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Rural Women's Access to Credit: Market Imperfections and Intrahousehold Dynamics

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Abstract

Using husbands' and wives' individual perceptions of their access to credit in rural Paraguay, this paper contributes to the empirical literature on credit rationing in three ways. First, by determining individual-specific credit rationing status, it improves over most studies that carry out the analysis at the household level. Second, it identifies gender-specific factors that constrain individuals' access to credit. Finally, it evaluates the extent to which women's limitations in the financial market are ameliorated by their husbands. The most significant findings of the paper are that i) compared to men, women are more likely to be non-price rationed; ii) women's rationing status responds to a different set of factors than men's; and, iii) husbands may choose not to intermediate capital to their wives even when they are able to do so. Results from this exercise provide empirically sound support for the assumptions underlying women-targeted credit programs and indicate that studies carried out at the household level may present an incomplete and biased assessment of who is likely to be constrained, why they are constrained, and what is the extent of the constraints.

JEL classification: C35, D13, G21, O12

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**RURAL WOMEN'S ACCESS TO CREDIT:
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1. Introduction

In settings where obtaining information about a potential borrower's creditworthiness is very costly and enforcing contracts difficult, resource poor households may be constrained in their access to credit even when the projects for which they seek funding are profitable (Ghosh, Mookherjee, and Ray 2001, Besley 1995). Improving their access to credit would enable these households to undertake profitable projects, increase their income and insure against negative shocks (Sadoulet and de Janvry 1995, Singh, Squire, and Strauss 1986).

The recognition that credit market imperfections can have severe consequences for poverty alleviation and growth has motivated empirical researchers to try to identify which households are more likely to be constrained, why they are constrained, and the extent of the constraints [see Petrick (2005) for a recent review of the approaches employed]. It has also led to the extraordinary growth of the microcredit industry, fueled by governments, NGOs and donors who embraced microcredit as an innovative approach for reaching out to poor rural households and addressing the obstacles poor families face in the credit markets.

Most of the rigorous assessments of rationing in credit markets and the policy recommendations emanating from those assessments are based on empirical studies using data gathered at the household level and perceptions of survey respondents, typically the male heads of household. This is the case, despite the fact that many of the microcredit programs targeting the poor have deliberately reached out to women and that these efforts have been largely driven by two premises. First, it matters who in the household receives the loan. Access to capital may influence who controls the income within the household, and a number of studies have found that women's relative control over resources has a positive impact in their families' nutrition, education, and health (Pitt *et al.* 2003, Pitt and Khandker 1998, Thomas 1997). Second, unless specifically targeted, women face additional legal, social, cultural, and economic restrictions that further limit their access to credit (Ospina 1998, Almeyda 1996, Sisto 1996, Lycette and White 1989).

Underlying these two premises is the implicit notion that family members may not intermediate resources effectively. Specifically, a male household member may obtain a loan, but not use it in a way that is best for the family. Supporting this view, and consistent with a separate spheres perspective of the intrahousehold economy (e.g., Carter and Katz 1997, and Lundberg and Pollak 1993), empirical evidence suggests that households leave unexploited opportunities for exchange of factors of production (Udry 1996) and for intermediation of risk (Duflo and Udry 2004).

Using data from a survey applied to 210 couples in rural Paraguay, I identify spouses' individual credit rationing status and propose a replicable, albeit improvable, method to explore intrahousehold financial intermediation. Survey findings indicate that rural women in this region experience different and more severe credit constraints than men, with women 6% more likely to be credit constrained than their husbands. More importantly, 15% of the women surveyed reported being capital constrained even though their husbands claimed to have adequate access to credit.

These findings provide initial support for the notion that, when spouses have conflicting preferences, women may not be able to count on their husbands' intermediation to help them overcome their insufficient access to credit. Furthermore, they suggest that the standard classification of households into two regimes, constrained or unconstrained, assuming perfect financial intermediation within the family is, indeed, inadequate and may lead to flawed policy recommendations.

2. Rural Financial Markets and Poor Households' Access to Capital

In a first-best world, households with adequate access to capital can always finance investments that are profitable at the market rate of interest. However, in rural settings where obtaining information about a potential borrower's creditworthiness can be very costly and enforcing contracts difficult, some lenders might find lending to be too risky and choose not to offer loans at all. Others, who do lend, might design contracts that rely on indirect mechanisms to screen borrowers and to induce them to undertake actions that reduce their likelihood of default. When lenders use instruments other than the interest rate to address the problems of adverse selection and moral hazard in the credit market, some households will become unable to meet their needs for capital to finance profitable projects. Such households are non-price rationed.

From an economic perspective, non-price rationing mechanisms are of concern because economic agents who cannot meet their demand for capital at the market interest rate are unable to put their resources to the most efficient use. Compared to their first-best alternative, these households underinvest, produce and earn less. Therefore, improving their access to capital becomes a critical element of rural development strategies.

A carefully designed strategy to address non-price rationing in the credit market requires identifying those who are likely to be constrained, and the main obstacles that they face. In his survey of the methods most commonly employed to assess credit rationing, Petrick (2005) distinguishes between approaches that rely directly on observed financial information (reliance on loans from sources other than formal lending institutions, loan-specific transaction costs, borrowers' assessments of their own credit limit, or qualitative information describing their positions in the credit market), and others that rely more heavily on econometric estimations, inferring households' credit rationing status from their production, consumption, and investment decisions.¹

In this study, I build on one of the "direct" approaches to infer households' credit rationing status. This particular approach starts with observed market transactions, recording all loans taken during a specific period (e.g., the previous agricultural year), and then asks qualitative questions to determine whether households had been denied credit or had received less credit than they had requested. These households are classified as non-price rationed. In addition to these non-price rationed households, there may, because of the imperfect nature of rural financial markets, be other households who did not apply for loans but may have had a positive demand for credit at the going interest rate. If applying for credit is costly and households believe that there is a high probability that their request will be denied, they may decide not to apply. They are Japelli's (1990) "discouraged borrowers" or Mushinski's (1999) "preemptively rationed borrowers." To properly distinguish these households, the questionnaire must include additional qualitative questions that elicit whether, at the going interest rate, the household would have liked to borrow and why it did not request a loan.

