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An Empirical Analysis of Gender Bias in Education Spending in Paraguay

by

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ABSTRACT

Gender affects household spending in two areas that have been widely studied in the literature. One strand documents that greater female bargaining power within households results in a variety of shifts in household production and consumption. An important source of intrahousehold bargaining power is ownership of assets, especially land. Another strand examines gender bias in spending on children. This paper addresses both strands simultaneously. In it, differences in spending on education are examined empirically, at both the household and the individual level. Results are mixed, though the balance of evidence weighs toward pro-male bias in spending on education at the household level. Results also indicate that the relationship between asset ownership and female bargaining power within the household is contingent on the type of asset.

Keywords: Gender Bias; Education; Assets; Intrahousehold Allocation; Latin America; Paraguay

JEL Classifications: C39, D13, J13, J16

I. INTRODUCTION

This paper attempts to organize thinking about the impact of gender on household decision making processes and to apply that organized framework to the task of assessing the impact of gender on the composition of education expenditures in Paraguay. I explore two aspects of gendered patterns in expenditure decision making within households. First, I examine the importance of female bargaining power (as measured by the proxies of female landownership, homeownership, and female income share). Second, I investigate the occurrence of bias in spending on children in the household based on their sex. The empirical analysis focuses on education spending.

Gender patterns in decision making can be divided into two broad categories. The first category includes systematic differences in economic decision making between sexes, presumably the result of gender formation or, more controversially, inherent differences. We could call these *subjective gender patterns*, since the focus is on the decision maker. The second category includes systematic differences in the allocation of resources depending on the sex of the recipients. These patterns could be called *objective gender patterns*, since the focus is on the object of the decision (this is commonly referred to as *gender bias*). This breakdown could certainly be applied to extrahousehold phenomena, as well as interactions between households and institutions, by characterizing the various sides of such interactions by gender. And so, individuals in households could occupy a number of positions with respect to various instances of gender patterns in a given context. For example, a female household head could be on the receiving end of pro-male extrahousehold gender patterns (perhaps by not being approved for a farm production loan that an otherwise identical male household head would receive), while simultaneously being the agent of pro-male intrahousehold gender patterns (for example, leaving the lion's share of her land to her eldest son). Since this paper explicitly focuses on intrahousehold phenomena, from this point forward all mentions of gender patterns will refer to the intrahousehold variety.

There is a wide and growing literature within the intersection of development economics and feminist economics on both types of gender patterns. Most of the literature falls into one or the other category. With the empirical work, this is doubtless

due to the data available. The information necessary to assess objective gender patterns (information about actual decision making processes and power) is rarely available. This lack of data means that the presence of objective gender patterns must usually be inferred. Data on spending on an individual level is much more common. Therefore, the presence of subjective gender patterns lends itself much more easily to detection in many cases.

Literature that attempts to describe the presence of gender patterns frequently focuses on outcomes. The prevalence of such studies is easy to understand, since the analysis is fairly straightforward and the data required is relatively easy to acquire. However, when researchers attempt to directly test for evidence of gender patterns in intrahousehold allocation, several obstacles immediately present themselves. First, the ideal data required for analyzing gender patterns (information on not only expenditures on every item by individual within household, but also information regarding how decisions are made) is almost never available.

Many of the studies on subjective gender patterns have focused on outcomes, employing indirect testing for gender patterns. The circumstantial evidence for the existence of pro-male bias has been documented widely. In numerous studies, boys are found to have better school outcomes (Behrman, Pollak, and Taubman 1982; Deolalikar 1993; Davies and Zhang 1995; Nkamleu and Kielland 2006) or to have better health outcomes (Rosenzweig and Schultz 1982; Bairagi 1986; Das Gupta 1987; Rosenzweig and Wolpin 1988; Senauer, Garcia, and Jacinto 1988). However, finding evidence of actual pro-male bias in intrahousehold resource allocation has been more elusive (Kingdon 2005).

Much of the literature on intrahousehold resource allocation that focuses on objective gender patterns studies how decisions are made within the household and the differential impact that bargaining power by gender has on household welfare in general. From a starting point of the unitary household model (in which households are assumed to be units within which egalitarian principles automatically apply to the distribution of resources among members, or are enforced by a benevolent dictator), the theory of the household has moved on to more nuanced analyses of intrahousehold distributional dynamics. Bargaining models allow us to consider the role of the relative bargaining

positions of different household members in distribution decisions (Folbre 1984). For the most part these models assume binary pairs of "players," bargaining over who gets what. Early models assumed Pareto efficient outcomes, but empirical evidence does not support that assumption. We are left with an analysis in which outcomes are determined by the relative bargaining positions of household members and the institutional structures within which they interact, which need not necessarily be technically or allocatively efficient (Udry 1996; Agarwal 1997).

