



ELSEVIER

The Journal of Socio-Economics 37 (2008) 672–693

**The Journal of
Socio-
Economics**

www.elsevier.com/locate/econbase

Constructing and reconstructing gender: Reference group effects and women's demand for entrepreneurial capital[☆]

Diana Fletschner^{a,*}, Michael R. Carter^b

^a *Evans School of Public Affairs, University of Washington, United States*

^b *Department of Agricultural and Applied Economics,
University of Wisconsin, United States*

Accepted 1 December 2006

Abstract

Women's acquisition of entrepreneurial capital may be restricted by demand side identity constraints as women who pursue non-traditional entrepreneurial livelihoods may stand at odds with activity-regulating social norms. By explicitly incorporating social norms into a model of women's decision-making, this paper provides an analytical framework that helps understand the social factors that limit women's demand for capital. The model shows that because of these social effects, a credit program that relaxes supply constraints may reconstruct gender norms and have a social multiplier effect, shifting an entire group or community to a higher-income equilibrium. Using a social effects econometric framework, the paper then confirms the existence of reference group effects on women's demand for entrepreneurial capital in rural Paraguay. Identification of these as endogenous social effects relies on the separate measurement of each woman's social reference group, allowing the use of village-level fixed effects to sweep away confounding contextual influences. Results are robust to the use of a restricted reference group comprised solely of 'inherited' family members, and analysis of demand by male partners reveals that the social effect is gendered

[☆] The empirical work in this paper was supported by the John D. and Catherine T. MacArthur Foundation and by all the institutions involved in the Credit Project for Northeast Paraguay: the International Fund for Agricultural Development (IFAD), the Paraguayan Center for Sociological Studies (CPES), the Fund for Peasant Development (FDC), the Department of Agriculture (MAG), and the Department of Charity (DIBEN). The authors would like to acknowledge and thank helpful suggestions from anonymous referees as well as participants at the NEUDC and PACDEC conferences, the CSDE seminar at the University of Washington and the Development Seminar at the University of Wisconsin. Any errors are our responsibility.

* Corresponding author at: 229 Parrington Hall, University of Washington – Box 353055, Seattle, WA 98195, United States. Tel.: +1 206 616 1297; fax: +1 206 543 1096.

E-mail address: fletschn@u.washington.edu (D. Fletschner).

and hence likely to reflect social norm effects rather than endogenous social learning or exogenous social effects.

© 2007 Elsevier Inc. All rights reserved.

JEL classification: C25; D13; O12; Z13

Keywords: Social norms; Credit; Demand; Constraints; Women; Paraguay

Micro-lending programs around the world often specifically target women with loans. These efforts are typically motivated by the supply side argument that compared to men, women have inferior access to, and control over, financial resources. While these supply constraints on women's access to capital are no doubt important, the factors limiting rural women's acquisition of entrepreneurial capital may be considerably more interesting and complex. Women's acquisition of capital may also be restricted by social identities that dictate appropriate spheres of activities for women and effectively limit demand for capital. Consistent with this notion, data collected in rural Paraguay reveals the seemingly perverse result that a credit program that boosted women's access to credit actually increased the prevalence of excess demand for credit, suggesting that the program increased demand more than it increased supply. In this data (discussed more below), women expressing excess demand for credit is marginally higher (28%) amongst program participants than amongst non-participants (25%). While there are several possible explanations for this pattern, this paper explores the idea that women in the credit program have more entrepreneurial social reference groups that reconstruct gender norms such that their demand for credit outstrips the increase in supply afforded by the program.¹

Observers of rural areas in developing economies have often noted the existence of sharply gender segregated spheres of activity [For examples in Africa see: Kevane (2004), Schroeder (1996), Carney and Watts (1991), and Roberts (1998), and in Asia: Cain et al. (1979)]. Women who step outside traditional gender roles by taking a more independent and entrepreneurial approach in their economic lives, will stand at odds with the traditional construction of gender and activity-regulating social norms. If these norms are strong enough, such women may express no demand for entrepreneurial capital even when they have investment opportunities that are profitable by conventional criteria.

In the areas of rural Paraguay that provided data for this study, focus group interviews confirmed the existence of strongly held beliefs about the appropriateness of women's participation in entrepreneurial, market-oriented activities.² While some enthusiastically praised these initiatives by emphasizing the opportunities for economic and personal growth for the women and their families, others (both women and men) expressed harshly negative opinions. The most frequently heard objections fall into three broad categories:

- *Entrepreneurial women neglect their families:* Women who actively engage in market-oriented activities are not able to take adequate care of their home responsibilities. Comments included:

¹ As with any voluntary program we are faced with a selection problem. Women who chose to participate may be systematically different from those who chose not to. Women who joined the program tend to be slightly younger and have younger spouses than those who did not. However, in comparing the two groups, we find no significant variation when it comes to the amount of land owned, titled land, family size, number of small children, and years of education. More importantly, the econometric strategy developed here moves beyond these simple comparisons to identify the impact of social reference groups on demand.

² Focus group participants were selected from the five communities described in Section 5 below.

“those women abandon their families and their household chores,” “the children may have problems (accidents) when their mothers are not at home,” “those women cannot see or hear what is happening in their houses,” “it would be better if women did not have to leave the house”;

- *Neighbors gossip about entrepreneurial women*: People question the morality of entrepreneurial women, noting that “women who work off-farm have a bad reputation” and that in turn “men don’t want people talking about their spouses”; and
- *Entrepreneurial women undercut men’s responsibilities and status*: It contradicts our culture. Some directly said: “men are supposed to support their families.”

Given the strength of these comments, it is reasonable to think that, in making decisions about demanding entrepreneurial capital and engaging in market-oriented activities, women are influenced by what their communities believe are appropriate activities for them.

Building on this insight, this paper models how the social construction of gender shapes women’s demand for entrepreneurial capital. Among other things, the model shows that relaxation of supply constraints can contribute to the reconstruction of gender and create social multiplier effects that move an entire community of women toward a higher-income equilibrium.

In order to verify the empirical veracity of these insights, this paper draws on data from surveys of women and their partners in rural Paraguay. The surveys employed a sequence of questions designed to elicit both the demand for credit and the existence of credit supply constraints. Rural Paraguay provides a useful setting for this type of research because of an International Fund for Agricultural Development (IFAD) sponsored credit program that explicitly included women and promoted women’s participation in income generating activities. Women who participate in this program receive technical assistance, become members of a cooperative, and take loans to be able to engage in market-oriented activities and sell their products in weekly or bi-monthly markets.³

While the descriptive finding that increased supply failed to reduce excess demand for capital is provocative, given the non-experimental nature of the IFAD program, convincing identification of the existence of social effects that shape women’s demand for capital faces a series of challenges.⁴ Identification of endogenous social effects is of course quite difficult, as Manski (2000) and others have pointed out. The strategy employed here relies on the separate measurement of each woman’s specific social reference group. In contrast to strategies that define a single reference group for all geographically proximate people, this strategy allows us to use village fixed effects to sweep away confounding contextual effects.⁵ Using this method, we find the sort of endogenous social effects that our model predicts as a woman’s demand for capital is estimated to increase with the demand of other women in her reference group. To allay concerns that this finding could reflect

³ Absent this program, women’s direct access to credit was almost non-existent in the study area. Field observations and survey results indicate that the three main sources of loans in the area were State banks, cooperatives, and wholesalers. However, women only received loans from the cooperatives. Although State banks and wholesalers do not openly discriminate against women, they tend to fund production activities such as cotton and livestock enterprises that are entirely run by men. In fact, the survey clearly shows that most women do not know where the State banks are located, what its requirements are, and whether they would qualify for a loan. The cooperatives in this area, on the other hand, have modified their statutes as a result of IFAD and now offer financing for enterprises pursued by women such as vegetable market gardens, small kiosks, tailoring businesses, and small animal enterprises.

⁴ Experimental opportunities to study social reference group effects are rare. In one such effort, Castillo and Carter (2005) employ a within-village randomization design in the context of a field experiment of the ‘trust game’ to study (and confirm) the existence of local emulation effects.