This method of eliciting households' credit constraints directly enables researchers to classify households into credit rationing regimes without resorting to assumptions about the financial market and often provides additional information on the specific rationing mechanism affecting the household. Examples of studies that rely on this methodology include Boucher, Guirking, and Trivelli (2006), Mushinski (1999), Barham, Boucher, and Carter (1996), Baydas,

Meyer, and Aguilera-Alfred (1994), Zeller (1994), Jappelli (1990), and Feder *et al.*, (1990). While its ease of implementation makes this approach very attractive for eliciting households' credit rationing status, researchers have worried about the self-reported nature of the credit constraints. Gilligan, Harrower, and Quisumbing (2005) address this concern using data from the Philippines. They test the validity of self-reported activity-specific credit constraints by using them to classify households as constrained or unconstrained and then comparing the consumption smoothing and labor demand patterns of the two groups. In their sample, they find that credit is not fungible across uses and that the validity of the self-reported constraints depends on the activity for which the credit constraint information was collected. However, their reservations regarding activity-specific self-reported constraints may not be relevant when households report their credit constraints more generally instead of doing so for each specific activity.

The extensive body of empirical research on credit rationing, valuable and informative as it is, has been carried out at the household level. Researchers have relied almost exclusively on the perceptions of the survey respondents, typically the male heads of the household.² Whether or not their findings adequately address the women of the households' need for capital depends on the answer to the following two questions. First, is there a gender bias in women's direct access to credit or can it be assumed that the constraints encountered by resource poor rural women are similar in type and severity to those that affect men? Second, if women are indeed more severely credit constrained than men, would it be correct to assume that husbands with adequate access to capital will act as financial intermediaries and help their wives overcome their constraints? This second question, in other words, deals with the way resources (including credit) are allocated within households. Sections 3 and 4 summarize literature that can help establish a framework to explore these two questions in more detail.

3. Rural Financial Markets and Poor Women's Direct Access to Capital

While poverty alone seriously handicaps creditworthy borrowers' access to capital, women may be even more constrained because of their gender. Legal, social, cultural, and economic constraints can affect both women's demand for capital and the supply of funds available to them. Supply-side constraints to women's access to credit stem from biases in lending practices. They can be the result of legal regulations or social norms that limit the extent to which women have access to and control over resources. They can arise from financial

institutions' perception of women as small and inexperienced borrowers and, as such, less attractive clients (Lycette and White 1989). Or, they can occur simply because the lack of specific knowledge about female clients prevents lending institutions from offering products tailored to women's needs. Demand-side constraints, in turn, include all those obstacles that may inhibit women from applying for loans, even when they have a creditworthy project.³ Because of these constraints, traditional financial programs may not serve women even when they belong to a wealth level that is actually served by the formal financial sector (Ospina 1998, Almeyda 1996, Sisto 1996, Lycette and White 1989). Some of the most frequently cited constraints are described below:

- Traditional financial institutions' collateral requirements tend to be biased against women even when they are part of a household that owns enough titled land because in many societies women are limited in their access to, or control over property (Deere and Leon 2001).⁴ Moreover, in poor households, any property that could be offered as collateral is likely to have already been pawned by the men of the household because they are often perceived to be engaged in more profitable activities (Ospina 1998).
- Female guarantors are often not accepted by lenders and it can be difficult for a woman to obtain a male guarantor, especially when programs limit guarantors to sponsoring one loan at a time (Ospina 1998, Baydas *et al.* 1994).
- In some countries, women can apply for loans from financial institutions only if they are represented, explicitly authorized, or supported by their husbands or a male relative, reducing not only their access to capital but also their control over it (Almeyda 1996, Berger 1989, Alvear Valenzuela 1987). Even when no such policies exist at the institutional level, married women in smaller and tighter communities may be denied credit if bank employees—who are typically male—believe they would be overstepping a friend's dominion by giving credit to his wife without prior consent from her husband (Ospina 1998).
- Rural lenders often fund specific production activities and those are typically run by men (Fletschner and Ramos 1999).
- In many societies, women do not use (or have access to) the same information channels as men. Their consequent lack of knowledge about available funds and application procedures prevents them from taking advantage of many available sources of credit (Almeyda 1996, Baydas, Meyer, and Aguilera-Alfred 1994, Weidemann 1992, Lycette and White 1989).⁵

- When procedures and requirements for obtaining loans are not clear or widely known, bank employees responsible for loan approvals may frame them as special favors. The most common forms of repaying those favors—such as inviting loan officials for a drink or for dinner, or the giving of bribes—are not considered acceptable behavior for women (Ospina 1998, Lycette and White 1989).
- Fixed transaction costs, especially in the form of time involved in applying for and repaying loans, have an adverse impact on women’s borrowing capacity. Female borrowers are typically responsible for their income-generating activities in addition to their “reproductive roles” and it follows that long travel distances, inconvenient schedules, and complicated procedures are greater obstacles in women’s access to credit compared to men’s (Restrepo and Reichmann 1995, Baydas *et al.* 1994, Moser 1993, Lycette and White 1989).
- Poor women, especially those from households close to the survival margin, give primary importance to satisfying the basic needs of their children and themselves and may be more averse to undertaking risky business activities (Almeyda 1996, Morris and Meyer 1993).⁶
- Lower literacy levels and lack of experience with financial institutions may prevent women from preparing adequate feasibility studies (Lycette and White 1989). Women’s educational level—particularly for women old enough to engage in income-generating activities—varies widely across countries but still tends to be lower than men’s (Almeyda 1996, Baydas *et al.* 1994, Morris and Meyer 1993). Even when literate, women often feel intimidated by and less confident about applying for loans from traditional financial institutions, especially when they lack previous credit experience (Weidemann 1992, Kurwijila and Due 1991).

The combination of factors that determine women’s structural position (limited access to collateral, reproductive role, etc.), together with credit market imperfections (that lead traditional financial institutions to offer products that do not match low-income women’s financial needs) likely shape women’s demand for credit and the type of financial services that are offered directly to them. This suggests that husbands and wives may differ in the amount of capital they would like to obtain ($D_i^m \neq D_i^f$) or in the amount of capital directly available to them ($S_i^m \neq S_i^f$), where S_i and D_i are the individual supply and demand, at a given interest rate and the superscripts m and f denote male and female.

Yet, if families pooled their resources to achieve shared goals, as is often assumed, the extent to which women have direct access to capital is irrelevant from a purely economic

perspective. Under this scenario, a woman who cannot meet her needs for capital by borrowing directly from financial institutions, may obtain those funds indirectly, with her partner's assistance.