In many of these studies, the gender balance of power is measured using income. Studies of income effects on household welfare show that female income provides an advantage (Senauer, Garcia, and Jacinto 1988; Thomas 1990; Brown, Yohannes, and Webb 1994). Refinements of this type of study have examined the "lumpiness" of income to show that food expenditures depend on gender-disaggregated seasonal income flows (Hopkins, Levin, and Haddad 1994). The general conclusion drawn from these studies is that greater female income leads to greater spending on household welfare (food, health care, and education). Others have theorized that control over land should have a similar affect (Agarwal 1994). The extension to assets in general will be under closer scrutiny in this study.

Few studies attempt to analyze both aspects of gender's impact on household welfare simultaneously. This paper represents an attempt to do just that. The rest of the paper is organized as follows. Section II lays out the data I use in my analysis, the methods I employ, and the model I use. Section III presents the results of the analysis for household-level spending. Section IV presents the results of the analysis of individual-level spending. Section V summarizes the conclusions to be drawn from the analysis and suggests some ways forward.

II. DATA AND METHODS

The data used in this analysis is from the 2000–2001 Encuesta Integrada de Hogares (MECOVI 2001). The survey is based on the World Bank Living Standards Measurement Survey model. It is wide-ranging and fairly comprehensive, with detailed information about consumption expenditures and income-generating activities. There are important

details missing for the purpose of this paper, unfortunately. Specifically, there is no information about the ownership of specific assets (the ownership of homes and land would be especially good to know more about) or about decision making within the household. The survey frame is a stratified random sample, with the two strata defined as urban and rural, based on the definitions in Paraguay's decennial census. Of the 8,131 households in the overall survey, however, only 2,862 were asked about their consumption expenditures; of those households, 2,113 included children. These households comprise the sample for this analysis. While the overall survey is nationally representative, I cannot say that the subset is as well.[1] In the remainder of the paper, I will be implicitly talking about this sample of households.

The method used follows Kingdon (2005). The regression model is an application of the Working and Leser specification of the Engel curve:

$$s_i = \alpha + \beta \ln\left(\frac{x_i}{n_i}\right) + \gamma \ln(n_i) + \sum_{j=1}^{J-1} \theta_j \left(\frac{n_{ji}}{n_i}\right) + \eta z_i + \mu_i$$

where s_i is the share of household expenditures, x_i is total household expenditure, n_i is the number of household members, n_{ji} is the number of household members in age-sex category j, z_i is a vector of household characteristics, and μ_i is a stochastic error term, all for household i (Kingdon 2005). Household characteristics used include the age and years of education of the household head, dummy variables for land- and homeownership, and the dependency ratio (number of individuals in the household under 18 or over 64 divided by the total number of household members). I test for the presence of objective gender patterns using a set of variables for the age-sex composition of the household, the share of household members falling into the following categories: boys and girls, aged 0–4, 5–9, 10–14, 15–19, and 20–24. To test for subjective gender patterns, I add variables that are proxies for female bargaining power within the household: *MotherOwns* and *MotherOwnsHome* for female ownership of land and home; and *incshare*, the share of household income earned by the female spouse or partner. This model allows me to

[1] Missing values were multiply imputed using a hot-decking procedure (Reilly 1993; Cranmer and Gill 2007).

simultaneously detect both objective and subjective gender patterns in the allocation of consumption expenditure. I apply this model to spending on food and education. Since I want to estimate the impact of female bargaining power, I limit the sample to households with a male and a female, as head and spouse.[2]

In order to deal with the endogeneity of the woman's share of household income, I run a Heckman selection model using the above variables as independent variables, along with years of education and age of the female and the income quintile of the household. In the selection equation, the dependent variable is an indicator for positive female income. As independent variables, I use the additional variables just mentioned, as well as presence of children in the household. With the results of this regression, I create a new variable *incshare2*, which is the residual from the Heckman regression, with the exception that I set *incshare2* equal to zero if the original *incshare* is zero.

I follow Kingdon's comparative approach, running OLS on the complete sample of households with children and then estimating a probit equation for positive spending on education, and finally an OLS regression for those households with positive spending. The motivation for this is that, as Kingdon points out, the most common method in the literature is to run an OLS regression on spending for all households. But since a significant number of households will spend zero, this introduces bias into OLS regression coefficients. Using the Tobit regression is a possible solution, but it imposes the assumption that decisions about whether to spend (on education, for example) and how much to spend are made the same way. Hurdle models offer advantages over Tobit, in that they are two stage estimators: the first stage estimates the maximum likelihood function for positive spending and the second stage estimates the determinants of the amount of spending (Kingdon 2005). Finally, I run separate regressions for rural and urban households, after testing whether the coefficients were significantly different between the two. Using the adjusted Wald test, I was able to reject the null hypothesis that all of the coefficients were the same for rural and urban households at the 1% confidence level.

