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The Influence of Microfinance on the Education Decisions of Rural Households: Evidence from Bolivia

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Abstract

Human capital formation is key in efforts to alleviate poverty. Because education is costly, poverty traps emerge. The poor and less educated demand less schooling for their children and remain poor. The paper addresses household decisions about schooling and the role microfinance plays in those decisions through income, risk-coping, gender, child-labor, and information effects. Count regression models are used to examine the determinants of schooling achievements for households of microfinance clients, using two datasets from Bolivia. The results challenge usual microfinance assumptions in program design.

Keywords: *Credit, microfinance, poverty alleviation, human capital formation, education, poverty traps.*

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The Influence of Microfinance on the Education Decisions of Rural Households: Evidence from Bolivia

Increased access to education will be key in any efforts to improve the quality of rural life and the welfare of the next generation in developing countries. Microfinance programs have been among components of poverty alleviation strategies that have attempted to address this challenge. The purpose of this paper is to examine some channels through which microfinance may exert a positive influence on education outcomes. We identify five channels, designated as income, risk-management, child-labor demand, gender, and information effects.

The paper uses data from two different surveys of the households of clients of microfinance organizations (MFOs) in Bolivia. Based on a theoretical specification that explains schooling decisions at the household level, regression models are used to examine determinants of education achievements and to make inferences about the potential influence of microfinance, through these channels, on those achievements.

The regression models incorporate a negative binomial specification. The explanatory variables include individual (age, gender), household (siblings, schooling levels of household workers, area of cultivated land, poverty), environment (regional dummies), empowerment (women's contribution to household income), and program features (length of exposure to microfinance services).

The results challenge usual assumptions in microfinance programs. In particular, for some ranges of household income and some types of borrowers, access to loans has conflicting effects on school enrollment. On the one hand, loans increase the demand for education as a result of income, risk-management, gender, and information effects. On the other hand, credit-constrained households that cultivate land or operate labor-intensive microenterprises discover new demands for child labor, either for farming, working in the microenterprise, or taking care of siblings while the mothers operate the new or expanded business. Significant program and policy consequences are derived from these paradoxical results.

The paper is organized as follows. Next, we offer a short literature review on the subject. Then, we present a model that incorporates relevant determinants of education decisions at the rural household level. Based on this model, we propose econometric specifications for the empirical test of the hypotheses. We then use data from Bolivia for the regression estimations and discuss the results. The paper ends with some conclusions and recommendations.

Background

The relationships between education and income are complex. In particular, the demand for education depends both on household preferences and on budget constraints that are influenced by income levels. If a sufficiently high marginal value is placed on the education of family members, increases in income will result in higher expenditures in schooling (that is, there is a positive income elasticity of the demand for education).

In turn, given the labor-supply potential of children, a low household income increases the opportunity cost of keeping them in school. Therefore, income levels are expected to positively influence the schooling decisions of poor households, while adverse shocks that reduce income are expected to negatively influence these decisions. At the same time, because the higher productivity of better-educated household members may be rewarded in the labor market with higher incomes, prospects about production and employment opportunities will influence those decisions (Duryea and Pagés, 2002).

Human capital formation has been recognized as an effective tool for reducing poverty in the long run (Schultz, 1961; Bils and Klenow, 2000; Krueger and Lindahl, 2000). Particularly in the rural areas of developing countries, however, access to education is limited (Barro and Jong-Wha, 2000). Some concerned observers highlight **supply** constraints, due to lack of infrastructure and resources (e.g., roads, schools, teachers and materials). Low schooling achievements may also reflect, however, the consequences, on the **demand** for education, of severe budget constraints and of a competing demand for the youth's labor.

Child labor may be demanded either to fulfill the household's basic income-generating requirements or to take care of younger siblings, so as to facilitate the labor efforts of more productive household members. Further, differential schooling outcomes may reflect cultural factors (e.g., the traditional division of labor and expectations about gender roles as well as differences in male-female preferences). Through a number of channels, microfinance may influence the demands for education and for child labor.

Financial services (loans, payments instruments, and deposit facilities) allow rural households to more fully take advantage of their productive opportunities, facilitate consumption smoothing in the presence of unstable and seasonal income flows, and offer tools for risk management when adverse income shocks occur, thereby reducing the vulnerability associated with poverty (Zeller and Sharma, 2002). In turn, higher and particularly more stable income flows positively influence demands for schooling.

Typically, however, information, incentive, and contract enforcement problems severely constrain the access of poor rural households to formal financial markets (Gonzalez-Vega, 2003). Moreover, because human capital cannot be seized and transferred to a lender in the event of default, it cannot be used as collateral; consequently, the poor must fund their educational choices out of their past wealth, retained earnings, or abstention from current productive work or consumption. Because they are poor, the marginal cost of doing so may be prohibitively high (Ray, 1998).

The typical shortcomings of credit markets accentuate the joint causation between income and human capital. Combined with increasing returns to investment in education, these shortcomings generate **poverty traps** (Bardhan and Udry, 1999). Relatively wealthy households, able to invest in human capital, earn high incomes and remain wealthy. In contrast, the poor are unable to invest in human capital, continue to earn low incomes, and remain poor. To the extent to which it makes it possible to increase the supply of services to some poor segments of the rural population, microfinance offers, however, the potential to break this vicious circle, but its effects on schooling outcomes may be mixed.

Through innovations in cost-effective lending technologies, some MFOs have been offering mostly credit and sometimes deposit facilities for savings to segments of the rural population otherwise without access to formal finance (Navajas and Gonzalez-Vega, 2002; Rodriguez-Meza and Gonzalez-Vega, 2003; Quiros, Rodriguez-Meza and Gonzalez-Vega, 2003). These innovations have allowed households without traditional collateral to pledge their reputation in the community and the present value of their relationship with the MFO –based on their future ability to generate income from their microenterprises and on their human capital formation– as a guarantee on their loans. Some observers have hoped that this might be an important mechanism to influence, directly or indirectly, education outcomes.

Indeed, microfinance may influence human capital formation through several channels. First, it is widely recognized that income levels influence schooling (Behrman and Knowles, 1999). To the extent to which microfinance may influence the growth of poor households' incomes, it may influence the demand for schooling (*income effect*).

Second, the vulnerability of rural households to adverse exogenous shocks and the volatility of their incomes influence their ability to afford the opportunity costs of education. The absence of usual remedies for risk, such as borrowing and insurance opportunities, results in limited and costly income smoothing strategies (Deaton, 1997). Poor households cope with risk in various ways. They adopt diversified production plans and employment and migration strategies to reduce their exposure to the risk of adverse income shocks, even if this entails lower average incomes (Murdoch, 1995).