⁵ Bandiera and Rasul (2006) and Conley and Udry (2004), pursue similar strategies.

the fact a woman's reference group has been endogenously formed such that group members have correlated unobservable characteristics, we re-estimate the model using information on only the exogenous component of a woman's reference group, namely her 'inherited' family members. Our key result proves robust to this alternative definition of social reference group.

Identification strategies are of course always open to criticism, and it is of course possible that our findings reflect forces other than the endogenous reference group effect that we propose. First, the results here are also consistent with other forms of endogenous social effects, such as the sort of social learning explored by Conley and Udry (2004).⁶ As a test of social learning effects, we test if the behavior of a woman's social reference group affects her male partner's demand for capital, as it would if endogenous social effects reflected learning that was shared within the household. We find, however, that the social effects are gender-specific. The behavior of the woman's social reference group has no effect on her male partner, providing at least partial confirmation of our interpretation that the estimated social effects reflect the operation of gender-specific social norms rather than endogenous social learning.

It is also possible that our results reflect an exogenous social effect, or some contextual effect for which our identification strategy has not adequately controlled. While we of course think not, the results here can be minimally taken as suggestive evidence that motivates more creative data collection strategies in the future. The closing section of this paper reflects on lessons for such future efforts.

The remainder of this paper is organized as follows. Section 1 presents a brief review of the economic literature that formalizes the effect of group behavior on individuals' decision-making. Section 2 develops a framework for rural women decision-making that takes group behavior as given. Section 3 relaxes the assumption that group behavior is exogenous and shows that an enhanced supply of credit to one woman can have a social multiplier effect on the demand for credit by other women. Section 4 describes the econometric challenges associated with identifying group effects and proposes a solution based on our survey strategy that measured women's social reference groups independently from their village locale. Section 5 examines the factors affecting women's demand for capital in rural Paraguay, with special emphasis on the influence of the behavior of their group. Section 6 concludes the paper with reflections on the design of rural credit programs, and research designed to evaluate those programs in environments where credit supply may create its own demand via social identity effects.

1. The social construction of preferences and identity

Sociologists, psychologists, and anthropologists have done extensive research on how group interaction and their prescriptions of appropriate behavior influence individuals' actions. [See Asch (1952), Merton (1957), Lewis (1966), Liebow (1967), Schelling (1973), Ross et al. (1976) for some examples.] Their experiments consistently indicate that individuals have a strong tendency to conform to the behavior and beliefs upheld by their reference groups. Despite this evidence, it is only relatively recently, and perhaps reluctantly, that economists have taken social interactions into consideration when analyzing economic behavior [See Jones (1984) and Elster (1989) for examples of earlier work].

Efforts to formalize the direct effect of social interaction on individuals' decision-making and on the group behavior expected to emerge from that interaction have typically split individuals'

⁶ Symmetrically, the results of Conley and Udry are arguably influenced by the sort of norm effects studied here.

preferences in two. Individuals are portrayed as economic agents who derive utility from private consumption, *private utility*, and who are penalized or stigmatized for deviating from accepted norms of behavior, *social utility* (Brock and Durlauf, 2001; Bernheim, 1994).⁷

Following this approach, and denoting a woman i 's entrepreneurial choice variable as K_i , then her preferences can be expressed as the sum of two, additively separable components:

$$V = U(C(K_i)|u_i) - \alpha(K_i - K_i^e)^2 \quad (1)$$

where U is her private utility, defined as a typical utility function, and the second term is her social utility. The former depends on the choices she makes (e.g., greater investment in entrepreneurial activity will increase income and command over commodities, C , that can be consumed). Private utility explicitly depends on individual characteristics (captured by u_i) that shape the intensity of preferences for material goods.

Social utility latter depends on the deviation between her behavior and her understanding of the socially proscribed gender norm, K_i^e , which indicates the socially appropriate amount of entrepreneurial investment for a woman. The variable K_i will measure the amount of capital a woman actually invests in these non-homebound, entrepreneurial activities. The extent to which she will feel compelled to follow the norm will depend on the severity of the social penalty for deviating, as represented by the parameter $\alpha > 0$. Under this formulation of the social utility what matters is not the direction in which her behavior deviates from that of the group (it is a symmetric function), but rather how far off it is, with larger deviations being penalized more than proportionally.⁸

The effect of social norms seems to be especially relevant in rural settings in developing countries, where communities are tightly-knit, with a strong overlap between neighbors, relatives, friends, and coworkers, and with limited contact with outsiders. Two relevant applications of group dependent preferences in agrarian settings are Shaffner (1994), who looks at rural labor arrangements in Brazil's plantations, and Kevane and Wydick (2001) who examine women's time allocation in Burkina Faso.

In her work, Schaffner expands a model of agricultural employment to include two characteristics of farm labor arrangements. First, workers are required to exhibit "servility," or subordination to their employers on and off the job. They supply these services under implicit long-term arrangements and face dismissal if they refuse to provide them. Because workers' preferences are shaped by those with whom they interact, their disutility of being servile depends on the prevalence of that behavior in their reference group. Second, and precisely for that reason, employers have incentives to control workers' reference groups by restricting where workers live and whether they can leave the plantation. Schaffner shows that by manipulating workers' social reference groups, employers are able to lower worker's reservation utility and maintain wages at a level lower than what would be necessary to attract workers from outside.

In their analysis of Burkina Faso, Kevane and Wydick incorporate social norms in women's decisions on how to allocate their time among competing requirements: their husbands' farms, their own independent activities, and housework. Comparing families from two different ethnic groups in Burkina Faso, they find that in those two communities, women's labor decisions are

⁷ In the literature, private utility has also been referred to as intrinsic utility or individual utility. Similarly, the social component has been referred to as identity utility, status, prestige, approval, and popularity.

⁸ This social utility, which is consistent with Bernheim's (1994) "conformity effect", exhibits constant strategic complementarity. The degree of dependence across agents is captured by the parameter α .

more responsive to norms that “prescribe or proscribe certain economic activities for women” than they are to the resources women have available.

Activity-regulating social norms are strong among peasants in Paraguay. Activities carried out by men and those carried out by women remain clearly distinct (Fletschner and Ramos, 1999; Ocampos, 1996). Household services such as cooking, childcare, laundry, and cleaning are solely performed by women. Women are responsible for most of the animal husbandry and the processing of agricultural or animal products. Men are in charge of tilling, plowing, fumigating, and marketing the crops. Note that both the productive and reproductive activities proscribed to women are consistent with them staying close to home. We will refer to this suite of conventionally proscribed activities as *homebound activities*. In contrast, less conventional, entrepreneurial activities require women to spend time away from home to produce and, or market products.

Woman i 's understanding of the socially correct extent of non-homebound activities, K_i^e , comes from two sources. The first is the general social environment as articulated by social institutions such as the church, as well as by her male partner. Denote this component of the social norm as K_{0i} . In addition, her understanding of what is proper is shaped by the specific behavior of her social reference group, $K_{g(i)}^e$, where the subscript $g(i)$ denotes the social reference group of woman i . Specifically, assume there are n_i women in the social reference group of woman i , and denote as K_{ij}^e woman i 's expectation of how intensively woman j will invest and participate in the non-homebound entrepreneurial activity. Based on her knowledge of the behavior of those in her reference group, woman i infers that her *group generated norm* for non-homebound activity is:

$$K_{g(i)}^e = \frac{\sum_{j \neq i} K_{ij}^e}{n_i - 1}, \quad (2)$$

or the average amount of capital woman i expects the other women to demand.

Combining K_{0i} with the group generated norm, $K_{g(i)}^e$, we assume that a woman's understanding of gender roles is constructed as:

$$K_i^e = \theta K_{0i} + (1 - \theta) K_{g(i)}^e, \quad (3)$$

with $0 \leq \theta < 1$. It follows that if $\theta = 0$ social norms are completely determined by the group behavior and we refer to this special case as *group generated gender norms*. The weighted average in (3) is meant as a first order approximation to a scheme in which a woman updates her inherited prior on gender roles (K_{0i}) based on the observed behavior of her reference group.⁹

In the analysis that follows, we formalize rural women's decision-making process allowing for the possibility that their decisions may be affected by the behavior of their reference groups. We start the analysis assuming that in making their decisions women take their groups' behavior as fixed (Section 2). Clearly, however, group behavior is not exogenous. With her actions, each woman also helps define the overall group behavior. We relax that assumption in Section 3 and describe the equilibrium that emerges under non-cooperative decision-making.