The central question is the presence of gender patterns. In the case of objective gender patterns, this will be tested using *F* tests on marginal effects within age cohorts—

[2] Note that none of these households are classified as male-headed in the survey.

if the marginal effect of age-sex category shares is significantly different by sex within age category, this constitutes evidence that the data cannot refute the presence of subjective gender patterns. In the case of subjective gender patterns, the significance (both statistical and economic) of marginal effects of my proxies for female bargaining power within the household is the test. Any conclusions based on these tests come with qualifications, of course. Finding consistent significant results would mean that the data are not inconsistent with subjective gender patterns. But given the nature of the data at hand, it would fall short of proof; rather it would constitute a failure to disprove the hypothesis.

Table 1 shows that there are certainly gendered differences in educational outcomes in Paraguay. Illiteracy is significantly higher among women and in rural areas. Enrollment rates and private school attendance rates are significantly lower in rural areas. Enrollment rates are lower and private school attendance rates are higher, but not significantly so, for females.

Summary statistics for the variables I use in the analysis are presented in table 2. In rural households, the average share of expenditures going to education is significantly lower than in urban households.[3] Rural households spend, on average, less than one-half of what urban households spend per capita. Rural households are also larger than the average urban household by more than one-half of a person. Rural households have a significantly greater share of younger children.

The primary female in rural households is less than half as likely to own a home as her urban counterpart, although urban households are only slightly more likely to own homes.[4] Rural households are twice as likely to own land as urban households. Rural households have an extra half a dependent per household member compared to their urban counterparts. Primary females are much more likely to have no income in rural households than urban, while almost none of the rural households have a primary female as the sole income earner. Because of these two dynamics, I report the female share of income both for all households and for those households in which it is non-zero. In both

[3] For testing the significance of difference in mean values, I used the STATA command *svy : mean* in combination with the *lincom* post-estimation command to generate the t values reported in table 1. The same method is used for table 2.

[4] For both land and home ownership, only those households with title are counted as owners. For those households that say they own land or their home but have no title, no individuals are listed as owners.

cases, it is significantly smaller in rural households than urban households, though in the non-zero case the differences are much smaller.

Next, I compare shares of household expenditure going to education by area and various gender variables (see table 3). Rural households with male children devote significantly greater shares of their spending to education, while in urban areas the difference in education shares is negative, but not statistically significant. This evidence is consistent with an objective gender pattern at work, at least in rural households. Rural households with female land rights spend more and urban households with female land rights spend significantly less on education. Female homeownership is associated with significantly greater spending on education in rural areas. The preliminary analysis thus looks promising, at least in terms of finding evidence of objective gender patterns. The evidence of subjective gender patterns is mixed.

III. EDUCATION SPENDING BY HOUSEHOLDS

I report the results of the regression analysis in table 4 for rural households and table 5 for urban households. The first two columns in tables 4 and 5, entitled "Probit and Conditional OLS," report results for the maximum likelihood estimate of spending on education by the household and the log of share of expenditures for education, given non-zero spending, respectively. The third column reports the combined marginal effect for each independent variable, computed from the results in the first two columns. The last column reports the results of the OLS regression of share of spending on education for all rural households. What is immediately obvious is that determinants of the decision to spend and how much to spend can behave quite differently. This is the sort of insight that hurdle models can bring to the analysis. For example, the share of females in rural households aged 20 to 25 significantly decreases the likelihood of spending on education, but increases the share spent in the event that spending does occur. Comparing the marginal effects to the OLS results provides some contrasts, as well.

Looking first at the results in table 4, for rural households' decision on whether and how much to spend on education, spending per capita and household size were both positive and significant for the decision to spend, but not significant for the amount of

spending. Households with more educated heads were significantly more likely to spend on education, but those households do not spend significantly more than others. All of the age-sex category shares for children aged 5 to 14 were positive and significant for the decision to spend, while the share of females aged 20 to 24 significantly decreased the likelihood of spending on education. But for the amount of spending, only the shares of male and female children aged 10 to 14, males aged 15 to 19, and females aged 20 to 24 were significant and positive, while the share of boys aged 0 to 4 significantly decreased the share of spending on education. The latter result suggests that households with young boys might be foregoing spending on their older children to save for the future education of the young boy.