4. Intrahousehold Dynamics and Women's Indirect Access to Capital

Within a household, spouses may not have complete information about one another or be able to fully observe each other's efforts costlessly. Yet one would expect that their frequent and close interactions reduce the problems associated with adverse selection, monitoring, and contract enforcement. As a result, creditworthy borrowers with insufficient access to credit could, presumably, persuade their partners to act as their intermediaries in the financial markets and, as long as the spouses' combined supply of capital exceeds their combined demand, $(D_i^m + D_i^f) \leq (S_i^m + S_i^f)$, they would both meet their needs for capital.

However, the growing economic literature on intrahousehold decision-making indicates that families do not always pool their resources, that, in fact, spouses often differ in their preferences, and that household decisions are better portrayed as the outcome of a bargaining process (Duflo and Udry 2004, Haddad, Hoddinott, and Alderman 1997, Carter and Katz 1997, Udry 1996, Hoddinott and Haddad 1994, and Lundberg and Pollak 1993).

Moreover, while it might be easier for members of a family to enforce contracts than it would be for lenders, the enforcement of intrafamily-agreements cannot and should not be taken for granted. Furthermore, spouses' ability to enforce contracts and the consequences of intrafamily-defaulting may differ across gender since women are more likely to hold their wealth in assets that can be readily seized and marketed (hogs, chicken, or jewelry as opposed to land, large animals, or large pieces of equipment). The repercussions of non-compliance with intrafamily agreements may be greater for women than for men: intrafamily loans are more likely to be women's only source of capital than men's; cultural norms may sanction women more severely for this kind of behavior; and women are more commonly subjected to domestic violence (see Tauchen, Witte, and Long 1991).

Thus, in line with the literature on intrahousehold decision making, each spouse's supply of capital maybe more accurately described as the sum of what they can obtain directly from financial institutions and what they are able to borrow indirectly with their partners' assistance: $S_i^f + \theta_i$ for wife i

and $S_i^m - \theta_i$ for husband i , where θ_i are net intrafamily loans the size and direction of which are a function of spouses' preferences, bargaining power, and direct access to credit.

It is important to note that in families where spouses have conflicting preferences, a spouse with sufficient bargaining power may refuse to alleviate his or her partner's credit constraints. Under this scenario, there may be families where one of the spouses is constrained even though the other has adequate access to credit, that is $D_i^f > (S_i^f + \theta_i)$ or $D_i^m > (S_i^m - \theta_i)$ even though

$$(D_i^m + D_i^f) \leq (S_i^m + S_i^f).$$

The inability to rely on a spouse's financial intermediation may be of particular relevance to women since, as described in the previous section, absent programs that target them specifically, women tend to have more limited access to credit. In traditional settings where spheres of production tend to be gender-specific and women are the sole providers of household services such as cooking, childcare, laundry, and cleaning (Fletschner and Ramos 1999), husbands may choose not to channel funds to their wives' income generating activities. This would be the case if husbands place greater value on their wives' household services than on the additional goods that their wives could provide for the family, or if women's engagement in market oriented activities violates established social norms.

5. Data and Context

To explore intrahousehold dynamics and women's access to credit, I surveyed 210 couples in Eastern Paraguay in 1999. Field observations and survey results indicate that of the three main sources of loans in the area—State bank, credit cooperatives, and wholesalers—women only received loans from the cooperatives. State banks and wholesalers do not openly discriminate against women, but they tend to fund production activities that are entirely run by men, such as cotton and livestock enterprises. During their interviews, male respondents repeatedly volunteered the information that they had never seen a female client in the State bank office. In fact, the survey findings clearly show that most women in the region do not know where the State bank agencies are located, what the bank's lending requirements are, or whether they would qualify for a bank loan.

Women's participation in the cooperatives is relatively recent and was the result of a credit program sponsored by the International Fund for Agricultural Development (IFAD) that explicitly included women. The program was launched in 1994 by the Paraguayan Department of

Agriculture and two Paraguayan State organizations, the Fund for Peasant Development and the Office of Charity. It had as its main goal the strengthening of the financial and institutional infrastructures of the credit cooperatives. The program also aimed to improve women's socio-economic conditions by promoting their participation in income-generating activities and enhancing their access to credit. A team of female agronomists was formed to provide technical support to the women, to help them organized into production oriented committees, and to advise those who wanted to join a credit cooperative and apply for loans.

To identify the population of interest, I used information obtained from combining a rapid oral census of the region, the comprehensive membership lists of the three credit cooperatives in the area, and data from the committees supported by the Rural Women component of the IFAD project.⁷ Because of the study's focus on the effects of intrahousehold dynamics, the sample was limited to households headed by couples. The sample frame was stratified into three groups: *i*) Non-Participants: couples in which the woman was not involved in the IFAD program; *ii*) Partial-Participants: couples in which the woman participated in a committee and received technical assistance, but was not a member of a cooperative; and, *iii*) Full-Participants: couples in which the woman participated in a committee, received technical assistance, and was a member of a cooperative. Given the program's emphasis on market-oriented production, women in the second and third groups are likely to have a demand for capital. Women in the third group should have direct access to credit. I selected couples randomly from each of the three groups. Households in groups two and three were oversampled because of the small number of women who were active participants.

6. Identifying Spouses' Credit Rationing Regimes

Most of the empirical studies that identify households' credit rationing status, do so based on information reported by the household head. As a result, families in which women are credit constrained are typically classified as price rationed as long as their husbands reported having adequate access to credit. By contrast, for this study, information was collected about each spouse's ability to meet his/her individual demand for capital. Since spouses may not have complete information about one another, the survey posed the questions directly to each of them, rather than rely on one of the spouses to be the informant. Furthermore, given the potentially private nature of this information, both spouses were interviewed simultaneously, though far enough from one another that they could not hear or influence

each other's responses. Finally, female enumerators were used to interview women and male enumerators to interview their husbands, in an attempt to make both spouses comfortable with the interview process and more willing to share information that could be gender-sensitive.

Each spouse was asked about loans anyone in the household had obtained from financial institutions during the 1998-1999 agricultural year. If they reported having received at least one loan (in cash or kind) under their own name, they were asked whether they had been able to obtain as much capital (and inputs) as they would have liked to, and if not, why not. If, on the other hand, they reported that they had not received any loan personally, they were asked whether they had requested one. Those who replied that they had applied for a loan were then asked why they had not received one. Those who had not applied for one were asked whether they had wanted a loan at the current rates, and why they had not applied or why they did not want a loan.