In addition, households smooth consumption by saving, selling assets, taking children out of school, and developing informal insurance and credit arrangements (Kanbur and Squire, 2001). Access to loans from MFOs –particularly when emergency loans are offered, such as those from the **internal account** of village banks– reduce the probability that children will be withdrawn from school when adverse shocks occur. Jacoby and Skoufias (1997), among others, show that poor households affected by income shocks withdraw their children from school. According to these authors, a 10 percent decline in agricultural income across seasons caused a fall in school attendance of five days in a sample of six Indian villages. Access to microfinance may thus improve a household's ability to anticipate and cope with income shocks and may thereby influence the demand for education (*risk-management effect*).

Third, several studies have hypothesized that, compared to men, women show a stronger preference for educating their children (Thomas, 1990; Sallee, 2001; Behrman and Rosenzweig, 2002). If preferences toward education are gender-related and if microfinance improves access to loans by women and, thereby, changes their power to influence household schooling decisions, the rate of human capital formation may be altered (*gender effect*). This approach substitutes a bargaining process within the household for the traditional unitary model of optimization of a single preference set. The outcome of this bargaining process reflects both gender differences in preference functions and in relative power in influencing household decisions (Phipps and Burton, 1995; McElroy, 1997; Nanda, 1999).

Fourth, given uncertainty about the future, imperfect information, and high private discount rates, household choices about education may be revised with the acquisition of new knowledge, which modifies intertemporal preferences or changes perceptions about the value of schooling (*education effect*). In effect, higher levels of parent education have been found to positively affect schooling decisions (Lillard and Willis, 1994). In particular, preferences about schooling may be influenced by adult training programs that highlight education as a tool for income generation and as a determinant of the quality of life.

Some MFOs, as is the case of CRECER in Bolivia, hold meetings with their borrowers on a regular basis and take advantage of these meetings to disseminate information about birth control, child education, health care, and nutrition. The influence of these credit-cum-education programs in improving standards of living is subject to great debate (MkNelly and Dunford, 1999). An additional and important debate questions the optimality, from an organizational perspective, of **jointly** providing credit and other services. On the one hand, there may be economies of scope from this joint provision. On the other hand, the supply of non-financial services may jeopardize the pursuit of financial sustainability by the MFO, through diseconomies from overburdening the organization's management capabilities or from signals that weaken borrower discipline (Gonzalez-Vega, 1998). The present paper does not address these issues. The analysis of the paper is, in this respect, incomplete, in that it only assesses the marginal **value** of the supply of credit-cum-education services, but it does not measure the marginal **cost** of providing these services.

Fifth, there is a growing literature on the influence of the demand for child labor on schooling outcomes (Psacharopoulos, 1997; Jensen y Nielsen, 1997; Patrinos y Psacharopoulos, 1997; Grootaert y Patrinos, 1999). Additional productive activities, made possible by access to microfinance, may change household demands for child labor directly, in the newly-created or expanded microenterprises, or indirectly, in child care or in farm and livestock duties (*child-labor demand effect*).

This paper evaluates the influence of microfinance on human capital formation by looking at whether children from rural households with access to **credit-cum-education** programs are kept longer in school. To accomplish this, we assume that those who have been members of the program for a short period (*i.e.*, less than a year) have not had enough time to increase their incomes or change their attitudes toward schooling. We use them as a control group to compare to households with members that have received credit and non-formal education for longer periods.

The assessment of impact, which involves attributing specific effects to specific interventions, encounters formidable methodological problems (Ravallion, 2001). Meyer (2002) claims that measurement and attribution of impacts of microfinance on clients is the most difficult and controversial aspect in the evaluation of the performance of MFOs. One important dimension of these difficulties, of relevance here, is the possibility of selection bias. Both the selection of clients and program placement are sources of concern. The first concern arises because MFO clients will not likely be randomly selected; rather, they possess characteristics that are systematically different from those of a randomly selected sample.

Self-selection into the program can occur because of systematic differences in preferences among those who choose to participate and those who do not. Moreover, if the lender uses a systematic creditworthiness screening criterion, borrowers should differ from non-borrowers. Non-participants, therefore, are a non-equivalent comparison group. Ignoring this source of potential endogeneity can lead to biases due to the omission of unobserved relevant variables (Moffitt, 1991).

A second concern arises because MFOs choose to start operations in areas with specific attributes, such as communication and transportation facilities (Pitt and Khandker, 1998). Programs may also be developed in localities that are either more dynamic than others or where the incidence of poverty is greater. Unmeasured locality factors and household attributes may simultaneously affect the demand for program participation, women's empowerment, and the demand for education. This possibility of selection bias implies the difficulty to determine if differences between groups are due to the supply of microfinance services or to non-representative clients and locations.

Our study modestly attempted to minimize these selection problems. Client selection issues were addressed by using a cohort approach in the sampling process. Participants were separated into *old* clients, with more than one year in the program, for which benefits had already accrued, and *new* clients, with one year or less, which had successfully passed the credit screening mechanism but for which benefits would not have yet accrued. Self-selection may still be present if older participants possess unobserved features that differ in degree from those of more recent participants.

The model

Based on Schultz (1993), Lardé de Palomo and Argüello de Morera (2000) recognized that the late incorporation of children to the schooling system and their early withdrawal are mostly due to demand factors. When parents decide about their children's schooling, they chose to allocate a fraction of household income to education, according to their perceived profitability of schooling. This perception depends, in turn, on the parents' own level of education and on features of the economic environment. Credit-cum-education programs may influence these perceptions. Behrman, Pollack, and Taubman (1986) further argue that resources for education are split according to the number of children, their gender, and their age, given household composition and the severity of the budget constraint.

In the rural areas of developing countries, the demand for schooling is influenced by determinants of other forms of human capital that may substitute for or complement education and that are influenced by microfinance-cum-education programs (such as health and nutrition), by the productivity and diversification of sources of labor income (also influenced by access to microfinance), by flows of non-labor income, such as subsidies and remittances, and by the ownership of assets that can be used as collateral for loans. Khandker (1998) found that, in Bangladesh, microloans had a significant impact on children's schooling, especially for boys. The child's gender may also matter. Ray (1998) notes that in 1995, for all low-income countries, there were almost twice as many female as there were male illiterates.