The combined marginal effect incorporates the results of the probit and conditional OLS regression. We see that the marginal effect of the share of boys aged 0 to 4 in the household is negative and significant, while the effect of shares of children aged 5 to 14 were positive.

Turning to the proxies of female bargaining within the household, the ownership of assets by women has a significant impact on the decision to spend on education, but not on the share of expenditures devoted to education. Interestingly, the direction of the effect is negative for landownership and positive for homeownership. Their combined marginal effects on education spending are not significant. While the OLS regression shows some similarities to the combined marginal effects, we can see important cases that are misleading. For example, the indicator for no female income is negative and significant in the OLS regression, but not in either of the probit or conditional OLS regressions, or in the combined marginal effect. Also, the estimated coefficient share of female children aged 20 to 24 is significant and positive, which follows the conditional OLS result, but masks the negative effect on the decision to spend on education.

The decision to spend on education ("Probit" column in table 5) by urban households increases significantly with per capita spending. For all children aged 5 to 14 the estimated coefficients are large, positive, and significant. The share of female children aged 0 to 4 significantly decreased the likelihood of education spending of the urban household. In terms of the female bargaining power proxy variables, only the estimated coefficients for primary female homeownership and the indicator for no

income for the primary female were statistically significant, but with countervailing signs: the latter was negative, while the former was positive. In terms of the share of spending on education in urban households, we can see from the regression of the conditional shares of education spending ("Conditional OLS" column, table 5) that households that own homes, households that have higher dependency ratios, and households with more educated household heads spend a significantly greater share on education. The years of education of the household head has a relatively small impact on the share of spending on education. The share of females aged 0 to 4 significantly decreased spending, while the share of males aged 15 to 24 increased it significantly. Looking for signs of subjective gender patterns, we find that the estimated coefficients for mothers owning a home are significantly different from zero, large, and negative, while the estimated coefficient for female share of income is positive and significant.

The estimated marginal effects on urban households' education spending shows more statistical significance in general. Expenditures per capita, household size, and landownership all significantly increase education spending, while additional years of education for the household head significantly decreases it. The latter result is a contrast with both the rural results and with the probit conditional OLS and OLS regressions for urban households. The age-sex shares follow the rural pattern. Children aged 0 to 4 reduce the share of education spending, while children aged 5 to 19 increase it. These results are all significant with the exception of females aged 15 to 19. The contrast here is for males aged 20 to 24, the share of which increases education spending significantly. Mothers that own land or have no income decreased education spending shares, while the female income share increased it.

The presence of objective gender patterns requires that the marginal effects for each age category be significantly different for the two sexes (for example, $ME_{sM0509} \neq ME_{sF0509}$). Table 6 reports the difference in marginal effects (the marginal effect of the share of boys minus the marginal effect of the share of girls) on education spending. An *F* test of this hypothesis rejected the null hypothesis that the effects were equivalent in all age categories in urban areas, and for ages 0 to 4 and 10 to 14 in rural areas. Among rural households, male children aged 0 to 14 reduced spending, while in urban areas the opposite was true. In urban households spending was lower for higher shares of male

children aged 10 to 14, but higher for all other categories. Confining attention to school-age children, three of four significant results are positive, so there does seem to be evidence of objective gender patters (specifically pro-male bias) in education spending, though it is far from clear-cut.

The evidence for subjective gender patterns among rural households is scant and contradictory. Women owning land reduces the likelihood of spending on education, while owning homes increases it. Among urban households the evidence is stronger, though no less contradictory. Women owning land has an overall negative impact on education spending, while women owning homes has a positive effect on the spending decision, but a negative effect on the amount, which cancel each other out in the combined effect. More suggestively, no female income reduces the likelihood of spending and the likely amount of spending, while the female income share raises the amount and positively impacts the combined effect. Among urban households then, we may say that there is a gender pattern, affected by bargaining power more strongly determined by income rather than asset ownership.

IV. EDUCATION SPENDING ON INDIVIDUALS

Kingdon (2005) supplements her household analysis with an analysis of individual spending in India to see if aggregation is hiding gender bias that may be more visible at the individual level. I also continue my analysis on disaggregated individual-level spending data. Table 7 reports average spending (in millions of guaranies) on individuals by sex and area. Statistical significance is verified with *t* tests. Spending is significantly lower in rural areas for every age-sex combination, but, within age and area, the differences between spending on boys and girls is not statistically significant anywhere. Indeed, average spending is *greater* on boys than girls in urban areas.