⁹ A strictly Bayesian approach would endogenize the weights, θ , in (3), making them sensitive to the precision of the signal received by a woman from her social reference group. The noisier the signals she receives from her group, the less weight she will assign to group generated norms. That is, θ will be larger the larger the variance of women's involvement in non-homebound entrepreneurial activities within the group.

2. Introducing social effects to a model of rural women decision-making

The preferences and constraints that guide how much a rural woman participates in production activities can be formalized as follows:

- *Technology*: Each woman i has access to an entrepreneurial project that produces income according to a technology $Q(K_i|X_i, X_{v(i)}, X_{g(i)})$, which is assumed to be continuously differentiable, increasing, and strictly quasi-concave in K . The output the woman can obtain depends on the capital she invests in the project, K_i . The productivity of the project is also conditioned by characteristics of the woman herself, X_i (such as innate skill and education); the characteristics of her village $X_{v(i)}$ (e.g., distance to markets, quality of natural inputs); and the characteristics of her social group, $X_{g(i)}$ (e.g., the size of her network, and the level of wealth and education among members of her group that may affect her access to information and to new opportunities, and her ability to share costs and spread risks). Note that in general we do not assume that village and social group are co-extensive.
- *Capital*: A woman i 's participation in production activities is constrained by the amount of capital she borrows from financial institutions, K_i . She is able to borrow up to a pre-determined borrowing ceiling, $\bar{S}_i \geq 0$. Interest rates are uniform. Assuming no voluntary default, at the end of the year she pays back the capital she had borrowed plus the accrued interest, $(1+r)K_i$.
- *Consumption*: In this one-period model, women's revenue is calculated by valuing their production at market prices and assuming that all their wealth, W_i , can be sold at the end of the year. Women repay their loans and use the remaining income for consumption, C , where C includes both the goods they buy and the subsistence goods they produce. Thus, woman i 's vector of consumption goods is constrained by $C_i \leq Q(K_i|X_i, X_{v(i)}, X_{g(i)}) - (1+r)K_i + W_i$.
- *Preferences*: As described by (1) above, a woman's utility depends on private and social components. Woman i 's private utility depends on the goods she has available for consumption, $U_i = U_i(C_i|u_i)$, and her social utility depends on how much she deviates from the socially constructed norm of behavior, $-\alpha(K_i - K_i^e)^2$.

Combining pieces, a woman's choice of investment in the entrepreneurial activity will be guided by the following problem:

$$\begin{aligned} \text{Max}_{K_i} \quad & U(C_i|u_i) - \alpha(K_i - K_i^e)^2 \\ \text{subject to} \quad & \\ & C_i \leq Q(K_i|X_i, X_{v(i)}, X_{g(i)}) - (1+r)K_i + W_i \\ & K_i \leq \bar{S}_i \\ & K_i^e = \theta K_{0i} + (1-\theta)K_{g(i)}^e \\ & K_{g(i)}^e = \frac{\sum_{j \neq i} K_{ij}^e}{n_i - 1} \end{aligned} \tag{4}$$

Letting λ denote the LaGrange multiplier corresponding to the supply side capital constraint, the first order condition defined by (4) for the choice of K_i is:

$$\left(\frac{\partial Q}{\partial K_i} - (1+r) \right) \frac{\partial U}{\partial C_i} = 2\alpha(K_i - K_i^e) + \lambda \tag{5}$$

When the supply side capital constraint does not bind, i.e., $\lambda = 0$, (5) simply says that woman i chooses to invest in the entrepreneurial activity until her marginal private returns are just offset by the marginal cost of social approbation that comes from her violating gender norms. If, instead, the supply side capital constraint binds, i.e. $\lambda > 0$, woman i is unable to meet her need for capital. She borrows \bar{S}_i and has an excess demand for capital.

Note that in the special case where $\alpha = 0$ and $\lambda = 0$, the optimal amount of capital will be the profit-maximizing amount that equates the marginal productivity of capital to its cost. Denote this profit-maximizing amount of capital as \tilde{K}_i^* . Outside of this special case, however, woman i 's optimal demand for capital will be a function of her beliefs about the behavior of other women in her group. Denote this general solution to problem (4) as $K_i^*(K_{g(i)}^e)$. Because of this dependence, two women who are otherwise exactly alike – with equivalent preferences, endowments, and access to credit – may behave differently depending on how they expect their reference groups to behave. By totally differentiating the first order conditions with respect to $K_{g(i)}^e$ one can see that an increase in woman i 's perception of other women's demand for capital will lead her to demand more capital herself.

We say that a woman has a *socially constrained demand* for capital if $K_i^*(K_{g(i)}^e) < \min(\tilde{K}_i^*, \bar{S}_i)$. These are women for whom the returns to capital are higher than the financial cost of obtaining additional funds. They want more capital, and could obtain it, but restrict their demand because of group pressure. When group demand increases, socially constrained women feel less pressure, they demand more capital and increase their production. For socially constrained women, an increase in the group demand leads to increased production, consumption, and private utility ($\partial K_i^*/\partial K_{g(i)}^e > 0$, $\partial C_i^*/\partial K_{g(i)}^e > 0$, $\partial U_i^*/\partial K_{g(i)}^e > 0$).¹⁰

The analysis up to this point assumes that, in making her decision, woman i takes the group behavior as given. However, she is also part of her group. Her behavior impacts her peers' decisions. Thus a more accurate depiction of group behavior would not take it as a predetermined exogenous variable, but rather as the observed equilibrium of a non-cooperative decision-making process.

3. Women's demand for capital under non-cooperative decision-making

We assume that all n_i woman in the social reference group of woman i solve the analogue problem to (4), facing the same technology, prices, and social pressure. Women may, however, differ in their productivity characteristics (X), in their borrowing ceilings (\bar{S}), in their family or church environments K_{0i} , and in the intensity of their preferences for consumer goods (e.g., women with more mouths to feed may exhibit a stronger preference for consumer goods). We assume that investment behavior, and therefore actual borrowing, are public information, whereas information on the borrowing constraint is private.

The Nash, non-cooperative equilibrium for the group will be the set of individual decisions such that each woman does what the others expect her to do, $K_{ij}^e = K_j^*(K_{g(j)}^e) \forall i, j$. In the special case that all women in the reference group are identical, all women undertake the same action in equilibrium. Rewriting $K_i = \theta K_i + (1 - \theta)K_i$, and assuming non-binding supply side capital constraints

¹⁰ In principle, there could also be a corresponding group of women who have a socially induced demand for capital, meaning that social pressure leads them to allocate more than the profit-maximizing amount of capital to entrepreneurial activities. However, we will ignore this case on the assumption that K_{0i} is sufficiently small that K_i^e will never exceed \tilde{K}_i^* .

($\lambda = 0$), expression (5) becomes:

$$\left(\frac{\partial Q}{\partial K_i} - (1 + r) \right) \frac{\partial U}{\partial C_i} = 2\alpha(\theta(K_i - K_{0i}) + (1 - \theta)(K_i - K_{g(i)}^e)) \quad (6)$$

In equilibrium the following will be true for all women:

$$\left(\frac{\partial Q}{\partial K_i} - (1 + r) \right) \frac{\partial U}{\partial C_i} = 2\alpha(\theta(K_i - K_{0i})) \quad (7)$$

Note that in the special case of *group generated gender norms*, $\theta = 0$, expression (7) implies that profit-maximizing behavior for all women is the only equilibrium.

To explore this further, let's consider the simple case of only two women, Alicia and Beatrice. Assume initially that Alicia and Beatrice are identical in all respects. The top panel of Fig. 1 shows the reaction functions first for the case of *group generated gender norms*, $\theta = 0$. As described above, when borrowing constraints do not bind, $\lambda = 0$, the only Nash equilibrium is at point C on the 45-degree line where both women are at their profit-maximizing amounts, \tilde{K}_A^* and \tilde{K}_B^* .