For the analysis of this paper, we assume that parents make decisions about sending their children to school from the perspective of a long-run investment. Several authors have modeled schooling as an investment decision that generates a flow of benefits and costs over time (Becker, 1993; Glick and Sahn, 2000). Given a household rate of time discount, each household perceives an **expected net present value** from the decision. In the first period ($t=0$) of a simple two-period model, the household invests in the education of its children. In the second period ($t=1$), the children grow up and the household reaps the benefits.

In addition to spending on education (E), the household consumes goods and services during both periods (C_0 and C_1). The main source of income is household labor (L), supplied by both parents and children, which can be sold at a wage rate w . If the parents decide to educate some of the children, a proportion of the labor force, α , will not be available to generate income in period $t=0$. In period $t=1$, this proportion of the labor force will receive a wage rate w' (where $w' > w$). In period $t=0$, income will be equal to $[(1-\alpha) w L]$. In period $t=1$, income will be $[(1-\alpha) w L + \alpha w' L]$. Assuming a composite good C , with price $p=1$, expenditures in period $t=0$ will be $[C_0 + E]$ and in period $t=1$ they will be $[C_1]$. If in period $t=0$ income is low or if education expenditures are high, a small proportion of the children will go to school.

Assume that the household gains access to a loan B , to be repaid in the second period, given an interest rate and borrower transaction costs. We define r as the sum of the interest rate and per peso transaction costs. Thus, the cash flow for period $t=0$ becomes $[(1-\alpha) w L + B]$, and expenditures for period $t=1$ become $[C_1 + (1+r) B]$.

Utility comes only from consumption (C_0, C_1). The problem for the household is to choose the level of consumption for each period, C_b , the rate of schooling of the children α , and the optimal loan size B , in order to

$$\max_{C_0, C_1, \mathbf{a}, B} U(C_0, \mathbf{r}C_1) \quad s.t. \quad (1-\mathbf{a})wL + B = C_0 + \mathbf{a}E \quad ; \quad (1-\mathbf{a})wL + \mathbf{a}w'L = C_1 + (1+r).B \quad (1)$$

Here \mathbf{r} is the intertemporal discount factor, given by $(1/(1+\delta))$, and \mathbf{d} is the time discount rate for the household. Solving for C_0 and C_1 in the budget restrictions and substituting into the utility function, the problem becomes

$$\max_{\mathbf{a}, B} U((1-\mathbf{a})wL + B - \mathbf{a}E, \mathbf{r}[(1-\mathbf{a})wL + \mathbf{a}w'L - (1+r)B]) \quad (2)$$

The first order conditions for an optimum are given by

$$\frac{dU}{dC_0}(wL + E) = \mathbf{r} \frac{dU}{dC_1} L(w' - w) \quad (3)$$

$$\frac{dU}{dC_0} = \mathbf{r} \frac{dU}{dC_1} (1 + r) \quad (4)$$

The first condition implies that the marginal utility of current consumption, weighted by the sum of education expenses and forgone income from the last unit of labor used (LHS), which can be interpreted as the marginal cost of devoting a proportion α of the household's labor force to education, should equal the discounted marginal utility of future consumption, weighted by the difference between earnings from wage rates for skilled and unskilled labor (RHS), which can be interpreted as the discounted marginal benefit of educating a proportion α of the household's labor force.

The second condition implies that the marginal utility of the additional purchasing power from the loan in the initial period (LHS) should equal the discounted marginal disutility of loan repayment, given transaction costs and interest rates (RHS).

In order to incorporate *gender effects* in the model, following Sallee (2002), let us assume that the household's utility can be written as a Cobb-Douglas function, where the shares correspond to weights for females and males in the household.¹ If γ represents the proportion of women in the household and $(1-\gamma)$ the proportion of men, the utility function can be written as:

$$U(.) = U^F(C_0, C_1, E, B)^\gamma U^M(C_0, C_1, E, B)^{1-\gamma} \quad (5)$$

Although both components of utility depend upon the household's consumption and the education of the children, we assume that women have a stronger preference than men about the schooling.

The model accounts for the expected effects of microfinance on schooling decisions. The household's labor supply $(1-\alpha)L$ and the wage levels for skilled and unskilled workers (w and w') determine levels of income, while α accounts for the demand for child labor. The presence of B in the budget constraint accounts for the risk-management effect (as the loan facilitates both income and consumption smoothing). The shares γ in the utility function account for the gender effect, while the specific functional form can capture the information effect.

¹ Strictly speaking, the weights should reflect the shares of members making decisions about the household's levels of consumption, education and borrowing.

Using the implicit function theorem, the first-order conditions imply that optimal demand functions for education and credit exist, namely

$$\mathbf{a} = \mathbf{a}(w, w', E, r; L, \mathbf{g}, \mathbf{r}) \quad (6)$$

$$B = B(w, w', E, r; L, \mathbf{g}, \mathbf{r}) \quad (7)$$

The outcome of this decision-making process determines the optimal proportion of the household's potential labor force to be kept out of work and into education and the optimal size of loan to be demanded, as functions of the opportunity cost of education (wage-earning activities), expected future income, education expenses, and the cost of credit, given parameters about household size, the importance of women in the decision-making exercise, and the time discount rate.

Although this is a simple model, it identifies several key variables considered by households when making decisions about sending their children to school. With this conceptualization in mind, an econometric specification is necessary in order to capture the most important aspects of this model.

Econometric specification

From the first-order conditions, we see that the household decides on the amount of education by looking at the current marginal costs and expected future marginal benefits of education. The share of household members sent to school will be positive if the present value of net benefits is positive and it will be an increasing function of this present value.

The net expected utility from education can be expressed as a function of a vector of household and child characteristics (\mathbf{z}), observed by the researcher, and of a stochastic component of preferences, known to the parents but not observed by the researcher. Then, the expected net present value of schooling for a given child in the household (denoted by i) can be written as

$$\text{ENPV}_i = f(\mathbf{z}_i, \varepsilon_i) \quad (8)$$

This latent result cannot be measured. In its place, proxies for the potential determinants of the ENPV of schooling must be used. Further, given uncertainty about functional form and about unknown parameters, we must reinterpret the model in terms of probabilities: the **probability** that a child will be sent to school is the probability that his/her parents think that the household will be better off if he/she is studying:

$$\Pr(\text{schooling}_i) = \Pr[f(\mathbf{z}_i, \varepsilon_i) > 0] \quad (9)$$

Using the approach of the random utility model (RUM) and assuming the function f to be additively separable in deterministic and stochastic components (Haab and McConnell, 2002), the expected net present value of schooling can be written as:

$$f(\mathbf{z}_i, \varepsilon_i) = h(\mathbf{z}_i) + \varepsilon_i \quad (10)$$

Then, the probability of schooling can be rewritten as:

$$\Pr(\text{schooling}_i) = \Pr(h(\mathbf{z}_i) > \varepsilon_i) \quad (11)$$

According to the RUM, we can regress a binary dependent variable ($y_i = 1$ if the child is studying, $y_i = 0$ if the child is not studying) against the vector of observable and deterministic variables \mathbf{z}_i .