The regression analysis follows the same methodology as that in the household-level analysis, with the exception that the unit of analysis is now the individual. This focus has certain implications for the analysis. First, the regressions are now run within age categories. Second, we now have one dummy indicator, *male*, in place of the age-sex category shares. Third, the presence of objective gender patterns will be tested with the

significance of the male indicator, rather than as the significance of the difference in marginal effects. In addition, I add interaction terms between *male* and *MotherOwns* and *MotherOwnsHome*. The results of the analysis are reported in tables 8 and 9 for rural and urban households, respectively.

In rural areas, expenditures per capita have a consistently positive and significant effect on the decision to spend, as well as the amount of education spending, as expected. This effect is, in all cases, not carried over to the marginal effect, which, though positive, is not significant. Household size positively and significantly impacts the decision to spend on children aged 10 and up, and significantly increases the amount spent on those aged 15 to 19. Higher dependency ratios increase the likelihood of spending on education on 5- to 10- and 15- to 19-year-olds, and landownership and more years of education increases spending on 5- to 10-year-olds.

The measure of objective gender patterns, *male*, has two significant impacts in this analysis. There is a significantly greater likelihood of spending on the education of male children between 10 and 14; there is significantly less spending on the education of boys aged 15 to 19 among individuals on whom positive sums were spent. In all age groups, the combined marginal effect is economically small and not statistically significant. In all age groups, the signs for mothers owning land and homes are opposite. Subjective gender patterns also do not appear to be overwhelmingly in evidence. Households with landowning mothers spend significantly more on 15- to 19-year-olds. Households with homeowning mothers are more likely to spend on 5- to 9-year-olds and spend *less* on 15- to 19-year-olds. Households with higher female share of income spend more on 10- to 14-year-olds and are more likely to spend on 15- to 19-year-olds.

The interaction terms between *male* and *MotherOwns* and *MotherOwnsHome* are interesting. The signs for the coefficients of the two interaction terms are opposite in each age group and opposite of the asset ownership variables as well. Although mostly not statistically significant, this pattern is curious. Significant impacts include: households in which the mother owns land spend more on boys aged 5 to 9 and households with mothers that own homes are less likely to spend on boys aged 5 to 9 and spend less on boys aged 5 to 9 and 10 to 14.

Turning to urban households (table 9) we see some similarities. Households with higher expenditures per capita are significantly more likely to spend on education and spend significantly more as well. Notably, the combined marginal effect of expenditures per capita is significant in the 10 to 14 and 15 to 19 age groups in urban areas. Household size has no significant impact on spending among urban households. Higher dependency ratios significantly increase the likelihood of spending on the education of 5- to 10-year-olds, while significantly increasing the amount spent on 5- to 9- and 15- to 19-year-olds. Higher dependency ratios also have a significant positive marginal effect on education spending on 10- to 14- and 15- to 19-year-olds. Older household heads are significantly more likely to spend on the education of 10- to 19-year-olds, and spend significantly more on 15- to 19-year-olds. More educated household heads spend significantly more on 5- to 10- and 15- to 19-year-olds, and the combined marginal effect is significantly positive for the latter group.

There is thin evidence for objective gender patterns in urban areas. The only statistically significant result is that boys aged 10 to 14 are more significantly likely to receive education spending. This result does match the rural finding. For subjective patterns, we have another mixed bag. There are no significant impacts of mothers owning land in urban households (no doubt due to the lower incidence of landholdings in urban areas). Households in which the mother owned the home spent significantly less on the education of 5- to 10- and 15- to 19-year-olds. For the latter group, this result also holds in rural households. Households in which the mother earned no income were less likely to spend on the education of 5- to 10-year-olds, but the share of female income had no statistically significant impacts. The interaction terms had no significant impact in urban households.

V. CONCLUSIONS

This analysis perhaps raises more questions than it answers. Consistent results for objective gender patterns across areas were few and far between at the individual level: there was significantly greater likelihood of spending on boys aged 10 to 14 and significantly less spending on children aged 15 to 19 among households in which mothers

owned homes. At the household level, the increase in education spending from the share of boys aged 10 to 14 was significantly greater than that of girls aged 10 to 14 in both urban and rural areas. But, in the case of children aged 0 to 4, the impact of the share of boys decreases education spending more in the rural areas and decreases it less in urban areas than the share of girls. So is there pro-male gender bias in education spending in Paraguay? At the household level, five of seven significant differences in marginal effects were pro-male. At the individual level, two of three significant results were pro-male. On balance then there seems to be a pro-male bias in education spending, but it is not consistent across areas and age groups.