On the basis of their responses, respondents were classified as non-price rationed if, during the previous year, they had been unable to obtain the amount they had wished to borrow. That is, if: *i*) they had asked for a loan and were turned down; or, *ii*) they were offered a smaller amount than what they had solicited; or, *iii*) they wanted a loan at the going rates but decided not to apply or requested less than they had wished to borrow because they thought they would not get it.

Table 1 gives the frequency of credit rationing at the individual level. Seventeen percent of the men and 23% of the women are found to be non-price rationed. These figures support the notion that women are more likely to be restricted in their access to credit than men. What remains is to carefully explore two important questions: *i*) are the factors affecting men and women's individual access to credit different?, and, *ii*) do intrahousehold dynamics affect whether spouses, particularly wives, are able to meet their needs for capital?

7. Factors That May Influence Men's and Women's Credit Rationing Status

Spouses' credit rationing status can be influenced by individual and household characteristics that affect their needs, resources, and access to opportunities; by intrahousehold dynamics that shape how those resources and opportunities are distributed among family members; and, by village-specific characteristics that may determine the resources and opportunities available to their families because of where they are located. The variables described below are expected to capture these characteristics and help elucidate the main factors affecting men's and women's ability to meet their needs for capital:⁸

Household Characteristics:

- i)* the household's wealth and liquidity, summarized by three variables: household wealth (defined as the value of the land they operate, their livestock assets, and their physical capital); the share of the household's wealth held in land; and, the share of the household's wealth held in physical capital;
- ii)* the household's human capital, represented by three variables: spouses' age, spouses' education, and the gender-specific availability of family labor;⁹
- iii)* the household's collateral and tenure security, captured by a dummy indicating whether either spouse has land titled under their name; and,
- iv)* the household's credit history, summarized by a dummy indicating whether the husband had defaulted on a formal loan prior to the 1998-1999 agricultural year, thus creating a public record that could influence the supply of capital directly available to him or to his wife.

Households with more wealth, with higher levels of education, and with more family labor available are expected to have higher returns and to exhibit a higher demand for capital. But, they are also likely to have better access to capital. They may appear to lenders to present less of a credit risk; they are more likely to be aware of financial opportunities; and, it may be easier for them to visit financial institutions, do the required paperwork, and attend meetings.

The composition of the household assets may also affect the spouses' credit rationing status. Other things equal, households with larger share of assets in land or physical capital (as opposed to livestock) may have higher returns to capital and lower liquidity, suggesting a higher demand for credit. On the other hand, these households may also have access to more funds.

Lack of titled land—the most traditional form of collateral—is often viewed as the bottleneck to improving access to credit. In Eastern Paraguay, titled land is required as collateral for loans over \$1,600 from the State bank, and loans over \$5,000 from the cooperatives. Households without titled land will likely be able to access some funds, but they face significantly lower borrowing ceilings.

Women have only recently begun to receive loans and therefore do not have an established credit history of their own. There is, however, a high rate of default among the men. Their negative credit history can restrict the supply of funds directly available to them or to their wives; it can limit husbands' ability to intermediate funds to their wives; it can lead women to increase their demand for capital, borrowing more only to transfer funds to their husbands; and, depending on the consequences they faced as a result of defaulting, it can affect whether spouses are willing to bear additional risk by borrowing.

Intrahousehold Dynamics:

- v) the wife's control over the household budget, represented by the share of small animals in the household's overall wealth;
- vi) the husband's opposition to his wife taking a loan, captured by a dummy that takes the value of one if either spouse indicated that the husband does not want his wife to get involved in market-oriented activities or take loans;
- vii) the wife's relative bargaining power, captured by two dummies: one which indicates whether the wife is more educated than the husband, and one which indicates whether her parents had more land than his parents at the time their relationship began;
- viii) interaction terms that combine the wife's relative bargaining power with her husband's objection to her taking a loan.

In this rural setting, the ratio of the value of small animals to the household's overall wealth can act as a proxy for the degree to which wives' have control over family assets since women tend to be in charge of the smaller animals and of the income these animals generate (Fletschner and Ramos 1999).

Spouses' preferences and bargaining power may influence who has access to and control over resources. The assumption here is that husbands' opposition to their wives taking out loans could affect women's access to capital because they could refuse to loan funds to them, refuse to allow them to go to the financial institutions and participate in committee meetings, refuse to help them pay their membership shares, or refuse to grant them control over collateral, etc. On the other hand, if men have sufficient bargaining power, they may be able to impose their preferences, effectively driving their wives' demand for capital to zero. In these cases their wives might indicate having an adequate supply of capital even when, effectively, they have no access to funds.

Village Characteristics:

- ix) five regional dummies control for unobserved village characteristics.

The village dummies capture the combined effects of omitted factors common to all households in each region. These characteristics may affect spouses' demand for capital (e.g., regional variation in weather conditions, soil quality, and access to markets) or the supply of funds available to them (number and size of the financial institutions in the area, and how time consuming or costly it is for borrowers to go to those institutions and for credit officers to visit clients).

The descriptive statistics in Table 3 allow some basic comparisons of families in which men or women are able to meet their needs for capital versus those in which they are constrained. These results

suggest that, the main factors affecting individuals' credit rationing status may differ by gender and that spouses' ability to obtain adequate access to credit are correlated. Relative to the men who are able to meet their needs for capital, the men who are constrained are more likely to have a bad credit history and to belong to households with more male family labor. Women who are constrained, on the other hand, are more likely to belong to a wealthier household and to have less control over the family budget. Both men and women, are more likely to be constrained if their spouses are also constrained. A more in-depth analysis of how these factors influence men's and women's position in the credit market follows.

8. Econometric Assessment of the Factors Affecting Individuals' Access to Credit

Denote as $S_i + \theta_i$, the maximum amount of capital that agent i can borrow, at the market interest rate, from the market (S_i) or from his/her spouse (θ_i). Agent i 's supply of credit is a function of household, H_i^S , intrahousehold, W_i^S , and village characteristics, V_i^S :

$$S_i + \theta_i = \gamma^S + \alpha^S H_i^S + \beta^S W_i^S + \delta^S V_i^S + \varepsilon_i^S \quad (1)$$

Denote as D_i , agent i 's demand for capital, which is a function of socioeconomic household characteristics, H_i^D , intrahousehold dynamics, W_i^D , and village characteristics, V_i^D :

$$D_i = \gamma^D + \alpha^D H_i^D + \beta^D W_i^D + \delta^D V_i^D + \varepsilon_i^D \quad (2)$$

Data limitations prevent the estimation of these two structural equations. However, the probability that agent i will be non-price rationed can be estimated as the reduced-form equation:

$$\Pr[D_i > S_i + \theta_i] = \gamma + \alpha H_i + \beta W_i + \delta V_i + \varepsilon_i \quad (3)$$

where $H_i = H_i^D \cup H_i^S$, and W_i and V_i can be similarly defined [see Mushinski 1999, Kochar 1998, Barham, Boucher and Carter 1996, and Conning 1996 for other examples of reduced-form estimations of households' credit rationing]. Under this specification, the parameters capture the combined supply and demand effects of each of those variables.