Now consider the imposition of a binding borrowing constraint on Alicia, \bar{S}_A . The reaction function $K_A(K_B)$ can be seen as Alicia's notional demand. Alicia's effective demand for capital, however, is truncated at \bar{S}_A . Point C is no longer feasible and the constrained equilibrium is at point D. Note that Alicia would like to increase her investment in the entrepreneurial project, but cannot. Beatrice, however, is on her best response function given that Alicia is observed to invest \bar{S}_A . Alicia's supply side constraint has helped construct a gender norm that keeps Beatrice at home. Conversely relaxation of the constraint (an increase in Alicia's borrowing constraint to \bar{S}'_A) will reconstruct Beatrice's gender norm such that she too increases her entrepreneurial investment in the wake of the relaxation of Alicia's borrowing constraint, and the new equilibrium will be at D'.

The bottom panel of Fig. 1 displays the reaction functions for the case when gender norms are shaped by women's socially inherited norms as well as by the group generated norms, $\theta > 0$.¹¹ In this case, the Nash equilibrium when borrowing constraints do not bind will be at a point along the 45-degree line like point C, but both women invest less than the profit-maximizing amount, unwilling to stray further beyond the inherited gender behavior. An imposition of a binding capital constraint will again operate as before.

The model works similarly when Alicia and Beatrice are heterogeneous. Fig. 2 illustrates this case on the assumption that Alicia is now more productive than Beatrice for any level of capital invested in the entrepreneurial project, or assigns a higher level of marginal utility to additional cash income. Note that \tilde{K}_A^* is now greater than \tilde{K}_B^* . When capital constraints do not bind, but norms are shaped by socially inherited and group generated norms, $\theta > 0$, the Nash Equilibrium will be at point C. Imposition of a capital constraint on Alicia will shift the equilibrium to D. As in the case of homogenous agents, credit supply constraints shape preferences and influence demand for capital by socially constrained agents.

A key result of this analysis is that one woman's constraints in the capital market may have negative effects on other women's demand for capital. As a result, women who have little access to capital – and who are operating well below the profit-maximizing amount of investment – may in fact express no excess demand for capital if their reference group is similarly constrained.

¹¹ We are still assuming a traditional society in the sense that that K_{0i} is small relative to \tilde{K}_i^* .

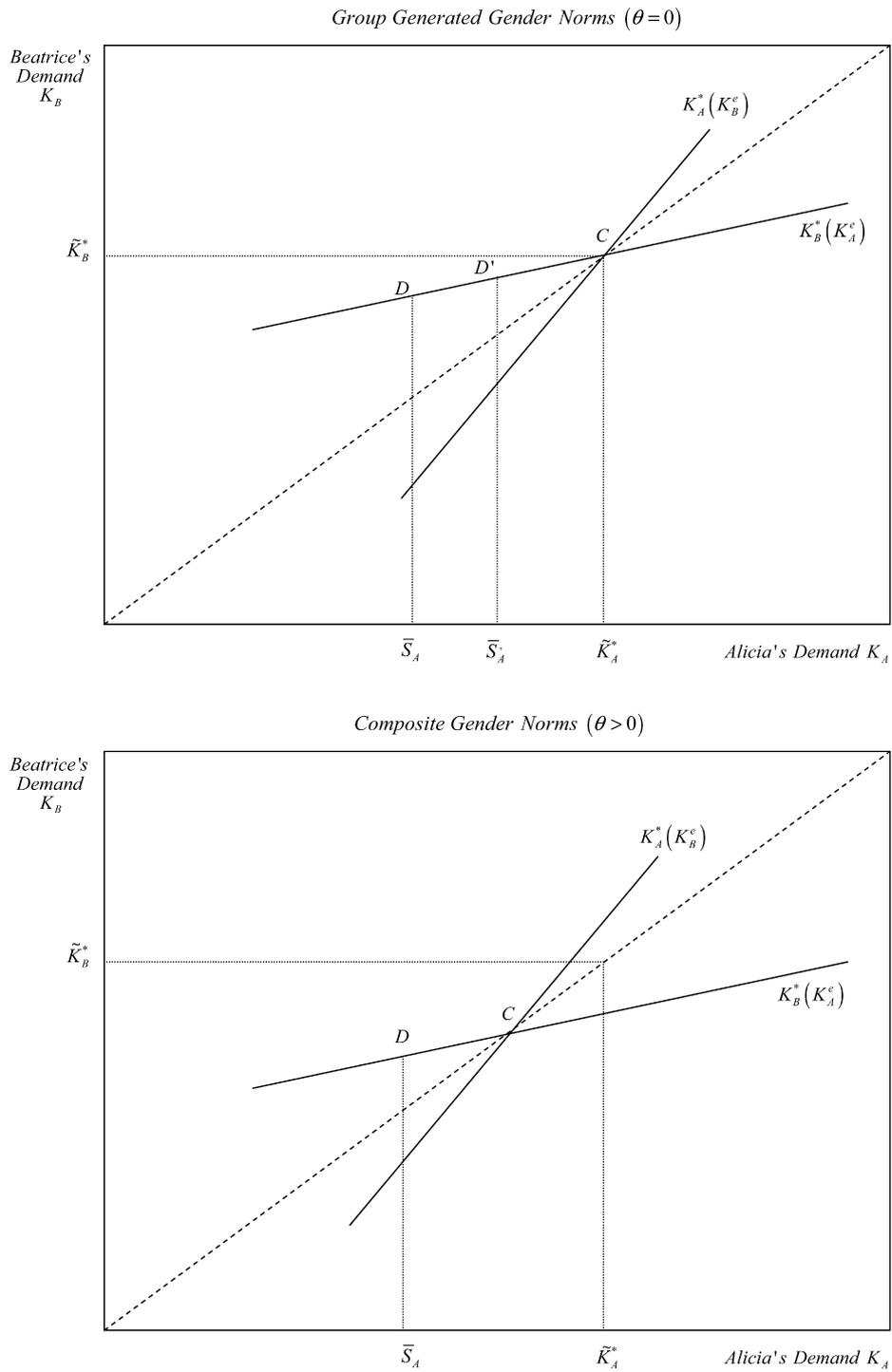


Fig. 1. Gender norms and the demand for entrepreneurial capital—Homogeneous Agents.

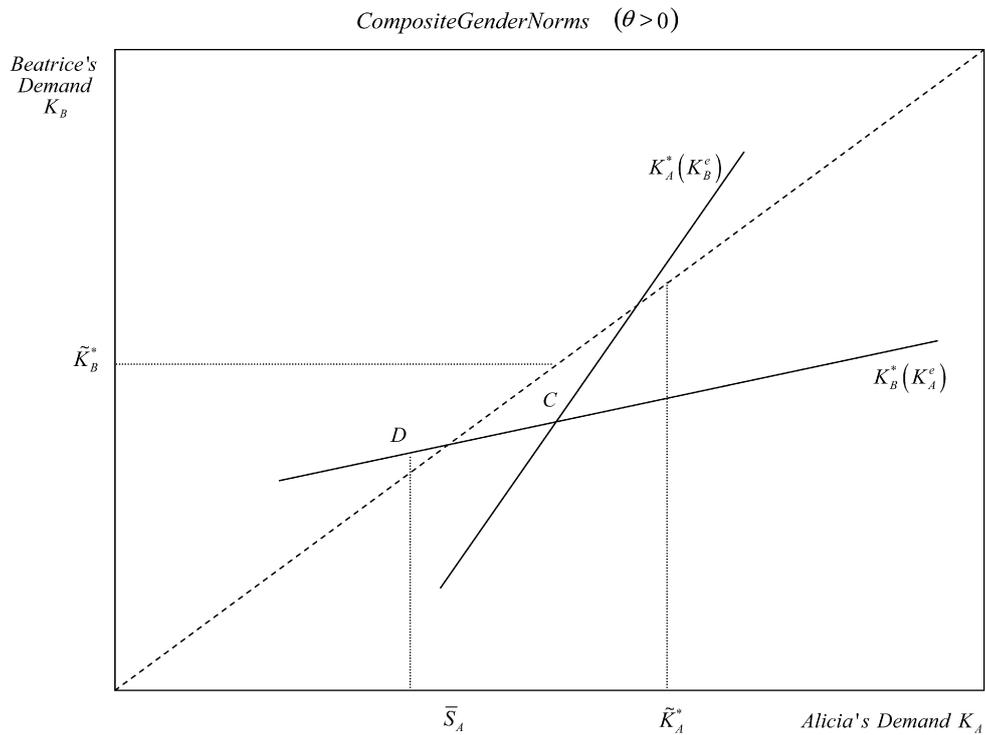


Fig. 2. Gender norms and the demand for entrepreneurial capital—Heterogeneous Agents.