Why should there not be more uniformity with regard to objective gender patterns between town and country? Certainly, if the results supported the argument that the town was more or less biased than the country (in terms of objective gender patterns), there might be an argument about differing gender norms in the two areas. But there is no consistent difference between town and country other than urban households spending more on education, and this is surely due to differences in household income and opportunity.

The picture is even less clear for subjective gender patterns. At the household level, female landownership had negative impacts (when significant), while at the individual level, the only significant impact was positive. Where significant, female homeownership had positive impacts on the decision to spend, but negative impacts on the amount of spending. This, at least, was consistent across areas and age groups. Female income share had a positive impact in the rare case that it had any significant impact. Given that the effects of female ownership of different types of assets and female income generation differ so greatly, we are left to speculate at why this might be so.

Another interesting aspect of this analysis is that gender patterns seem to be more pronounced at the aggregate household level than at the individual level. The motivating question for the Kingdon study was whether aggregation into households was masking gender bias (Kingdon 2005). Indeed, Kingdon finds greater evidence of gender bias at the individual level than at the household level. In this study, I find the opposite: more evidence at the household than at the individual level.

More detailed information about asset ownership and decision making is sorely needed to enable further analysis that can point the way towards effective policy interventions. More detailed knowledge about ownership will certainly help to refine our understanding of bargaining power. Without it, parsing the results presented here is akin to an exercise in fantasy. One might be tempted to argue that the different results were traceable to the fact that land is more of an income-generating asset than a home, so it confers greater bargaining power. But the impact of homeownership was more similar to the impact of income share than was landownership, so it is difficult to see the relationship between women's economic empowerment within the household and bargaining power, at least as reflected in spending on education.

The question of how this study might inform policy is instructive in underlining the need to better understand the dynamics at play. If we want to encourage education spending by households, for example, should we encourage female homeownership (perhaps by requiring joint title within couples)? If we want to improve educational outcomes for females, should policy be designed to increase female landownership instead?

On the broader topic of the nature of gender patterns, more careful attention to the nuances of gender processes within households will, I think, be quite fruitful. Separating out agency and recipiency will add to our understanding of the dynamics of intrahousehold resource allocation. In some cases, there is broad overlap, as in studies of labor allocation to plots owned by individuals of different sexes within households. But in cases in which those affected by decisions have little or no direct influence in decision making, there are likely to be at least two layers of gender processes in play.

TABLES

Table 1. Literacy, Enrollment, and Private School Enrollment by Area and Sex

Sex	Rural		Urban	
	Literacy			
	Illiterate	Literate	Illiterate	Literate
Male	18.44	81.56	9.87	90.13
Female	21.86	78.14	11.2	88.8
	Enrollment			
	Not Enrolled	Enrolled	Not Enrolled	Enrolled
Male	24.15	75.85	12.44	87.56
Female	20.27	79.73	11.76	88.24
	Type of School			
	Public	Private	Public	Private
Male	95.63	4.37	72.54	27.46
Female	94.68	5.32	70.13	29.87

Source: MECOVI (2001)

Table 2. Summary Statistics of Regression Variables by Area

	Urban		Rural		
	Mean	Linearized Std. Err.	Mean	Linearized Std. Err.	t value
Education Share of Expenditures	0.074	0.006	0.033	0.002	-5.932**
Education Expenditures (millionG/individual)	0.141	0.014	0.045	0.003	-6.57**
Expenditures per capita (G1,000)	620.399	36.066	259.932	13.472	-9.363**
Household Size	5.021	0.163	5.750	0.216	2.693**
Share of male children 0-4	0.062	0.005	0.081	0.008	2.066*
Share of female children 0-4	0.045	0.005	0.072	0.005	3.912**
Share of male children 5 to 9	0.051	0.005	0.074	0.006	2.823**
Share of female children 5-9	0.054	0.006	0.055	0.004	0.139
Share of male children 10-14	0.039	0.005	0.067	0.006	3.902**
Share of female children 10-14	0.046	0.004	0.056	0.004	1.71†
Share of male children 15-19	0.044	0.004	0.050	0.005	0.91
Share of female children 15-19	0.055	0.005	0.043	0.005	-1.636
Share of male children 20-24	0.034	0.003	0.038	0.004	0.665
Share of female children 20-24	0.054	0.006	0.042	0.005	-1.62
Mother Owns Land	0.030	0.010	0.042	0.011	0.772
Land Owner	0.135	0.019	0.287	0.031	4.231**
Mother Owns Home	0.111	0.017	0.044	0.012	-3.251**
Home Owner	0.415	0.034	0.295	0.034	-2.51*
No Female Income	0.342	0.022	0.545	0.036	4.783**
Female Share of Income	0.018	0.010	0.002	0.001	-1.738†
Female Share of Income[a]	0.198	0.015	0.116	0.013	-4.137**
Dependency Ratio	0.770	0.027	1.245	0.062	7.058**
Age of HH Head	45.253	0.717	44.981	0.797	-0.253
Years of Education of HH Head	10.130	0.420	4.467	0.211	-12.038**

*Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

Notes: a. This is only for those households with non-zero primary female income.