However, to evaluate spouses' individual position in the credit market and allow the factors affecting men's and women's access to capital to be different, I estimate two separate models:

$$\Pr[D_i^m > S_i^m + \theta_i] = \gamma^m + \alpha^m H_i^m + \beta^m W_i^m + \delta^m V_i^m + \varepsilon_i^m \quad (4)$$

and

$$\Pr[D_i^f > S_i^f - \theta_i] = \gamma^f + \alpha^f H_i^f + \beta^f W_i^f + \delta^f V_i^f + \varepsilon_i^f \quad (5)$$

where the superscripts m and f indicate male and female respectively. Equations 4 and 5 are estimated twice, first using linear probability models and then using probit models. Probit models are likely to provide a better fit given the dichotomous nature of the dependent variable, a spouse's ability to meet his or her need for capital, but they may generate biased estimates for the village-specific effects. Linear probability models address that latter concern.

While estimating the two models separately yields consistent results, unobserved factors such as spouses' preferences, intrafamily transfers of capital, family members' health, the family's status in the community, etc., may affect both spouses' access to credit. The efficiency of the results can therefore be improved by estimating both equations jointly:

$$\begin{cases} \Pr[D_i^m > S_i^m - \theta_i] = \gamma^m + \alpha^m H_i^m + \beta^m W_i^m + \delta^m V_i^m + \varepsilon_i^m \\ \Pr[D_i^f > S_i^f + \theta_i] = \gamma^f + \alpha^f H_i^f + \beta^f W_i^f + \delta^f V_i^f + \varepsilon_i^f \end{cases} \quad (6)$$

where the disturbances ε_i^m and ε_i^f have a standard bivariate normal distribution with an unknown correlation ρ :

$$[\varepsilon_i^m, \varepsilon_i^f] \approx BVN \left[\underline{0}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right] \quad (7)$$

In this model, the disturbances, ε_i^m and ε_i^f capture the excess demand shocks of the husband and the wife in couple i , and ρ embodies the extent to which the spouses' shocks are correlated. If spouses have perfect information and fully share their resources, financial intermediation within the family is perfect and ρ would be very close to one. If, instead, spouses have asymmetric information or conflicting preferences, one spouse's excess demand shock may not completely be passed on to the other spouse. The more segregated the economic spheres of the husband and wife, the closer ρ would be to zero.

Again, two versions of this model will be estimated. The equations in (6) are first estimated using a seemingly unrelated regressions (SURE) model, and then using a bivariate probit model.

Finally, to learn more about financial intermediation between the spouses, the results from the bivariate probit model will be used to look at the probability that a woman (man) has an adequate supply of capital *conditional* on her (his) spouse's credit rationing status. For instance, the probability that a woman would be non-price rationed when her husband is also credit constrained is given by:

$$\Pr[D_i^f > S_i^f + \theta_i \mid D_i^m > S_i^m - \theta_i, H_i, W_i, V_i] = \frac{\Pr[D_i^f > S_i^f + \theta_i, D_i^m > S_i^m - \theta_i \mid H_i, W_i, V_i]}{\Pr[D_i^m > S_i^m - \theta_i \mid H_i, W_i, V_i]} \quad (8)$$

or

$$= \frac{\Phi_2 \left[(\gamma^m + \alpha^m H_i^m + \beta^m W_i^m + \delta^m V_i^m, \gamma^f + \alpha^f H_i^f + \beta^f W_i^f + \delta^f V_i^f, \rho) \right]}{\Phi \left[\gamma^m + \alpha^m H_i^m + \beta^m W_i^m + \delta^m V_i^m \right]}$$

where, Φ_2 and Φ denote the bivariate and univariate normal cumulative density functions.¹⁰

9. Determinants of Men's and Women's Credit Rationing Status in Rural Paraguay

Table 4 reports the results of linear probability models (first two columns) and probit models (third and fourth columns) used to predict men and women's credit rationed status separately, ignoring the likely correlation between their error terms. The results from both models are very similar and shed light on the two issues of interest: they provide evidence that intrahousehold dynamics have an effect on women's position in the credit market and they reveal credit rationing patterns that do indeed differ by gender.

The set of variables affecting women's credit rationing status is quite different from those that impact men's position in the credit market. The results for men suggest that, at least for the strata of producers included in this study, the likelihood that they will meet their demand for capital is affected by the composition of the household assets, the family's endowment of male labor, and the family's credit history. Men are more likely to be constrained in households where there are more adult males and in households that have a larger share of their assets in livestock, as opposed to land or physical infrastructure. Men are also considerably more likely to be constrained if they have defaulted on a loan. Despite the fact that men have access to several financial institutions, and that those institutions do not share financial records, a bad credit history appears to have a strong impact on whether or not men are able to meet their need for capital. This is important considering the high rates of default among men in the region.

These are not the factors that affect women's ability to meet their capital needs. Women are more likely to be constrained if they belong to wealthier households, suggesting that other things equal, household wealth boosts their demand for capital more than it expands the supply of funds available to them. But they are less likely to be constrained if their households own titled land, possibly because their ability to offer land as collateral raises their borrowing ceiling.

More importantly given the focus of this paper, the results are consistent with the notion that spouses may not pool all their resources since they indicate that intrahousehold dynamics affect women's ability to meet their needs for capital. Women are less likely to be constrained if they have control over a

larger share of the family assets or if they have a stronger bargaining position. When their husbands are opposed to them taking loans, women are less likely to have a demand for capital, and, consequently, less likely to be constrained. However, the women who are in a stronger bargaining position—those who are more educated than their husbands—are able to offset their husbands' opposition and therefore more likely to be credit constrained.

As explained in the previous section, however, unobserved characteristics can also affect both spouses' credit rationing status. Estimates based on a SURE and a bivariate probit model yield only slight improvements in efficiency over estimates using independent linear probability models and probit models, but the Breusch-Pagan test rejects the hypothesis that the two equations in the SURE model are independent¹¹ and the bivariate probit model also indicates that the error terms of men's and women's equations are correlated with an estimate of $\rho = 0.59$ that is significant at the 1% level.