Conversely, under this scenario, a program that improves one woman’s access to capital may, in addition to improving her own welfare, have a positive *social multiplier effect*. If, indeed, women’s demand for capital is socially constructed and their groups are trapped in socially constrained equilibria then programs that improve women’s access to capital may allow an entire group or community to move to a higher-income equilibrium. By virtue of its social multiplier effect, a program that improves a woman’s access to credit and allows for even a small change in her demand for capital may bring about large changes in group behavior and overall production.

As a first step in evaluating this claim, we now concentrate on evaluating the hypothesis that a woman’s demand for capital is affected by her group’s behavior. Identifying the nature of the group effect on individuals’ behavior is no easy task. The remainder of the paper describes the complexities of evaluating social effects empirically and tests the assumption that a woman’s demand for capital is affected by the behavior of her reference group using data from rural Paraguay.

4. Identification of social reference group effects

As the theoretical analysis in the previous sections has shown, the existence of reference group effects on norms, preferences and behavior can have powerful economic implications, both for the maintenance of traditional, low income equilibria and for their rapid transformation. Unfortunately, empirical identification of such reference group effects on individual behavior is difficult. As Manski (1993) argues, the root of this difficulty lies in the fact that there could be multiple reasons why an individual’s behavior may statistically mimic that of her social reference

group. Put differently, correlation between a woman's demand for capital and her group's demand for capital is a necessary but not a sufficient condition to say that her demand for capital is directly shaped by the behavior of her group.

The model developed earlier suggests the following linear regression approximation for woman i 's demand for entrepreneurial capital:

$$K_i^* = \beta X_i + \gamma K_{g(i)} + \delta X_{g(i)} + \phi X_{v(i)} + (\eta u_i + \varepsilon_i), \quad (8)$$

where, as before, X_i is a vector of individual and household characteristics that affect the woman's potential entrepreneurial productivity and her demand for capital; $K_{g(i)}$ summarizes her reference group's demand for capital; $X_{g(i)}$ summarizes characteristics of her reference group that may affect her productivity; $X_{v(i)}$ captures local, village-level features that shape returns to investment; u_i measures idiosyncratic personal characteristics that influence the woman's eagerness to undertake entrepreneurial activities; and ε_i is a demand shock error term that is independent and identically distributed across individuals and reference group members.

Using the language of the empirical social effects literature, this equation helps clarify three different reasons why a woman's demand for entrepreneurial capital may track the demand of her social reference group:

- (1) *Endogenous social effects*, or pure reference group effects, which occur when a woman's demand is directly influenced by the behavior of the women in her social reference group (i.e., $\gamma > 0$). As modeled above, if a woman's demand for capital is affected by social pressure to conform to her group's behavior, $\alpha > 0$, then there are endogenous social effects and $\gamma > 0$. Endogenous social effects could also occur if increased capital demand by other women creates spillover learning or risk sharing externalities.
- (2) *Exogenous social effects* which occur if a woman demands capital when her social reference group exhibits characteristics that boost her returns to capital irrespective of whether or not the other women actually demand capital and undertake entrepreneurial activities (i.e., $\delta > 0$). A woman may be more likely to demand capital if her group includes people who are more educated, or who have better access to information. Since a group with these characteristics is also likely to have a demand for capital themselves, their behavior will tend to be correlated even though there is no direct connection between the *behavior* of the group and that of the individual (i.e., the individual would still demand capital even if the other women were counterfactually prevented from accessing loans while still maintaining their educational and other characteristics).
- (3) *Correlated effects* which occur when a woman and her social group behave similarly, not because they influence each other in any way, but because the behavior of each is shaped by the same or highly correlated factors. It is useful to distinguish two types of correlated effects:
 - (a) Correlated *contextual effects* that result from the fact that women within a social reference group may live in the same village, face the same agro-climatic conditions, and have access to the same markets, extension agents and financial institutions ($X_{v(i)}$ is the same for all women in the reference group); and,
 - (b) Correlated *idiosyncratic characteristics* that result when women endogenously identify or affiliate with social reference groups comprised of women with similar personal or family characteristics such that u_i would be correlated across women within the social reference group. For example, women with relatively high marginal utility of material consumption may tend to affiliate with other, like-minded women. Note, however, that

such factors are unlikely to be correlated across the exogenous, or unchosen, part of a reference group, namely family members.

Consistent estimation of the social effects parameters, γ and δ , confronts two difficulties. Social effects go in both directions. By being part of the group, woman i contributes to the overall group behavior. In other words, a simultaneity problem exists whereas a woman's demand for capital is influenced by her reference group, but her demand also affects the attitudes and decisions of the other women in her group (this is what Manski (1993) calls the "reflection problem"). In principle, this simultaneity problem could be resolved by taking the analogue to (8) for every woman in the social reference group and solving for a set of reduced form equations that express each woman's demand as a function of exogenous characteristics (see Bandiera and Rasul (2006) for a formal derivation of these equations).

Unfortunately, the data requirements for such an indirect least squares approach are daunting as it would require complete information on all women in all the relevant social reference groups. These data requirements become a bit less daunting if social reference groups are defined broadly (e.g., all women in a village). However, such a geographically based approach to social reference groups risks conflating social effects with correlated effects as village characteristics (the $X_{v(i)}$) become co-extensive with the characteristics of reference group members (the $X_{g(i)}$).¹²

This paper takes a different approach to identifying social effects. Similar to Bandiera and Rasul (2006), we measure woman-specific social networks. As detailed in the next section, each surveyed woman was asked to identify nearby female friends and family members that she felt closest to for various social purposes (e.g., discussing personal problems). This strategy yielded multiple networks per village, making it econometrically possible to sweep away village contextual effects with a simple dummy variable, eliminating one important inconsistency in the identification of social effects.

In addition, our survey also obtained measures of $X_{g(i)}$ so that we have the data to estimate (8) directly as specified. Even with all variables included, OLS estimation of (8) cannot consistently identify the endogenous social effects parameter, γ , as other women's demand for capital ($K_{g(i)}$) will in general not be orthogonal to woman i 's demand shock, ε_i . However, such demand shocks can only influence other women if in fact endogenous social effects are operative. A significant OLS estimate of the coefficient of $K_{g(i)}$ would thus be evidence of the existence of endogenous social effects.¹³

5. Does group behavior affect women's demand for capital in rural Paraguay?

The data come from surveys administered to a sample of 213 rural couples in Eastern Paraguay. We obtained information about the population of interest by combining a rapid oral census of the region, a comprehensive membership list of the three cooperatives in the area, and data from

¹² Manski (1993) argued that this specification does not allow one to empirically distinguish between the endogenous and the exogenous social effects, but Brock and Durlauf (2001) explained this to be the case only if the variables describing the group span the same space as the variables describing the individual.

¹³ For example, imagine that woman i is innately driven to be entrepreneurial such that she has a high ε_i and a greater demand for capital than would be predicted based on the other variables in (8). If $\gamma > 0$, then woman i 's extraordinary entrepreneurial spirit will spillover and make other women in her social network demand more capital than they otherwise would. In equilibrium, the demand of other women ($K_{g(i)}$) will thus be correlated with ε_i making the OLS estimate of γ biased. However, if $\gamma = 0$, this bias will disappear and the demand of other women will have no statistical effect on woman i 's demand.

the committees supported by the rural women component of the IFAD project.¹⁴ In order to take intrahousehold dynamics into consideration, we limited our focus to households headed by couples. The sample frame was stratified in three groups: (i) Non-participants: couples in which the woman was not involved in the 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. Women in the second and third groups are likely to have an effective demand for capital. Women in the third group should have direct access to credit. We selected couples randomly from each group and oversampled households in groups two and three because of the small number of women who were active participants in the financial market.