This specification has a drawback, however; we have to consider the possibility that, if the child is attending school this year, it does not mean that he/she had been able to attend during previous years. Therefore, a more dynamic framework is needed to capture the **accumulated** performance of each child.

The dependent variable used for the empirical estimation of the model is the **education gap**, measured as the number of years of the difference between the highest level of education actually completed by the child and the expected level of education, according to the child's age. The expected level of education is calculated as:

$$Expected\ education = \begin{cases} 0 & \text{if } age \leq 6 \\ (age - 6) & \text{if } 7 \leq age \leq 18 \\ 12 & \text{if } age > 18 \end{cases} \quad (12)$$

The education gap is then defined as:

$$Education\ gap = \max \{0, expected\ education - actual\ education\} \quad (13)$$

If the child successfully stayed at school up to the end of secondary education, the gap is zero. If she/he encountered problems (such as late entry, failed grades, or desertion), the gap is a positive number. If she/he never attended school, the gap is the level of expected education according to her/his age. As attendance to primary school is widespread, only children between 13 and 18 years old are considered in the analysis.

Because the dependent variable is a positive integer number, the estimation is specified as a **count** model, rather than as of ordinary least squares. To take into account the possibility of over-dispersion, all the estimations are adjusted through a negative binomial regression model. We use, therefore, a Poisson maximum likelihood regression with over-dispersion.

The explanatory variables, namely the vector \mathbf{z} , described in detail in the Annex, include variables required by the model and some control variables. The function h can be written as

$$h_i(z_i) = f(I_i, H_i, F_i, N_i, E_i) \quad (14)$$

where I_i refers to individual characteristics of the i th child (age, gender, position among his/her siblings). These are control variables expected to influence education achievements;

H_i refers to characteristics, for the i th child, of her/his household's wealth (*i.e.*, levels of education of working members, area of arable lands, and poverty, measured with an index of basic needs satisfaction). The level of schooling of working household members, a proxy for the stock of human wealth, is expected to improve the educational achievements of children. This variable can be used to reflect the household's income-earning capacity as well as perceptions about returns to education. Landholdings are a proxy for physical wealth and also reflect the potential demand for farm labor within the household. The index of basic needs satisfaction is a proxy for access to health facilities and other public services, such as potable water (*i.e.*, social wealth);

N_i refers to the environment surrounding the i th child (*i.e.*, a household living in a departmental capital, other urban center or a rural area);

E_i refers to empowerment, related to the importance of women in the decision-making process of the household of the i th child (*i.e.*, the proportion of the household's human capital held by working women). This variable captures the effect of the parameter γ in the specification of the demand for education; and

F_i refers to access to microfinance-cum-education, measured by the length of time a member of the household of the i -th child has been in the program (old versus new clients of CRECER). This variable is used to test for the impact of microfinance-cum-education on the schooling achievements of children.

The data

Bolivia is one of the poorest countries in Latin America. Deep inequalities and poor quality characterize its education outcomes. The average number of years of schooling completed declined from 4.2 in 1960 to 4.0 in 1980 and then increased to 5.5 in 2000 (Barro and Jong-Wha, 2000). Productivity and wages are very low for a large share of the working population. Over 45 percent of urban male workers earn less than US\$1 (PPP) a day (Duryea and Pagés, 2002).

In turn, over the past 15 years, Bolivia has experienced a strong development of microfinance (González-Vega and Rodríguez-Meza, 2002). MFOs, originally developed as employment-generation tools for excluded sectors of society, have grown into a competitive and sustainable segment of the Bolivian financial system. Outreach toward the rural areas is, however, limited.

The available dataset is made up of the results of two household surveys. One survey investigated households of microfinance clients of CRECER and SARTAWI in the municipality of Batallas (April 2001). This dataset includes 130 households, mainly from the countryside of the municipality (Romero, 2002).

The second dataset (November 2000) resulted from a survey of households of CRECER clients in five departments (Chuquisaca, Cochabamba, La Paz, Oruro, and Potosi). This dataset includes 427 households and about half of the sample comes from rural areas. Although the two surveys were designed with different purposes, they share the same structure. A large number of the same questions were asked in both cases.

For the analysis of education achievements, the children in school age (7 to 18 years old) were divided into two groups: primary-school children (7 to 12 years old) and high-school children (13 to 18 years old). The distribution of the sample is shown in Table 1. Tests with the sub-sample of children between 7 and 12 years old, a fairly homogeneous group, did not reveal any key significant differences. This paper focuses, therefore, on the sub-sample of children between 13 and 18 years old.

The results for the dependent variable, the education gap, are reported in Table 2. For the two samples, 56 percent of all children in school age show some education gap. The gap is larger among those 13 to 18 years old, with 66 percent of the sub-sample showing a gap. The CRECER dataset for five departments (national sample) shows 60 percent of all children and 71 percent of the 13-18 year old group with a gap. Most of the gaps correspond to one or two years of delay, with few cases of total abandonment of studies.

Based on years of education for each working member in the household, human capital indicators are presented in Table 3. The same table shows information about the participation of women in the labor force. Main statistics for the sub-sample of children in high school age (13 to 18 years old), by department, are presented in Table 4.

Results

The regression analysis examines the dependence of the education gap on the explanatory variables. The regressions test for the difference in education gaps between households that have had access to credit-cum-education (CRECER) for more than one year versus households with members with less experience in the program. The hypothesis is that access to credit and non-formal adult education makes a marginal difference in the size of the education gap. The results are shown in Table 5.

For the case of the national sample, the independent variable for access to credit is the number of months that the client had been a member of CRECER until the date of the survey. We do not have this information for the Batallas sample; instead, the sample was designed to include old clients –members for two years or more– and new clients –members for up to one year. For this sample, the independent variable is a dummy taking the value of one for old clients and of zero for new clients. The Batallas sample included 134 youths 13 to 18 years old, while the national sample included 346 youths.