These results support the notion that spouses' economies are linked and that they do share resources—one spouse's excess demand shock does extend to the other spouse. More precisely, the figures in the first row of Table 5 indicate that an average woman is approximately 42% more likely to be constrained when her husband is also constrained than when he is able to meet his needs for capital. Yet, while spouses may intermediate funds to each other, the results suggest that the sharing is not perfect: even when her husband has adequate access to credit, a woman from an average family has a 12% probability of being constrained.

In contrast, men's credit rationing status appear to be less influenced by intrahousehold dynamics. The probability that a man from an average family will be constrained is not significantly affected by his wife's bargaining power or control over the family budget. Nor does it fluctuate as much in response to his wife's credit rationing status (22%, instead of 42% for women).

The figures presented in Table 5 enable us to take a more in-depth look at the intermediation of funds within the household. The first two columns indicate the marginal contribution of each factor to the probability that an average man will be credit constrained, conditional on his wife credit rationing status. Similarly, columns three and four present the conditional marginal effects for women.¹²

The third column is of particular interest since those estimates shed light on characteristics that may leave women constrained even when they belong to a family that most studies would have considered as having adequate access to credit. Conditional on her husband having adequate access to credit, the only variable that seems to affect a woman's ability to meet her needs for capital is her command over her family's budget. If her husband is unable to meet his own needs for capital (fourth column), intrahousehold dynamics are even more important: the probability that she would be constrained

is strongly determined by how much control she has over her family budget and, if he opposes her involvement in economic activities, by her bargaining power.

By contrast, the first two columns of Table 5 suggest that these same intrahousehold dynamics—spouses' preferences, bargaining power, and control over resources—do not have a significant impact on whether or not men have adequate access to capital.

Taken together, these findings provide a rigorous analysis of the conditions that may affect spouses' individual access to credit and enhance our understanding of the role that intrahousehold dynamics can play in augmenting or attenuating imperfections in the financial market.

10. Conclusions

Using a unique and specially designed survey tool to gather information on both husbands' and wives' individual perceptions of their access to credit in rural Paraguay, this paper contributes to the empirical literature on credit rationing in three ways. First, by determining individual-specific credit rationing status, it improves over most studies that carry out the analysis at the household level. Second, it identifies gender-specific factors that constrain individuals' access to credit. Finally, it evaluates the extent to which women's limitations in the financial market are ameliorated by their husbands. The most significant findings of the paper are that i) compared to men, women are more likely to be non-price rationed; ii) women's rationing status responds to a different set of factors than men's; and, iii) husbands may choose not to intermediate capital to their wives even when they are able to do so.

These interrelated findings suggest that credit rationing studies carried out at the household level present an incomplete and biased assessment of who is likely to be constrained, why they are constrained, and what is the extent of the constraints. A more adequate assessment of the type and severity of credit rationing calls for an approach that takes into consideration both women's specific conditions and the possibility of conflicting intrahousehold dynamics.

Moreover, the findings of this paper provide empirically sound support for the assumptions underlying women-targeted credit programs: the factors determining spouses' credit rationing status vary by gender and intrafamily financial intermediation does not always compensate for women's insufficient direct access to credit.

Enhancing women's direct access to credit requires interventions at several levels. It is important to demonstrate to credit officers that women can be creditworthy clients and should be treated accordingly. Certainly in interviews conducted for this study, some credit officers were found to regard

women as good clients, who are organized, responsible, and exhibit good repayment behavior. However, this was not a widely held view. In fact, a number of officials even argued that women had no experience in income-generating activities and would likely hand over funds to their husbands should they receive any credit. A second type of intervention requires assisting the branch directors and staff of financial institutions in the design of programs that better suit women's needs. Among other things, this would include offering loans for activities in which women engage, using information channels that are more effective at reaching women, and reducing the burden of loan applications by simplifying procedures. Finally, changes in policies at the local and national levels may promote the creation and expansion of microfinance NGOs and other finance institutions that are friendlier to women.

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Table 1. Men's and Women's Credit Rationing Status

	Men	Women
Borrower		
Price Rationed	55.11%	8.84%
Constrained	2.28%	0.80%
Non Borrower		
Price Rationed	28.16%	67.69%
Constrained	14.45%	22.67%
Total		
Price Rationed	83.27%	76.53%
Constrained	16.73%	23.47%

Table 2. Description of Variables

Variables	Definition
<i>Household Wealth and Liquidity</i>	
Household's Wealth	Value of the land the family operates, their physical capital, and their livestock assets at the beginning of the agricultural year (in 000s of US\$)
Share of Household's Wealth Held as Land	Value of the land the family operates / Household's Wealth
Share of Household's Wealth in Physical Capital	Value of their physical capital / Household's Wealth
<i>Human Capital</i>	
Husband's (Wife's) Age	Age of husband (wife) in # of years
Husband's (Wife's) Education	# of years of education of husband (wife)
Additional Male (Female) Adults	Number of additional male (female) adults
<i>Credit History, Collateral and Tenure Security</i>	
Has the Husband Defaulted?	(1=yes, 0=no)
Do they Own Titled Land?	(1=yes, 0=no)
<i>Intrahousehold Dynamics</i>	
Wife's Share of Household Budget	Value of small animals / Value of household's wealth
Is Wife More Educated than Husband?	(1=yes, 0=no)
Did Her Parents Have More Land than His ?	# of Has her parents had minus # of Has his parents had, when they got together
Does Husband Oppose to his Wife Taking Loans?	(1=yes, 0=no) The dummy equals 1 if either spouse indicated that he does not want his wife to get involved in market-oriented activities or take loans.