In each household, both spouses were interviewed. Men and women were interviewed separately, at the same time and far enough from each other that they could not hear or influence each other's responses. Women were interviewed by female enumerators, while their husbands were interviewed by men.

Using K_i^* as defined in Eq. (8), we defined K_i as a binary variable that takes the value of one when a woman i has an effective demand for capital and zero otherwise:

$$K_i = \begin{cases} 1 & \text{if } K_i^* > 0 \\ 0 & \text{if } K_i^* \leq 0 \end{cases} \quad (9)$$

The probability that a woman i will have an effective demand for capital is therefore given by:

$$P(K_i = 1) = F(\beta X_i + \gamma K_{g(i)} + \delta X_{g(i)} + \phi X_{v(i)} + (\eta u_i + \varepsilon_i)) \quad (10)$$

We considered woman i as having a positive demand for capital, $K_i = 1$, if she indicated that she:

- Had taken a loan during the previous year; or,
- Had applied for a loan and was denied; or,
- Had wanted a loan but decided not to apply for one for fear of being rejected.¹⁵

Under this criteria, 35% of the women in our sample have a demand for capital.¹⁶

Finally, in order to define each woman's individual reference group we asked them the following questions:

- "To whom can you talk when you are experiencing problems, or when something good happens?";
- "Is there someone from whom you could borrow oil or sugar when you run out?";
- "Do you have relatives who live in the area?"

¹⁴ 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 – E 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.

¹⁵ This group of non-borrowers is what Mushinski (1999) calls "Preemptive Rationed."

¹⁶ While capital is fungible, the nature of the credit program gives us confidence that we are capturing demand for entrepreneurial capital. To apply for a loan the cooperatives require potential borrowers to present an investment plan. Women who apply work closely with an extension agent while preparing the investment plan and, if they are granted a loan, they are carefully monitored.

The first question aimed to capture people she could trust and confide in; the second looked for people she felt could help her with small problems, and who lived near by; the third question was geared toward relatives who could have an influence on her day-to-day life. While the first two categories could include individuals selected precisely because they share similar preferences and other characteristics, the same is less likely to apply to family members whom we inherit but do not choose. The names elicited with those three questions provide a fairly robust proxy for woman-specific reference groups. Their reported reference groups varied in size, from 1–11, with a median of 4.

To estimate the *endogenous group effects* we need a variable that captures each woman's reference group behavior. In particular, we need an indicator of the prevalence of women's demand for capital in each reference group. Although we have some data about every person in the reference groups, our survey did not ask whether or not women in the reference groups had a demand for capital. Lacking that information, we approximate $K_{g(i)}$, the proportion of women in woman's i group who had a demand for capital, by using instead the proportion of women in woman i 's group who belong to a cooperative. One of the most coveted benefits of joining the cooperatives is being able to obtain loans, thus it is reasonable to expect that most women who are members of a cooperative have a positive demand for capital. Indeed, among the 213 women in our sample, there is a strong correlation between whether they are members of a cooperative and whether they indicated having a demand for capital. Of the women interviewed who were members of a cooperative, 81% indicated having a demand for capital. Of those who were not in a cooperative only a quarter had a positive demand for capital. We take advantage of the high correlation between cooperative membership and demand for capital among the women in our sample and define $K_{g(i)}$ as the proportion of cooperative members among women in woman i 's reference group.¹⁷

5.1. Descriptive statistics

Table 1 presents descriptive statistics that allow comparisons between women who demanded capital and those who did not. An initial inspection of the data seems consistent with our hypothesis that the behavior of her reference group influences a woman's demand for capital: $K_{g(i)}$ is significantly larger for women with a positive demand for capital—34% of the group for women who have a demand for capital, relative to an average of only 12% for those who do not.¹⁸

The variables we included to capture individual- and household-level socioeconomic and demographic characteristics that may impact a woman's demand for capital are proxies for her human capital, her family's wealth, and intrahousehold dynamics. Families may not pool their resources (Carter and Katz, 1997; Haddad et al., 1997) and therefore a woman's demand for capital may hinge upon the level of control she has over the family budget. We use the proportion of the family wealth that is held in small animals as a proxy for her control over the family budget given that, typically, the management of small animals falls within women's decision-making sphere.¹⁹

¹⁷ Substituting cooperative membership for women's demand for capital has its drawbacks. In particular, it is likely that some women may have had a demand for capital and would have liked to join a cooperative but were unable to do so because of transaction costs or membership fees. However, given the data available this appears to be the best alternative.

¹⁸ The number of women who are members of a cooperative is still very low in this area. Only 35% of the women interviewed had cooperative members in her reference group.

¹⁹ The proportion of family wealth held in small animals is arguably endogenous to the household. While this variable allows us to control for intrahousehold dynamics when evaluating the impact of reference group behavior, we are cautious when interpreting results associated with it.

Table 1
Descriptive statistics

	Women with no demand for capital	Women with positive demand for capital	Men with no demand for capital	Men with positive demand for capital
Individual and household characteristics (X_i)				
• Value of the land the household controls (in 000s of US\$)	5.09	6.44	5.74	5.50
• Value of the animals and equipment owned by the household (in 000s of US\$)	2.02	3.25*	2.46	2.45
• Proportion of the family capital held in small animals	0.54	0.42*	0.49	0.50
• Does her partner have a demand for capital and a bad credit history?	0.26	0.51*		
• Does her partner oppose her taking a loan? His BP	0.35	0.18*		
• Her age (his age)	44.89	42.52	57.43	45.98*
• Her education (his education)	4.19	5.25*	3.71	4.47*
Endogenous social effects				
• Proportion of coop. members in her group ($K_{g(i)}$)	0.12	0.34*	0.22	0.19
• Prop. coop. members in her reduced-group ($K_{f(i)}$)	0.04	0.12*	0.05	0.07
Exogenous social effects ($X_{g(i)}$)				
• Size of her group	4.30	4.16	2.69	2.27
• Average land in her group	5.35	10.26	4.02	8.16*
Correlated effects ($X_{v(i)}$)				
• Village 2	0.12	0.06	0.07	0.11
• Village 3	0.17	0.20	0.17	0.18
• Village 4	0.18	0.15	0.15	0.18
• Village 5	0.07	0.19*	0.04	0.14*

* t -test rejects null hypothesis of equality of means between women who have a demand for capital and those who do not, and similarly for men. In testing whether the means are different we allowed the variances to differ across samples. The null hypothesis is that the means are equal, against the two-sided alternative. The test is performed at the 5% significance level.

Given the high prevalence of previous default among men in this region, women may be also be interested in borrowing only to transfer those resources to their partners. We control for that possibility with a dummy variable that takes a value of one when her partner has indicated having a demand for capital and a bad credit history.²⁰ Furthermore, a woman's demand for capital may be affected by her partners' attitudes and norms. As modeled above, his attitudes may help shape her understanding of appropriate gender roles (K_{0i}). If her partner opposes to her taking a loan, and has sufficient bargaining power, he may effectively enforce his preferences, driving his wife's

²⁰ As with women, we considered that men had a positive demand for capital if they indicated that they had taken a loan, or had applied for a loan and had been denied, or had wanted a loan but decided not to apply for fear of being rejected.

demand for capital to zero.²¹ As shown in Table 1, women who express no demand for capital are significantly more likely to have a partner who opposes the idea (and is empowered to act on it).

A larger and wealthier reference group is likely to affect a woman's demand for capital because she may be more aware of economic opportunities, may be able to take advantages of economies of scale or to share costs, and may have a safety net that allows her to engage in riskier economic activities. Thus, in order to capture the exogenous effects of her reference group we use two variables: the size of her reference group; and, a proxy for the average wealth of households in her reference group, given by the average amount of land held by those families.

As discussed in the introduction, we use village fixed effects to control for the local economic and environmental context (e.g., agro-climatic conditions, market access and prices, and extension services). As reference group members in almost all cases live in the same village, sweeping away these correlated, village-level contextual effects is a key part of our strategy to separately identify endogenous social effects.