In both cases, the coefficient for the microfinance program variable is negative and statistically significant (at the five-percent level for Batallas and ten-percent level for the national sample). The null hypothesis can thus be rejected. It appears that, *ceteris paribus*, children from households with a longer history of affiliation to microfinance programs have a greater chance of being kept longer in school in contrast to children from households just entering the program.

As expected, the coefficient for the variable *age* is significant and positive. That is, the older the child, the greater the probability that she/he will show an education gap.

The coefficient for the variable *gender* is positive although not significant. This is an important result. Lack of statistical significance means that there are no differences between girls and boys in their educational achievements. The results cannot show if this gender neutrality has been due to the influence of the MFO or not.

The *position* of the child compared to her/his siblings shows a positive and statistically significant effect on the education gap, supporting the hypothesis that position matters and that first daughters/sons are more likely to be sent to school than younger siblings.

The household's *human capital* (the average level of education of working members) significantly reduces the education gap. More educated household decision-makers have a greater propensity to encourage the education of their children. This may be facilitated by the higher incomes earned by more educated household workers.

The coefficient on agricultural *land* holdings is positive and significant. Farming appears to be a substitute or competition for education. This presents policymakers with a paradoxical result: increased opportunities to farm may pull children away from school. To the extent to which farming households tend to be the poorest, this may create a poverty trap for these households.

The coefficient for the *poverty* index is significant and shows the expected sign. That is, households with the least satisfaction of basic needs have children with greater education gaps. This reflects the high opportunity cost of the child's school attendance in households with a low productivity of labor and a tight budget constraint. In the absence of other productive household assets, expected returns from education also appear low.

The *empowerment* variable shows a significant coefficient for the Batallas sample, but it brings multicollinearity with several independent variables in the national sample. For this reason, it was dropped from the corresponding regression. For the Batallas regression, the coefficient for empowerment is negative and statistically significant. This indicates that the empowerment of women reduces the education gap for high-school children.

The dummy variables used to control for the type of household (rural, other urban, or departmental capital) are not significant at the 10-percent level. They are necessary, however, to provide consistency to the regression and to account for differences among types of household. For instance, if they are dropped from the regression, the coefficient related to landholdings becomes not significant, as landholdings have a different impact on rural than on urban households. For rural households, landholdings are a factor of production, which generate demands for the household members' labor, while for urban households land ownership mostly reflects wealth. Demands for child labor may still emerge in urban households if the children are asked to help in the microenterprise activities or help with childcare.

Over-dispersion was observed in both regressions, leading to the conclusion that the negative binomial regression model was the appropriate choice. With this method, over-acceptance of coefficient significance and over-rejection of the null hypothesis is avoided.

Conclusions

Poverty in Bolivia is dramatic, reducing standards of living not only for the current but also for the future generation. In the long term, the alleviation of poverty will require substantial improvements in education. This requires overcoming constraints from the supply as well as the demand side. The *demand* side of the education equation seems to be influenced by the attitudes, opportunities, and constraints of poor rural household members. Our results confirm this perspective. If a clear diagnosis is a precondition for the adoption of appropriate policies, important lessons, corroborated elsewhere, emerge from this study. Its results suggest that programs that improve the income-generating capacity of households and their ability to withstand adverse shocks can positively shift the demand for education.

Consistent with the threat of a poverty trap, deeper levels of poverty are associated with lower demands for education. The results for the index of basic needs satisfaction in all cases confirm a significant and unfavorable influence of poverty on education gaps. Educated household workers generate a stronger demand for the education of household children than non-educated household members do. Larger stocks of human capital are not only associated with higher household incomes but also with more optimistic perceptions about the returns from education. These outcomes reinforce the prediction of a poverty trap: more educated parents demand more education for their children. Non-formal adult education, through MFO credit-cum-education programs, may in part offset these attitudes.

The relationship between wealth levels and the demand for education may create, however, some policy dilemmas. First, greater access to land and, therefore, to opportunities for farming appear to increase the household's demand for child labor, as participants in the household's own productive activities. Land tenure policies, therefore, while increasing income opportunities for the household may, at the same time, increase the opportunity cost of keeping children at school. Similar effects might be created with the encouragement of household microenterprises.

Larger stocks of capital or land assets make these households search for additional labor inputs, given the highly labor-intensive technologies they use. The first source to fill this demand for labor is the family, thereby creating a trade-off between potential future welfare and the satisfaction of current needs. Even when household members are aware of some advantages from educating their children, given their precarious conditions they may be forced to sacrifice the potential flow of future benefits in order to compensate for extremely low current income flows. If, further, there is the perception that current employment options do not reward investments in education, the best alternative is to keep children at the farm or microenterprise since their early ages.

Unfortunately, at low levels of household income, this adverse impact of incentives to agricultural production and microenterprise development on the demand for education will be inevitable. Agricultural intensification policies, rather than land extensification, which substantially increase the productivity of available household labor and other resources and improve the returns on human capital, may be the only way out of this dilemma.

Another challenge presented by this dilemma is the demand of youth labor for childcare. As the nascent microenterprise demands the attention of older women in the household, an internal demand for childcare emerges, and this demand will be met by keeping older children at home. This effect will be stronger in younger families, because of the larger number of toddlers and the smaller number of adults in the household. The education component of microfinance programs may have an impact on the spacing of pregnancies and on the fertility rates of these women, and this may contribute to a reduction of this paradoxical threat to human capital formation (Romero, 2002).

The regression results imply a significant influence from the relationship with the MFO on the demand for schooling. Most likely, the most important influences of participation in the MFO program operate through the *income* and *risk-management* channels. The paper does not test, however, for the influence of the loans on household incomes and consumption smoothing strategies. Given the strong theoretical and empirical relationship between household income and the demand for education, nevertheless, to the extent to which these loans may have an influence on the level and stability of household incomes, this will be a strong channel for their influence on education gaps.

Additional positive impacts are generally associated with greater women empowerment. In general, women in the sample are aware of the threats to their children's education opportunities (Romero, 2002). The precise channel linking empowerment, access to credit, and a demand for education is yet to be determined.

We could not test for the influence of adult education in increasing awareness of the importance of schooling, as our results cannot separate the effects of the non-formal education component from those of the credit component.

