	-.02041713(-1.1715493)	.

Reason = lack of safety	Female credit	-.06532019(-2.328394)	.
	Male credit	-.00085579(-.05026752)	.
Reason = wife goes with husband/son	Female credit	.00564198 (.27281459)	.
	Male credit	.03149786 (2.5582753)	.
Reason = wife goes with neighbor	Female credit	.14400445 (6.1232355)	.
	Male credit	-.06842666(-4.468412)	.
Husband says w.e.=better society	Female credit	.05421608 (2.7797372)	.
	Male credit	-.01704432(-1.5155241)	.
Husband says w.e.=chaos in society	Female credit	.03310243 (1.7129112)	.
	Male credit	-.00927146(-.82634147)	.
Husband says w.e.=problems with kids	Female credit	.02226409 (1.073948)	.
	Male credit	-.01075105(-.88421994)	.
Husband says w.e.=loss of peace	Female credit	.0175682 (.88853243)	.
	Male credit	-.00413204(-.36055211)	.
Husband says w.e.=better economically	Female credit	.04666237 (2.3018161)	.
	Male credit	-.00193728(-.16867565)	.
Husband cites positive impact of w.e.	Female credit	.04462788 (2.3051181)	.
	Male credit	-.02053908(-1.8382332)	.
Husband cites negative impact of w.e.	Female credit	.05758083 (2.9349831)	.
	Male credit	-.00996125(-.88881097)	.
Husband's assessment of w.e.	Female credit	.04144622 (2.1361352)	.
	Male credit	-.01981529(-1.7648085)	.
Husband views lack of education as obstacle	Female credit	.00169411 (.09063681)	.1046509 (1.7900802) [b]
	Male credit	.00593213 (.54870205)	.00352775 (.33895392) [b]
Husband views lack of safety as obstacle	Female credit	-.01163518(-.6298988)	-.04936265(-.59179858) [c]
	Male credit	-.01664214(-1.5188646)	.04716903 (.58875338) [c]

Table 6. Male and female credit effects on individual empowerment questions (continued)

Name of variable	Female/male credit	Exogenous credit model	Appropriate model
Husband views lack of IGA as obstacle	Female credit	.06036897 (2.8999283)	.07183463 (3.5440582) [a]
	Male credit	.02357819 (2.0845775)	.02536636 (.39209182) [a]
Husband views social	Female credit	-.04693505(-2.2465429)	-.03773476(-1.8511036) [a]

structure as obstacle	Male credit	.00915417 (.76310031)	-.05232476(-.86429722) [a]
Husband views law as obstacle	Female credit	-.03500877(-1.0524301)	-.04685293(-1.4163627) [a]
	Male credit	-.05751117(-2.1869163)	-.14051447(-1.5996405) [a]
Wife has made husband use birth control	Female credit	-.00065728(-.0240695)	.
	Male credit	-.03375585(-1.7794337)	.
Wife has Income Generating Activity	Female credit	.15477253 (8.1828396)	.
	Male credit	-.04342009(-3.9260772)	.
Wife has Income Generating Activity which she herself operates	Female credit	.09505125 (4.7972341)	.
	Male credit	-.01599552 (-1.3898103)	.
Degree of mobility	Female credit	.31089568 (7.9629522)	.
	Male credit	-.07537371(-4.2162371)	.
Wife ever travels	Female credit	.31089568 (7.9629522)	.
	Male credit	-.07537371(-4.2162371)	.
Wife ever travels alone	Female credit	.11742115 (5.0836324)	.
	Male credit	-.02500812(-1.8386287)	.
Prevent remarriage (threaten divorce)	Female credit	-.06295729(-2.779748)	.
	M ale credit	-.00846561(-.5652342)	.
Prevent remarriage (family pressure)	Female credit	.01169626 (.58635634)	.12558993 (1.235492) [c]
	Male credit	-.0105242 (-.85967706)	.10049414 (1.0559964) [c]
Prevent remarriage (local govt.)	Female credit	.04096012 (2.0876515)	.
	Male credit	.01848534 (1.5525177)	.
Prevent remarriage (*parishad*)	Female credit	.02593949 (1.2173839)	-.09438037(-1.4866644) [b]
	Male credit	.01867645 (1.4848455)	.02582795 (2.131912) [b]
Prevent remarriage (deny permission)	Female credit	-.01546954(-.81803909)	-.01090626(-.58850542) [a]
	Male credit	.007914 (.68036286)	-.01045494(-.17848513) [a]
Household fights about kids	Female credit	.01404173 (.77187727)	.
	Male credit	-.01900658(-1.7803394)	.
Household fights about money	Female credit	.04539589 (2.4881701)	.
	Male credit	.02509254 (2.3033101)	.
Household fights about in-laws	Female credit	-.04694592(-1.3519341)	.
	Male credit	-.00885686(-.47053079)	.

Table 6. Male and female credit effects on individual empowerment questions (continued)

Name of variable	Female/male credit	Exogenous credit model	Appropriate model
Household fights about going outside	Female credit	.1881154 (3.5742584)	.
	Male credit	-.02962608(-1.0165987)	.
Household fights about loans	Female credit	-.02284063(-.85639037)	-.12355329(-1.2694608) [b]
	Male credit	.04246613 (2.1445597)	.0412928 (2.1254473) [b]
Household fights about chores	Female credit	-.02625961(-1.4146924)	-.04901846(-2.6898298) [a]
	Male credit	-.025423 (-2.2501207)	.15704929 (2.6484487) [a]
Wife views lack of ed as obstacle	Female credit	-.00427501(-.2370279)	.
	Male credit	.01070229 (1.0109335)	.
Wife views lack of safety as obstacle	Female credit	-.04081731(-2.2378315)	.
	Male credit	-.01799485(-1.6545223)	.
Wife views lack of jobs as obstacle	Female credit	.03693626 (1.9910125)	.
	Male credit	-.00553119(-.51098451)	.
Wife views social structure as obstacle	Female credit	-.03275009(-1.7516397)	.
	Male credit	.02392744 (2.2276055)	.
Wife views laws as obstacle	Female credit	.00952706 (.36527339)	.
	Male credit	-.00408264(-.2639975)	.
Wife views religion as obstacle	Female credit	.02434441 (1.3408948)	.00835915 (.47123233) [a]
	Male credit	-.04375407(-4.0588575)	-.08219524(-1.4885503) [a]

a - Male I.V. model (male credit endogeneous, female credit exogenous)

b - Female I.V. model (female credit endogenous, male credit exogenous)

c - Male and Female I.V. model (both male and female credit endogenous)

Note: Figures in parentheses are t-statistics.