Finally, foreshadowing later robustness checks, Table 1 shows that women with positive demand for capital have significantly more entrepreneurs in their restricted (exogenous) social reference group comprised of inherited family members. In addition, men with and without demand for capital show no significant difference in the composition of their female partner's reference group.

5.2. *Econometric estimates of endogenous effects*

In the analysis that follows we use a probit model to estimate $P(K_i = 1)$ as specified in Eq. (10). Table 2 presents the results of the probit regression of women's demand for capital. The model has a strong forecasting power. It correctly predicts whether a woman will have an effective demand for capital 77% of the times. Its predicting ability is particularly robust for women who do not have a demand for capital: it yields correct predictions 91% of the times.

Due to the nonlinearity of the probit model, the coefficients estimated for each variable are different from those variables' marginal effects. Figures on the first column of Table 2 are the marginal effects calculated at the mean of each regressor.²²

Turning first to the control variables, Table 2 shows that neither the land nor the capital controlled by her family appear to have a significant impact on the probability that a woman demands capital. Other things equal, her demand for capital is affected by:

- *Her control over the family budget:* the larger the share of household capital in small animals the more control women have over their families' budget and, consequently, the more likely women are to satisfy their needs for capital without resorting to loans;
- *Her level of education:* more educated women are more likely to demand capital;

²¹ To capture his opposition we use a dummy that takes the value of one if either spouse indicated that he does not want her to get involved in market-oriented activities or to take loans. We consider that the husband has bargaining power if he has more experience and came from a wealthier family—that is, he is at least as old as his wife and, at the time they got together, his parents had more land than hers.

²² Since probit models produce inconsistent results if heteroskedasticity exists, we use the approach suggested by Harvey (1976) to test for multiplicative heteroskedasticity. The alternative hypothesis is that $H_a: \tau \neq 0$ where $\text{Var}(\varepsilon_i) = \exp(\tau z_i)^2$ and z_i is the value of the land her family controls. We corrected for heteroskedasticity whenever the LM statistic was higher than $\chi_{0.95}^2(1) = 3.84$.

Table 2
Probability that a woman will demand capital. Marginal effects evaluated at mean values

	Core equation	Robustness checks	
	$P(K_i = 1)$	Exogenous reference group	Probability male partner demands capital
Individual and household characteristics (X_i)			
• Value of the land the household controls	–0.011	–0.029**	0.018
• Value of the animals and equipment owned by the household	0.011***	0.023	0.007
• Proportion of the family capital held in small animals	–0.615	–0.733***	–0.042
• Her age	0.004	0.003	
• Her education	0.045**	0.032	
• His age			–0.017***
• His education			–0.009
• Does her partner oppose to her borrowing and has bargaining power? ²⁹	–0.252***	–0.212**	
• Does her partner have a demand for capital and a bad credit history?	0.241***	0.201**	
Endogenous social effects			
• Proportion of coop. members in her group ($K_{g(i)}$)	0.621***		
• Proportion of coop. members in her family group ($K_{f(i)}$)		0.309**	–0.004
Exogenous social effects ($X_{g(i)}$)			
• Size of her group	–0.059**	–0.043*	–0.050***
• Average land in her group	0.003	0.003*	0.011**
Correlated effects ($X_{v(i)}$)			
• Village fixed effects	Included	Included	Included
Constant	–0.174	0.024	1.163***
log L	–100.262	–138.285	–121.939
LM	1.051	5.759	8.149
N. Obs	213	213	213

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

- *Her husband's position in the financial markets*: women are more likely to have a demand for capital when their husbands would like to borrow capital for themselves but have a bad credit history,²³

²³ In an attempt to gauge their separate effects, we re-estimated the model adding two individual dummy variables that capture whether he has a demand for capital and whether he has defaulted on a loan, respectively. The parameters associated with the individual variables and with the interaction term have the expected signs, but nothing is individually significant. All other results are robust to the inclusion of these variables.

- *Her husband's opposition to her taking loans*: women are less likely to indicate having a demand for capital if their husbands do not want them to take loans, and have bargaining power;²⁴ and,
- *The size of her reference group*: women with larger reference groups are less likely to want loans from a bank.

In addition, the estimated fixed effects (not reported in the table) reveal the influence of contextual factors as women in the most isolated region are significantly less likely to demand capital.

Finally, the results in [Table 2](#) are consistent with the hypothesis of endogenous social effects as the larger the proportion of cooperative members in a woman's reference group, the higher is the probability that she will have a positive demand for capital. As described in [Section 4](#), the large and strongly significant parameter associated with $K_{g(i)}$ confirms the existence of endogenous social effects even if data limitations prevent us from identifying the structural parameters and estimating the magnitude of those effects.

While it is tempting to take these results as strong corroboration of our social reference group hypothesis, alternative explanations are possible. First, while our identification strategy relied on fixed effects to sweep away contextual effects, it is possible that women within a reference group have been selected based on having similar unobserved characteristics that themselves directly shape the demand for entrepreneurial capital. Second, even if such correlated unobservables do not explain the apparent impact of a woman's reference group on her behavior, it is possible that endogenous social effects operate through an alternative mechanism (e.g., social learning) rather than the social norm circuit studied here.

5.3. Robustness check

As frequently raised in studies attempting to identify the influence of group behavior, we cannot ignore the intuitive notion that women are likely to associate with other women with similar characteristics. The possibility of endogenous group membership appears to be less important in the rural setting under study, where communities are very stable: the average woman has lived in that community for 29 years, and in the same house for 17 years. Furthermore, women's domestic responsibilities tend to reduce their mobility and limit the frequency and distance they would travel.

Nonetheless, what appears to be endogenous social effect may in fact be simply the result of other latent, correlated idiosyncratic effects due to endogenous group membership. To address this, we follow [Bandiera and Rasul's \(2006\)](#) premise that you may choose your friends but you do not choose your family, and separate each woman's social network into family and friends. We denote as $K_{f(i)}$ the subset of woman i 's reference group that is formed by her family members and repeat the analysis.²⁵ As the second column of [Table 2](#) shows, the endogenous social effects remain strongly significant even after we filter out suspect endogenous reference group members.

²⁴ An alternative version of the model included separate dummies for his bargaining power and his opposition and, as was the case in the previous point, the parameters lose significance. While we cannot be certain on whether it is male bargaining power on its own, male opposition on its own, or their interaction that matters, our results clearly indicate that there is some significant explanatory power in this constellation of factors. More importantly, the key endogenous social effects variable is robust to the inclusion of all these variables.

²⁵ The exogenous or "inherited" reference groups were defined in two ways. As a first cut, we defined woman i 's reference group as the subset of her reference group formed by her female relatives. However, that reference group may include in-laws and daughters—both of which would arguably not be exogenous. The more restrictive definition of the reference

While these latter results give greater confidence that we have indeed identified endogenous social effects, the question remains about the precise character of those effects. The theoretical approach put forward here treats those social effects as purely gender-specific: as women observe other women engage in economic activities and demand capital, they update their beliefs about what is socially acceptable behavior for women. We argue that, other things equal, an increase in the number of women who engage in economic activities and demand capital would induce other women to demand capital as well. Yet, to the extent that the influence of her group is only through the modeling of behavior for women, what her group does should have no impact on whether or not her male partner demands capital.²⁶

Note that this observation stands in contrast to other possible avenues by which reference group behavior could influence behavior through endogenous social effects. In particular, if the participation of reference group members in entrepreneurial activities facilitates social learning of the sort explored by Conley and Udry (2004), then some of that learning could spill over and facilitate entrepreneurial activities, and credit demand, by women's male partners. Similarly, if a more entrepreneurial (and economically more successful) reference group becomes a better source of mutual insurance, then arguably male partners of better insured spouses might be more willing to undertake business risk. While both of these arguments depend on the efficacy of intra-household sharing and intermediation,²⁷ we might expect to see at least some effect on male partner demand for capital if endogenous social effects do not operate through gendered social norm effects.