A clear policy recommendation acknowledges the importance of access to credit and other financial services that allow households to postpone or smooth their consumption, in increasing their investment in education. MFOs in Bolivia have been able to reach segments of the rural population that otherwise would not have had access to these services and, to the extent to which they are cost-effective, this is a valuable development contribution. The sustainability and cost-effectiveness of these MFOs has not been evaluated, however, in this study.

References

- Bardhan, P., and C. Udry. 1999. *Development Microeconomics*. Oxford: Oxford University Press.
- Barro, R.J., and L. Jong-Wha. 2000. International Data on Educational Attainment: Updates and Implications. CID Working Paper No. 42. Harvard University.
- Becker, G. S. 1993. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. Chicago: The University of Chicago Press.
- Behrman, J. R., and J. C. Knowles. 1999. Household Income and Child Schooling in Vietnam. *The World Bank Economic Review*, 13 (2): 211-256.

- Behrman, J. R., and M. R. Rosenzweig. 2002. Does Increasing Women's Schooling Raise the Schooling of the Next Generation. *American Economic Review*, forthcoming.
- Behrman, J. R., R. Pollack, and P. Taubman. 1986. Do Parents Favor Boys? *International Economic Review*, 27 (1): 33-54 (February).
- Bils, M., and P. Klenow. 2000. Does Schooling Cause Growth? *American Economic Review*, 90 (5): 1160-1183.
- Deaton, A. 1997. *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*. Baltimore: The Johns Hopkins University Press.
- Duryea, S., and C. Pagés. 2002. Human Capital Policies: What They Can and Cannot Do for Productivity and Poverty Reduction in Latin America. Working Paper No. 468. Washington, D.C.: InterAmerican Development Bank.
- González-Vega, C. 1998. Do Financial Institutions Have a Role in Assisting the Poor? *Strategic Issues in Microfinance*, M. Kimenyi, R. Wieland, and J.D. Von Pischke (eds). Aldershot: Ashgate.
- González-Vega, C. 2003. Deepening Rural Financial Markets: Macroeconomic, Policy and Political Dimensions, paper for "Paving the Way Forward: An International Conference on Best Practices in Rural Finance, Washington, D.C., 2-3 June.
- Gonzalez-Vega, C., and J. Rodriguez-Meza. 2002. "La Situacion Macroeconomica y el Sector de las Microfinanzas en Bolivia," report prepared for the SEFIR/DAI Project, La Paz, Bolivia.

- Grootaert, C., and H. A. Patrinos (eds.). 1999. *The Policy Analysis of Child Labor: A Comparative Study*. Volume 1. New York: St. Martin's Press.
- Haab, T. C., and K. E. McConnell. 2002. *Valuing Environmental and Natural Resources: The Econometrics of Non-Market Valuation*. Cheltenham: Edward Elgar Publishing..
- Jacoby, H., and E. Skoufias. 1997. Risk, Financial Markets and Human Capital in a Developing Country. *Review of Economic Studies*, 64 (3): 311-335 (July).
- Jensen, P., and H. S. Nielsen. 1997. Child Labour or School Attendance? Evidence from Zambia. *Journal of Population Economics*, 10: 407-424.
- Kanbur, R., and L. Squire. 2001. The Evolution of Thinking about Poverty. *Frontiers of Development Economics: the Future in Perspective*, G. Meier and J. Stiglitz (eds.). Washington, D.C.: The World Bank.
- Khandker, S. 1998. Fighting Poverty with Microcredit. Experience in Bangladesh. Washington, D.C.: The World Bank.
- Krueger, A., and M. Lindahl. 2000. Education for Growth: Why and for Whom? NBER Working Paper No. W7591. Cambridge, Ma.: National Bureau of Economic Research.
- Lardé de Palomo, A. and A. Argüello de Morera. 2000. La incorporación tardía de los niños rurales al sistema escolar: causas y posibles soluciones. *Boletín Económico y Social No. 177* (August). San Salvador: FUSADES.
- Lillard, L. A., and R. J. Willis. 1994. Intergenerational Educational Mobility: Effects of Family and State in Malaysia. *Journal of Human Resources*, 29 (4): 1126-1166.

- McElroy, M. 1997. The Policy Implications of Family Bargaining and Marriage Markets. *Intrahousehold Resource Allocations in Developing Countries: Models, Methods, and Policy*, L. Haddad, J. Hoddinott, and H. Alderman (eds.). Baltimore: The Johns Hopkins University Press.
- Meyer, R. 2002. Track Record of Financial Institutions in Assisting the Poor in Asia. Paper for the Capacity Building Seminar on the Role of Financial Intermediaries for Poverty Reduction, Singapore (March). Asian Development Bank Institute.
- MkNelly B., and C. Dunford. 1999. Impact of Credit with Education on Mothers and their Young Children's Nutrition: CRECER, Credit with Education Program in Bolivia. Freedom from Hunger Research Paper No. 5, Davis, California.
- Moffitt, R. 1991. Program Evaluation with Non-experimental Data. *Evaluation Review*, 15 (3): 291-314.
- Morduch, J. 1995. Income Smoothing and Consumption Smoothing. *Journal of Economic Perspectives*, 9: 103-114.
- Nanda, P. 1999. Women Participation in Rural Credit Programmes in Bangladesh and their Demand for Formal Health Care: Is there a Positive Impact? *Health Economics*, 8 (5): 415-428.
- Navajas, S., M. Schreiner, R. Meyer, C. González-Vega, and J. Rodríguez-Meza. 2000. Microcredit and the Poorest of the Poor: Theory and Evidence from Bolivia. *World Development*, 28 (2): 333-346 (February).

- Navajas, S., and C. Gonzalez-Vega. 2002. "Innovacion en las Finanzas Rurales. Financiera Calpia, en El Salvador" in Mark D. Wenner, Javier Alvarado and Francisco Galarza (eds.), *Practicas Prometedoras en Finanzas Rurales. Experiencias de America Latina y el Caribe*. Lima: Centro Peruano de Estudios Sociales, Banco Interamericano de Desarrollo and Academia de Centroamerica.
- Patrinos, H. A., and G. Psacharopoulos. 1997. Family Size, Schooling and Child Labor in Peru: An Empirical Analysis. *Journal of Population Economics*, 10:387-405.
- Phipps, S., and P. Burton. 1995. Social/Institutional Variables and Behavior within Households: an Empirical Test Using the Luxembourg Income Study. *Feminist Economics*, 1 (1): 151-174.
- Pitt, M., and S. Khandker. 1998. The Impact of Group-based Credit Programs on the Poor in Bangladesh: Does the Gender of Participants Matter? *Journal of Political Economy*, 106 (5): 958-96 (October).
- Psacharopoulos, G. 1997. Child Labor versus Educational Attainment: Some Evidence from Latin America. *Journal of Population Economics*, 10:377-386.
- Quiros, R., J. Rodriguez-Meza, and C. Gonzalez-Vega. 2003. "La Teconología de Crédito Rural de CRECER en Bolivia," report prepared for the SEFIR/DAI Project, La Paz, Bolivia.
- Ravallion, M. 2001. The Mystery of the Vanishing Benefits: an introduction to Impact Evaluation. *The World Bank Economic Review*, 15 (1): 115-140.
- Ray, D. 1998. *Development Economics*. Princeton: Princeton University Press.