Table 3. Descriptive Statistics

	Men			Women		All
	Price Rationed	Constrained		Price Rationed	Constrained	
<i>Spouse's Access to Credit</i>						
Is Husband Constrained?				0.105 (0.308)	0.369 (0.488)	** (0.167) (0.374)
Is Wife Constrained?	0.178 (0.383)	0.518 (0.507)	**			0.235 (0.425)
<i>Household Wealth and Liquidity</i>						
Household's Wealth	3.926 (3.016)	5.319 (4.021)		3.738 (2.512)	5.533 (4.693)	* (4.159) (3.238)
Share of Household's Wealth Held as Land	0.417 (0.174)	0.404 (0.151)		0.412 (0.177)	0.424 (0.151)	0.414 (0.170)
Share of Household's Wealth in Physical Capital	0.138 (0.104)	0.157 (0.121)		0.133 (0.101)	0.168 (0.151)	0.141 (0.107)
<i>Human Capital</i>						
Husband's Age	49.136 (11.961)	48.453 (7.713)		49.439 (12.053)	47.662 (8.633)	49.022 (11.349)
Husband's Education	4.222 (2.410)	4.406 (2.031)		4.231 (2.443)	4.324 (2.027)	4.253 (2.347)
Additional Male Adults	0.353 (0.630)	0.695 (0.905)	*	0.369 (0.669)	0.545 (0.760)	0.410 (0.693)
Wife's Age	44.231 (12.181)	43.612 (7.690)		44.152 (11.955)	44.046 (10.183)	44.127 (11.539)
Wife's Education	4.463 (2.409)	5.006 (2.361)		4.384 (2.383)	5.107 (2.414)	4.554 (2.404)
Additional Female Adults	0.332 (0.606)	0.361 (0.548)		0.329 (0.582)	0.362 (0.642)	0.336 (0.595)
<i>Credit History, Collateral and Tenure Security</i>						
Has the Husband Defaulted?	0.283 (0.452)	0.835 (0.376)	***	0.336 (0.474)	0.504 (0.506)	0.375 (0.485)
Do they Own Titled Land?	0.426 (0.496)	0.533 (0.506)		0.432 (0.497)	0.483 (0.505)	0.444 (0.498)
<i>Intrahousehold Dynamics</i>						
Wife's Share of Household Budget	0.318 (0.170)	0.288 (0.164)		0.329 (0.177)	0.261 (0.131)	** (0.313) (0.169)
Is Wife More Educated than Husband?	0.355 (0.480)	0.489 (0.507)		0.332 (0.472)	0.525 (0.505)	0.377 (0.486)
Did Her Parents have More Land than His?	-6.023 (22.854)	-10.148 (52.603)		-6.302 (22.961)	-8.056 (45.916)	-6.714 (29.827)
Does Husband Oppose to his Wife Taking Loans?	0.437 (0.497)	0.328 (0.476)		0.447 (0.499)	0.327 (0.474)	0.419 (0.495)
Husband Opposes and Wife is More Educated	0.135 (0.343)	0.114 (0.322)		0.125 (0.332)	0.152 (0.363)	0.132 (0.339)
Husband Opposes and Wife's Parents Had More Land	-0.957 (8.181)	-1.478 (4.637)		-1.228 (6.937)	-0.443 (9.841)	-1.044 (7.695)
N. Observations	173	37		165	45	210
Proportion	83%	17%		76%	24%	100%

* t-test rejects null hypothesis of equality of means between that mean and that of price rationed individuals. In testing whether the means are different I allowed the variances to differ across samples. The null hypothesis is that the means are equal, against the two-sided alternative (** = signif. at 1%, *** = signif. at 5%, * = signif. at 10%).

Table 4. Men's and Women's Credit Rationing Status

	Coefficients (OLS)		Marginal Effects Calculated at mean of regressors (Probit)	
	Probability Men are Constrained	Probability Women are Constrained	Probability Men are Constrained	Probability Women are Constrained
<i>Household Wealth and Liquidity</i>				
Household's Wealth	0.010 (0.009)	0.022 ** (0.010)	0.006 (0.006)	0.017 * (0.010)
Share of Household's Wealth Held as Land	-0.550 ** (0.258)	-0.068 (0.302)	-0.451 ** (0.203)	-0.057 (0.297)
Share of Household's Wealth in Physical Capital	-0.906 ** (0.376)	-0.301 (0.431)	-0.627 ** (0.280)	-0.265 (0.399)
<i>Human Capital</i>				
Husband's Age	0.001 (0.003)		0.001 (0.003)	
Husband's Education	0.006 (0.016)		0.011 (0.012)	
Additional Male Adults	0.104 *** (0.039)		0.064 ** (0.029)	
Wife's Age		0.004 (0.003)		0.004 (0.003)
Wife's Education		-0.003 (0.016)		0.000 (0.018)
Additional Female Adults		-0.025 (0.050)		-0.034 (0.046)
<i>Credit History, Collateral and Tenure Security</i>				
Has the Husband Defaulted?	0.297 *** (0.058)	0.022 (0.066)	0.300 *** (0.072)	0.046 (0.066)
Do they Own Titled Land?	-0.035 (0.062)	-0.126 * (0.070)	-0.008 (0.044)	-0.078 (0.063)
<i>Intrahousehold Dynamics</i>				
Wife's Share of Household Budget	-0.335 (0.257)	-0.674 ** (0.289)	-0.198 (0.187)	-0.877 *** (0.306)
Is Wife More Educated than Husband?	0.100 (0.078)	0.055 (0.081)	0.110 (0.078)	0.036 (0.084)
Did Her Parents have More Land than His?	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Does Husband Oppose to his Wife Taking Loans?	-0.028 (0.072)	-0.137 * (0.081)	-0.010 (0.058)	-0.148 * (0.078)
Husband Opposes and Wife is More Educated	0.013 (0.112)	0.221 * (0.127)	-0.006 (0.082)	0.362 * (0.212)
Husband Opposes and Wife's Parents Had More Land	-0.002 (0.003)	0.004 (0.004)	-0.002 (0.002)	0.003 (0.003)
<i>Village Dummies</i>				
Constant	0.298 (0.334)	0.068 (0.329)	-0.104 (0.254)	-0.452 (0.330)
R-squared	0.308	0.292		
Log L			-59.840	-77.758
N. Observations: 210				

*** = signif. at 1%, ** = signif. at 5%, * = signif. at 10%

Table 5. Conditional Marginal Effects -- Bivariate Probit
(calculated at mean of the regressors)