We explore this possibility by estimating the probability that men would demand capital using a similar set of independent variables, including information on the behavior of his partner's exogenous reference group. The results, shown in the final column of Table 2, indicate that the marginal effect of $K_{f(i)}$ is both insignificant and small, indicating that, other things equal, a man's demand for capital is not affected by the behavior of his female partner's reference group.²⁸ This result rules out cross-gender peer effects of the sort we might expect if social effects operated through social learning or risk sharing. While it is of course still possible that social learning is gendered (i.e., men do not learn from women), the absence of cross-gender effects lends further credibility to a social norm interpretation of the endogenous social effects.

6. Conclusions

Credit programs that target women with loans are based on supply side arguments. However, demand side constraints may also affect rural women's acquisition of entrepreneurial capital in developing countries. We argue that in those communities rural women's decision to acquire capital may be influenced by social norms that proscribe what are appropriate activities for them. Women who demand entrepreneurial capital and actively engage in market-oriented activities may in fact be challenging firmly established activity-regulating social norms.

group does not include in-laws or daughters. The results reported in Table 2 correspond to this more restrictive definition of inherited reference groups, but the direction and the significance of the results are the same on both cases.

²⁶ Similarly, our argument suggests that a woman's demand for capital would not be affected by the behavior of her husband's reference group. Unfortunately, the data we have does not allow us to test this empirically.

²⁷ See Duflo and Udry (2004), for evidence on the incompleteness of intra-household risk sharing in Cote d'Ivoire.

²⁸ His demand for capital does not respond to the behavior of her reference group even when we use the more inclusive definition of her reference group, $K_{g(i)}$.

²⁹ Marginal effects for dummies are calculated as $P|1 - P|0$.

By explicitly incorporating social effects in modeling rural women's decision-making, we provide a conceptual framework to better understand factors that may limit women's acquisition of capital even when they have adequate access to capital. The decision-making model we developed allows for women's demand for entrepreneurial capital to be socially constructed.

At an empirical level, we have identified the existence of positive endogenous social effects. Using an econometric strategy that controls for various contextual and correlated effects that may induce a spurious relation between the behavior of a woman and that of her social group, we find that in rural Paraguay a woman's demand for entrepreneurial capital is positively and significantly affected by the behavior of her reference group. Women are more likely to demand entrepreneurial capital the larger the proportion of cooperative members (women who are likely to have a demand for entrepreneurial capital) in their reference groups. While these endogenous social effects could reflect social learning, the absence of cross-gender social effects (male partners are not influenced by the behavior of a woman's reference group) supports the social norm interpretation.

In the final analysis, the exact source of endogenous social effects may matter less than their existence. Our finding of endogenous social effects suggests that in order to evaluate the full impact of an intervention that causes a shift in the supply of capital it is important to consider its repercussions on other women's demand for credit as well. In fact, the impact of a credit program that relaxes some women's supply side constraints may extend well beyond the direct beneficiaries. By indirectly relaxing other women's demand side constraints, this credit program could allow an entire group or community to move a higher-income equilibrium. By virtue of its social multiplier effect, a program that improves a woman's access to credit and allows for even a small change in her demand for entrepreneurial capital may bring about large changes in group behavior and overall production.

Finally, our identification strategy can of course be criticized. Absent a fully randomized experiment, further analysis of this new way of looking at the factors affecting rural women's position in the financial market and the indirect effects of a credit program that enhances women access to credit would require significantly more detailed data in at least three fronts. First, it would be useful to learn more about the way in which women obtain information: how do they learn about new investment opportunities and financial options and to what extent the information networks are segregated by gender. Second, it would help to gather more data about how beliefs about appropriate behavior for women are shaped. Finally, it would be important to gain a better understanding of their perceptions of the type and severity of social punishment applied to behavior that deviates from the norm, as this will shed light on why a seemingly welfare-reducing norm continues to exist.

References

- Asch, S., 1952. *Social Psychology*. Englewood Cliffs, N.J. Prentice-Hall.
- Bandiera, O., Rasul, I., 2006. Social networks and technology adoption in Northern Mozambique. *Economic Journal* 116 (514), 869–902.
- Bernheim, B.D., 1994. A Theory of Conformity. *Journal of Political Economy* 102 (5), 841–877.
- Brock, W., Durlauf, S., 2001. Discrete choice with social interactions. *Review of Economic Studies* 68, 235–260.
- Cain, M., Khanam, S., Nahar, S., 1979. Class, patriarchy, and women's work in Bangladesh. *Population and Development Review* 5, 405–438.
- Carney, J., Watts, M., 1991. Disciplining women? Rice, mechanization, and the evolution of Mandinka gender relations in Senegambia. *Signs* 16 (4), 651–681.
- Carter, M.R., Katz, E., 1997. Separate spheres and the conjugal contract: understanding the impact of gender-biased development. In: Haddad, L., Hoddinott, J., Alderman, H. (Eds.), *Intrahousehold Resource Allocation in Developing Countries: Methods, Models and Policies*. Johns Hopkins University Press, Baltimore, MD, pp. 95–111.

- Castillo, M., Carter, M., 2005. Identifying Social Effects with Field Experiments. Working paper.
- Conley, T., Udry, C., 2004. Learning about a new technology: Pineapple in Ghana, Economic Growth Center Working Paper 817.
- Dufló, E., Udry, C., 2004. Intra-household resource allocation in Cote d'Ivoire: social norms, separate accounts and consumption choices. NBER Working paper 10498.
- Elster, J., 1989. Social norms and economic theory. *The Journal of Economic Perspectives* 3 (4), 99–117.
- Fletschner, D., Ramos, N., 1999. Tienen las Mujeres las Mismas Oportunidades que los Hombres? Resultado de Seis Jornadas de Trabajo Grupal en San Pedro, Concepción y Coronel Oviedo. Fondo de Desarrollo Campesino. Paraguay.
- Haddad, L., Hoddinott, J., Alderman, H., 1997. Intra-Household Resource Allocation in Developing Countries: Models, Methods, and Policy. Johns Hopkins University Press, Baltimore, MD.
- Harvey, A.C., 1976. Estimating Regression Models with Multiplicative Heteroskedasticity. *Econometrica* 44, 461–465.
- Jones, S.R., 1984. *The Economics of Conformism*. Oxford, Blackwell.
- Kevane, M., 2004. Women and Development in Africa: How Gender Works. Lynne Rienner Publishers, Boulder.
- Kevane, M., Wydick, B., 2001. Social Norms and the Time Allocation of Women's Labor in Burkina Faso. *Review of Development Economics* 5 (1), 119–129.
- Lewis, O., 1966. *La Vida: A Puerto Rican Family in the Culture of Poverty*. Random House, New York.
- Liebow, E., 1967. *Tally's Corner; a Study of Negro Streetcorner Men*. Little, Brown, Boston.
- Manski, C., 2000. Economic analysis of social interactions. *Journal of Economic Perspectives* 14 (3), 115–136.
- Manski, C., 1993. Identification of endogenous social effects: the reflection problem. *Review of Economic Studies* 60 (3), 531–542.
- Merton, R., 1957. *Social Theory and Social Structure*. The Free Press, Glencoe.
- Mushinski, D., 1999. An analysis of offer functions of banks and credit unions in Guatemala. *Journal of Development Studies* 36 (2), 88–112.
- Ocampos, G., 1996. *Las Mujeres Productoras de Alimentos en Paraguay: Diagnóstico y Políticas*, Documento de Base. San José. IICA, Costa Rica.
- Roberts, P., 1998. Rural women's access to labor in West Africa. In: Stichter, S., Parpart, J. (Eds.), *Patriarchy and Class*. Boulder, pp. 97–114.
- Ross, L.G., Bierbrauer, Hoffman, S., 1976. The role of attribution processes in conformity and dissent: revisiting the Asch situation. *American Psychologist* 31, 148–157.
- Schelling, T., 1973. Hockey Helmets, concealed weapons, and daylight saving: a study of binary choices with externalities. *Journal of Conflict Resolution* 17, 381–428.
- Schroeder, R., 1996. Gone to their second husbands: marital metaphors and conjugal contracts in The Gambia's Female Garden Sector. *Canadian Journal of African Studies* 30 (1), 69–87.
- Shaffner, J.A., 1994. Attached farm labor, limited horizons, and servility. *Journal of Development Economics* 47, 241–270.