- Rodriguez-Meza, J., and C. Gonzalez-Vega. 2003. "La Teconología de Crédito Rural de Caja Los Andes en Bolivia," report prepared for the SEFIR/DAI Project, La Paz, Bolivia.
- Romero, V. 2002. Impacto del microcrédito en la vida de las mujeres y sus hijos: análisis comparativo de casos de estudio de FFH/CRECER y SARTAWI en el municipio de Batallas. Master's thesis. Universidad Andina Simón Bolívar.
- Sallee, J. 2001. The Effect of Improved Female Status on Child Health: Empirical Evidence from India. Winner, The Ohio State University Undergraduate Essay Competition.
- Schultz, T. W. 1961. Investment in Human Capital. *American Economic Review*, 51 (1): 1-17 (March).
- Schultz, T. W. 1993. The Role of Education and Human Capital in Economic Development: an Empirical Assessment. *Economic Growth in the World Economy*, H. Siebert (ed). Institut fur Weltwirtschaft an der Universitat Kiel.
- Thomas, D. 1990. Intra-household Resource Allocation: an ilferential Approach. *Journal of Human Resources*, 25 (4): 635-664.

Annex 1. Variables used

The explanatory variables have been grouped according to the classes defined as follows:

Individual characteristics:

- **Age:** measures the child's age in years. The expected sign is positive; the older the child, the more likely that she/he will show an education gap. This is a control variable.
- **Gender:** this is an instrumental (dummy) variable that takes the value of zero if the child is a boy, and the value of one if the child is a girl. The expected sign is positive, under the hypothesis that, within the Aymara culture, the value of the girls' education is less than the value of the boys' education; girls should show a larger education gap.
- **Position.** This variable assigns the value of one to the oldest child in the household, two to the next, and so on. When there are granddaughters/ grandsons in the household, the value of one is again assigned to the oldest child, two to the second one, and so on. A positive relationship between this variable and the gap is expected, under the assumption that the oldest children are more likely to be kept in school than the younger ones.

Household characteristics:

- **Human capital.** This variable is measured as the number of years of schooling accumulated by the workers of the household divided by the number of workers. The expected sign is negative, under the hypothesis that if the workers (who usually make decisions about the children's education) have higher levels of education, they will have a stronger preference for schooling and the gap will be smaller. Also, the level of the workers' human capital is an indicator of their income-generating capacity and, therefore, of their ability to pay for education expenses.
- **Own arable lands.** This variable shows the size of the plots of land owned by the household and used for crops or other productive activities, measured in hectares. The sign will be positive if, when the household owns land, it is likely that it will demand the child's labor time for farming activities, in competition with school time. The sign may be negative, however, if the variable influences education through the level of the household's wealth and consumption-smoothing tools.

- **Poverty Index.** This variable is based on the poverty index used in Navajas *et al.* (2000), adopted from the 1992 *Mapa de Pobreza* for Bolivia. For each household, the index of minimum satisfaction of basic needs (health, access to public services, such as water and electricity, housing materials and overcrowding, and literacy and education) was used here with a special adjustment; the education component of the original index was dropped, in order to avoid endogeneity problems in the estimation. The expected sign is negative; the higher the index of basic needs satisfaction, the less poor the household is estimated to be, and the smaller the expected education gap will be. The assumption is that greater poverty increases the opportunity cost of keeping children at school and that it also reduces the prospective yields of education.

Environmental characteristics:

- **Type of household.** This variable considers the difference between household living in the rural areas, the urban areas, and capital cities. It is constructed through dummy variables. Capital cities is the dropped variable in the econometric analysis. It can be expected for the rural dummy to be positive compared to the control (capital cities) if the hypothesis is that rural areas are less likely to have children with good educational performance. For the urban non-capital cities compared to the capital cities there is no expected sign.

Financial program characteristics:

- **Old client.** For the Batallas clients, the survey was designed in order to compare new clients (less than one year) with old clients (more than two years). This differentiation was used in the regression analysis incorporating a dummy variable that takes the value of one for old clients.
- **Months of affiliation to CRECER.** For the national Crecer dataset, the variable to measure exposure to the credit was the computed amount of months that the oldest client in the household has been a member of the organization.

Empowerment characteristics:

- **Human capital held by worker women.** This variable measures the proportion of the accumulated human capital measured by the number of years of schooling held by the women who work in each household. The expected sign is negative to assert that empowerment reduces the educational gap. There was some doubts that this variable would be correlated with human capital variable, but the relationship was weak.

Table 1. Composition of samples by age of household member and type of borrower

	AGE				RURALITY				
	7 to 12	13 to 18	7 to 18	Other ages	Total	Capital	Urban	Rural	Total
SARTAWI									
Batallas	71	68	139	219	358			358	358
CRECER									
Batallas	78	67	145	261	406			406	406
Total Survey 1	149	135	284	480	764			764	764
CRECER									
Chuquisaca	28	21	49	86	135	114	0	21	135
CRECER									
Cochabamba	126	100	226	467	693	108	277	308	693
CRECER									
La Paz	134	147	281	520	801	0	227	574	801
CRECER									
Oruro	90	75	165	361	526	382	25	119	526
CRECER									
Potosí	16	13	29	58	87	0	61	26	87
Total Survey 2	394	356	750	1492	2242	604	590	1048	2242
Total Two surveys	543	491	1034	1972	3006	604	590	1812	3006

Source: client household surveys

Table 2. Education gaps in the sample of children, according to age groups.