	Probability Men are Constrained		Probability Women are Constrained			
	If Wife is Price Rationed	If Wife is Constrained	If Husband is Price Rationed	If Husband is Constrained		
Model Predictions	3.8%	25.8%	11.5%	53.4%		
Household Wealth and Liquidity						
Household's Wealth	0.002 (0.005)	0.006 (0.020)	0.011 (0.013)	0.019 (0.027)		
Share of Household's Wealth Held as Land	-0.300 (0.230)	-1.221 (0.813)	0.082 (0.371)	0.674 (0.893)		
Share of Household's Wealth in Physical Capital	-0.403 (0.314)	-1.578 (0.979)	-0.084 (0.447)	0.505 (1.023)		
Human Capital						
Husband's Age	0.001 (0.003)	0.005 (0.011)	-0.001 (0.001)	-0.003 (0.007)		
Husband's Education	0.006 (0.012)	0.025 (0.049)	-0.003 (0.006)	-0.016 (0.032)		
Additional Male Adults	0.044 (0.034)	0.183 (0.113)	-0.020 (0.017)	-0.117 (0.069)	*	
Wife's Age	0.000 (0.001)	-0.003 (0.003)	0.003 (0.004)	0.008 (0.008)		
Wife's Education	0.000 (0.003)	0.002 (0.021)	-0.002 (0.025)	-0.005 (0.056)		
Additional Female Adults	0.006 (0.008)	0.035 (0.051)	*** (0.053)	-0.095 (0.117)		
Credit History, Collateral and Tenure Security						
Has the Husband Defaulted?	0.227 (0.083)	*** (0.146)	0.569 (0.070)	-0.235 (0.191)		
Do they Own Titled Land?	0.006 (0.039)	0.042 (0.173)	-0.059 (0.083)	-0.133 (0.199)		
Intrahousehold Dynamics						
Wife's Share of Household Budget	-0.038 (0.152)	0.083 (0.640)	-0.769 (0.354)	** (0.849)	-1.518 (0.849)	*
Is Wife More Educated than Husband?	0.073 (0.082)	0.251 (0.244)	-0.012 (0.091)	-0.118 (0.232)		
Did Her Parents have More Land than His?	0.000 (0.001)	0.001 (0.003)	0.000 (0.001)	-0.001 (0.003)		
Does Husband Oppose to his Wife Taking Loans?	-0.008 (0.076)	0.012 (0.348)	-0.130 (0.124)	-0.266 (0.323)		
Husband Opposes and Wife is More Educated	-0.027 (0.064)	-0.142 (0.332)	0.394 (0.330)	0.455 (0.237)	**	
Husband Opposes and Wife's Parents Had More Land	-0.002 (0.003)	-0.008 (0.011)	0.004 (0.003)	0.010 (0.009)		
Village Dummies						
Constant						
ρ	-0.593*** (0.197)					
Log L: -132.411	N. Observations: 210					

*** = signif. at 1%, ** = signif. at 5%, * = signif. at 10%

Table 6. Predictions of Households' Credit Rationing Status

Who is Constrained?	Observed	Correct Predictions	
		SURE	Bivariate Probit
Men			
Price Rationed	83%	72%	82%
Constrained	17%	94%	91%
Total	100%	76%	83%
Women			
Price Rationed	77%	69%	76%
Constrained	23%	91%	90%
Total	100%	74%	79%
Households			
Both Spouses Price Rationed	68%	54%	67%
Only Husband Constrained	8%	68%	70%
Only Wife Constrained	15%	58%	66%
Both Spouses Constrained	9%	95%	92%
Total	100%	59%	69%

¹ More specifically, Petrick (2005) aggregated these approaches into: *i*) direct measurement of loan transaction costs; *ii*) qualitative information collected in interviews; *iii*) the credit limit concept; *iv*) spill-over effects; *v*) econometric household modeling; and, *vi*) an econometric analysis of dynamic investment decisions.

² Exceptions are the study by Diagne and Zeller (2001) in which all adult household members were interviewed, and Baydas *et al.* (1994) in which both male and female microentrepreneurs were interviewed.

³ In addition, there is literature reporting that poor rural women tend to undertake projects that are more traditional and that render lower levels of return (Almeyda 1996, Rhyne and Holt 1994, Restrepo and Reichmann 1995, Morris and Meyer 1993). Their choice of project is often bounded by norms indicating what type of activities are socially acceptable for women (Fletschner and Carter 2006), by the extent to which their reproductive roles limit their mobility and time availability, by the absence of innovative role models, by the lack or inadequacy of information about other activities in which they could potentially engage, and, by the tendency of those providing technical assistance to guide women to traditionally female projects.

⁴ Inheritance laws in some societies give preference to male relatives; and, in some instances, ignorance of legal inheritance rights results in women losing their land to male relatives (Lycette and White 1989). Women who have partners but are not legally married face additional constraints. In most countries, they do not have legal access to any of the property their partners own, nor are they counted among the beneficiaries when their partners die (Deere and Leon 2001).

In addition, the agrarian reforms of the last couple of decades, with few exceptions such as the reforms in Cuba and Nicaragua, have allocated land to “household heads.” And, conforming to the family farm stereotype in which male heads of household are the principal breadwinners, they have excluded most women from the possibility of benefiting directly (Deere and Leon 1997).

⁵ A study of the financial sources for women microentrepreneurs in Chile found that “...women were less aware than men of financial institutions and instruments such as loans available. Women identified fewer sources of finance and were more misinformed than men regarding collateral requirements and types of enterprises financed by commercial banks.” (in Almeyda 1996, p. 46).

⁶ For the same reasons, women are also more likely to demand ex-post consumption loans. However, the focus of this study is on ex-ante production loans, the only loans offered by formal lenders in the region.

⁷ The communities included in this study are: San Juan, Yukyty, La Novia, Leiva'i, Piquete Cue, Ka'atymi 29, Costa Villalba, San Isidro, Calle 10, Ykua Pora, San Enrique, Calle 1- Esperanza, Calle 1 – San Agustín, Guavira, Moreira, Calle 2, Calle 3, Calle 4, Arroyo Moroti, Santo Domingo, San Roque, and Calle 12. The cooperatives serving this area are: Cooperativa Coronel Oviedo, Cooperativa Peteichapa, and Cooperativa Blas Garay.

⁸ A more detailed description of the variables is included in Table 2.

⁹ I separate additional male adults from additional female adult because of the consistent empirical finding that chores and responsibilities are defined along gender lines (Fletschner and Ramos 1999, Restrepo and Reichmann 1995). In peasant families household services such as cooking, childcare, laundry, and cleaning are solely performed by women. Men are in charge of tilling, plowing, fumigating, and selling crops to wholesale traders. Women, on the other hand, are responsible for vegetable gardens, most of the animal husbandry, and the processing of agricultural or animal products.

¹⁰ A woman's probability of being constrained when her husband has adequate access to credit, and the corresponding probabilities for men's credit rationing status can be derived similarly.

¹¹ Breusch-Pagan test of independence for SURE: $\chi^2(1) = 53.671$, $Pr = 0.0000$.

¹² Greene (1997) provides a detailed derivation of the marginal effects on the conditional probabilities.