Table 3. Shares of Spending on Education, by Area and Gender

	Mean	Linearized Std. Err.	Mean	Linearized Std. Err.	t value
	Without Boys		**With Boys**		
Rural	0.025	0.004	0.038	0.003	2.864**
Urban	0.090	0.017	0.076	0.007	-0.796
	No Female Land Rights		**Some Female Land Rights**		
Rural	0.036	0.003	0.062	0.016	1.644
Urban	0.079	0.007	0.057	0.009	-2.043*
	No Female Homeowner		**Female Homeowner**		
Rural	0.036	0.003	0.061	0.012	2.009*
Urban	0.079	0.007	0.074	0.009	-0.531

*Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

Table 4. Rural Regression Results

	Probit	Conditional OLS	Combined Marginal Effect	OLS
Expenditures per Capita	0.305	-0.052	0.008	0.006
	(0.169)†	(0.123)	(0.006)	(0.004)
log of Household Size	1.495	0.018	0.043	0.026
	(0.458)**	(0.330)	(0.019)*	(0.008)**
Share of female children 0–4	-0.465	-1.024	-0.037	-0.021
	(1.185)	(0.760)	(0.035)	(0.024)
Share of male children 0–4	-1.573	-1.751	-0.085	-0.046
	(1.457)	(0.746)*	(0.047)†	(0.021)*
Share of female children 5–9	3.709	-0.389	0.097	0.01
	(1.481)*	(0.937)	(0.052)†	(0.028)
Share of male children 5–9	3.757	-0.042	0.106	0.027
	(1.402)**	(0.827)	(0.050)*	(0.027)
Share of female children 10–14	4.815	1.625	0.175	0.1
	(1.246)**	(0.666)*	(0.060)**	(0.026)**
Share of male children 10–14	5.818	1.547	0.202	0.089
	(1.369)**	(0.588)**	(0.067)**	(0.023)**
Share of female children 15–19	-0.32	1.073	0.015	0.045
	(1.073)	(0.797)	(0.035)	(0.021)*
Share of male children 15–19	-1.373	2.002	0.006	0.055
	(1.176)	(0.778)*	(0.046)	(0.025)*
Share of female children 20–24	-2.028	1.556	-0.022	0.035
	(0.756)**	(0.882)†	(0.043)	(0.019)†
Share of male children 20–24	0.022	-0.695	-0.015	-0.028
	(1.136)	(0.728)	(0.032)	(0.018)
Mother Owns Land	-1.136	0.535	-0.004	0.021
	(0.416)**	(0.410)	(0.020)	(0.023)
Land Owner	0.287	-0.114	0.000	-0.001
	(0.250)	(0.165)	(0.007)	(0.006)
Mother Owns Home	1.013	0.271	0.014	0.008
	(0.520)†	(0.529)	(0.021)	(0.023)
Home Owner	-0.195	0.058	0.000	0.004
	(0.259)	(0.161)	(0.007)	(0.007)
No Female Income	-0.169	-0.18	-0.006	-0.007
	(0.185)	(0.127)	(0.006)	(0.004)†
Female Share of Income	0.826	0.013	0.024	0.008
	(0.525)	(0.385)	(0.017)	(0.013)
Dependency Ratio	-0.148	0.202	0.000	0.002
	(0.149)	(0.086)*	(0.005)	(0.004)
Age of HH Head	0.007	-0.002	0.000	0.000
	(0.011)	(0.007)	(0.000)	(0.000)
Years of Education of HH Head	0.085	0.023	0.003	0.001
	(0.030)**	(0.017)	(0.001)*	(0.001)†
Observations	739	557	557	739
R-squared		0.18		0.27

*Standard errors in parentheses. Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