Educational Gap (years)	Batallas			CRECER			TOTAL		
	7 to 12	13 to 18	7 to 18	7 to 12	13 to 18	7 to 18	7 to 12	13 to 18	7 to 18
0	94 63%	62 46%	156 55%	195 49%	103 29%	298 40%	289 53%	165 34%	454 44%
1	32 21%	28 21%	60 21%	119 30%	103 29%	222 30%	151 28%	131 27%	282 27%
2	9 6%	13 10%	22 8%	44 11%	49 14%	93 12%	53 10%	62 13%	115 11%
3	2 1%	7 5%	9 3%	16 4%	29 8%	45 6%	18 3%	36 7%	54 5%
4	6 4%	4 3%	10 4%	8 2%	15 4%	23 3%	14 3%	19 4%	33 3%
5	3 2%	6 4%	9 3%	7 2%	10 3%	17 2%	10 2%	16 3%	26 3%
6	3 2%	1 1%	4 1%	5 1%	12 3%	17 2%	8 1%	13 3%	21 2%
7	-	3 2%	3 1%	-	17 5%	17 2%	-	20 4%	20 2%
8	-	6 4%	6 2%	-	3 1%	3 0%	-	9 2%	9 1%
9	-	4 3%	4 1%	-	0 0%	0 0%	-	4 1%	4 0%
10	-	1 1%	1 0%	-	6 2%	6 1%	-	7 1%	7 1%
11	-	0 0%	0 0%	-	3 1%	3 0%	-	3 1%	3 0%
12	-	0 0%	0 0%	-	5 1%	5 1%	-	5 1%	5 0%
Total	149	135	284	394	355	749	543	490	1,033

Source: client household surveys

Table 3. Human capital formation by households in microfinance clients

	Chuqui- saca	Cocha- bamba	La Paz	Oruro	Potosí	Total CRECER	Total BATALLAS
Observations (households)	23	130	154	104	16	427	130
Household size	5.9	5.3	5.2	5.0	5.4	5.2	5.9
Workers	2.6	2.2	3.2	2.6	2.1	2.7	3.9
Female workers	1.1	1.2	1.7	1.4	1.1	1.4	2.1
Household human capital	22.6	27.6	24.9	27.7	34.3	26.6	27.6
Female human capital	10.1	14.5	11.2	14.4	12.7	13.0	11.6
Workers human capital	11.3	15.3	18.9	19.4	15.0	17.4	22.7
Female workers human capital	4.3	7.6	7.9	9.2	6.6	7.9	10.0
Average household human capital	3.6	5.2	4.7	5.5	6.0	5.0	4.9
Average workers human capital	4.4	7.0	6.0	7.4	7.4	6.6	5.8
Average female workers human capital	7.8	12.0	7.6	10.8	11.3	9.8	5.8
Women human capital / household human capital	0.50	0.53	0.43	0.53	0.48	0.49	0.43
Female workers human capital / Household workers human capital	0.37	0.50	0.42	0.53	0.51	0.47	0.44
Female workers / household workers	0.47	0.58	0.54	0.60	0.56	0.56	0.54

Source: client household surveys

Table 4. Main statistics for the sub-sample of high school children (13-18 years old)

Variable	Chuqui-saca	Cocha-bamba	La Paz	Oruro	Potosí	CRECER	BATALLAS
Observations	21	100	146	75	13	355	135
Education gap	3.0	1.9	2.3	1.9	2.8	2.2	1.8
Age	15.2	15.5	15.4	15.4	15.5	15.4	15.3
Gender	0.5	0.6	0.5	0.6	0.4	0.6	0.5
Household size	7.1	6.5	6.9	6.3	6.7	6.7	6.8
Number of students in the household	3.0	3.4	3.4	3.3	4.0	3.4	3.6
Number of children in the household	3.8	3.9	4.1	3.5	3.2	3.9	4.1
Position of child in the family	2.5	2.2	2.5	2.4	3.1	2.4	2.1
Average human capital of family members	3.9	5.9	5.3	6.5	6.9	5.7	5.3
Average human capital of family workers	4.1	6.7	5.7	7.6	7.8	6.4	5.8
Holdings of land	0.6	0.3	2.8	2.8	0.0	1.8	1.4
Basic needs satisfaction index	1.0	1.0	0.8	0.9	0.9	0.9	0.8
Distance to school	15.6	12.0	24.2	11.7	7.7	17.2	30.0
Proportion living in capital cities	0.9	0.1	0.0	0.7	0.0	6.0	0.0
Proportion living in other urban centers	0.0	0.4	0.2	0.0	0.7	4.0	0.0
Proportion living in rural areas	0.1	0.5	0.8	0.2	0.3	1.0	1.0
Proportion of old clients	0.1	0.5	0.4	0.3	0.2	0.4	0.4
Months of affiliation	3.3	19.3	21.7	12.6	12.6	17.8	N/A
Human capital of female workers	9.6	17.8	10.3	15.0	12.8	13.4	6.3
Working women as a fraction of total workers	0.42	0.59	0.53	0.58	0.44	0.55	0.53
HK of women as a fraction of HK of household	0.52	0.59	0.45	0.55	0.38	0.51	0.42
HK of worker women as a fraction of HK of total workers	0.38	0.53	0.40	0.52	0.37	0.46	0.43

Source: client household surveys

Table 5. Results of regressions.

Dep. Var. EDU GAP	Batallas			Creceer		
Variable	Coeff.	Std Dev	P>z	Coeff.	Std Dev	P>z
Permanence as CRECER client ²	-0.63	0.28	0.03	-0.01	0.00	0.08
Age	0.21	0.08	0.01	0.15	0.04	0.00
Gender	0.04	0.26	0.89	0.10	0.13	0.46
Position				0.15	0.05	0.01
Household human capital	-0.02	0.01	0.02	-0.02	0.01	0.00
Poverty Index	-0.89	0.54	0.10	-0.66	0.30	0.03
Land holdings	0.10	0.05	0.08	0.00	0.01	0.79
Female workers human capital	-0.10	0.04	0.01			
Urban dummy ³				-0.26	0.19	0.16
Rural dummy				0.14	0.16	0.38
Constant	-1.02	1.30	0.43	-1.01	0.69	0.15
Overdispersion	1.12	0.28	0.00	0.91	0.12	0.00
Number of obs.	134			346		
LR chi2(k)	30.02			31.84		
Prob. > chi2	0.00			0.00		
Pseudo R2	0.06			0.02		

² For Batallas regressions, the variable is a dummy with value one for old clients. For CRECER regressions, the variable is the number of months as a client

³ The excluded variable is Departmental Capital.