Table 5. Urban Education Regression Results

	Probit	Conditional OLS	Combined Marginal Effect	OLS
Expenditures per Capita	1.168	0.035	0.060	0.007
	(0.220)**	(0.128)	(0.008)**	(0.006)
log of Household Size	0.711	0.248	0.048	0.026
	(0.598)	(0.164)	(0.013)**	(0.009)**
Share of female children 0–4	-3.104	-1.757	-0.241	-0.093
	(1.489)*	(0.889)*	(0.074)**	(0.049)†
Share of male children 0–4	-2.467	1.261	-0.185	-0.085
	(1.530)	(0.807)	(0.061)**	(0.053)
Share of female children 5–9	7.509	1.221	0.434	0.127
	(2.400)**	(0.840)	(0.064)**	(0.079)
Share of male children 5–9	4.309	0.454	0.237	0.017
	(2.100)*	(0.644)	(0.042)**	(0.041)
Share of female children 10–14	6.689	0.428	0.354	0.054
	(3.141)*	(0.795)	(0.053)**	(0.047)
Share of male children 10–14	17.22	0.108	0.863	0.02
	(5.501)**	(0.847)	(0.070)**	(0.049)
Share of female children 15–19	0.092	1.222	0.065	0.079
	(1.350)	(0.827)	(0.060)	(0.047)†
Share of male children 15–19	1.025	2.095	0.155	0.137
	(1.764)	(0.716)**	(0.075)*	(0.053)*
Share of female children 20–24	-0.253	0.735	0.024	0.017
	(1.150)	(0.707)	(0.047)	(0.036)
Share of male children 20–24	1.311	1.786	0.154	0.15
	(1.221)	(0.871)*	(0.074)*	(0.055)**
Mother Owns Land	-0.852	-0.055	-0.045	0.002
	(0.822)	(0.288)	(0.017)*	(0.018)
Land Owner	0.86	-0.192	0.033	-0.016
	(0.572)	(0.190)	(0.013)*	(0.014)
Mother Owns Home	0.675	-0.324	0.017	-0.037
	(0.383)†	(0.122)**	(0.012)	(0.009)**
Home Owner	-0.278	0.379	0.005	0.03
	(0.238)	(0.105)**	(0.013)	(0.007)**
No Female Income	-0.464	0.094	-0.018	-0.002
	(0.194)*	(0.086)	(0.006)**	(0.006)
Female Share of Income	0.565	1.035	0.058	0.065
	(0.756)	(0.266)**	(0.034)†	(0.023)**
Dependency Ratio	0.142	0.216	0.012	0.009
	(0.325)	(0.106)*	(0.009)	(0.008)
Age of HH Head	0.025	0.005	0.000	0.001
	(0.015)	(0.007)	(0.000)	(0.000)
Years of Education of HH Head	0.003	0.042	-0.795	0.004
	(0.027)	(0.010)**	(0.042)**	(0.001)**
Observations	892	799	799	892
R-squared		0.27		0.34

*Standard errors in parentheses. Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

Table 6. Difference in Marginal Effects

	Rural	Urban
Share of children 0–4	-0.0483 **	0.0561 **
Share of children 5–9	0.0093	-0.1973 **
Share of children 10–14	0.0269 *	0.5094 **
Share of children 15–19	-0.0089	0.0901 **
Share of children 20–24	0.0072	0.1302 **

*Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

Table 7. Education Spending on Individuals by Area and Sex

		Urban		Rural		
		Mean (millions G)	Std. Err.	Mean (millions G)	Std. Err.	t
Age 5 to 9	Female	0.281	0.003	0.057	0.000	-4.129**
	Male	0.213	0.001	0.069	0.000	-4.759**
	t	-1.169		1.466		
Age 10 to 14	Female	0.287	0.001	0.113	0.000	-4.971**
	Male	0.278	0.001	0.113	0.000	-5.839**
	t	-0.273		-0.001		
Age 15 to 19	Female	0.348	0.002	0.100	0.000	-5.856**
	Male	0.344	0.008	0.075	0.000	-2.923**
	t	-0.042		-1.341		

*Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

Table 8. Rural Individual Regression Results

	Ages 5 to 9				Ages 10 to 14				Ages 15 to 19			
	Probit	Conditional OLS	Combined Marginal Effect	OLS	Probit	Conditional OLS	Combined Marginal Effect	OLS	Probit	Conditional OLS	Combined Marginal Effect	OLS
Log of Expenditures per capita	0.09	0.682	0.036	0.043	0.857	0.691	0.137	0.09	0.48	0.62	0.121	0.075
	(0.182)	(0.093)**	(0.079)	(0.008)**	(0.167)**	(0.079)**	(0.125)	(0.012)**	(0.172)**	(0.140)**	(0.091)	(0.019)**
Log of Household Size	-0.275	0.016	-0.015	-0.008	0.44	0.033	0.044	0.014	0.425	0.815	0.123	0.065
	(0.258)	(0.184)	(0.035)	(0.012)	(0.204)*	(0.174)	(0.047)	(0.013)	(0.226)†	(0.244)**	(0.110)	(0.018)**
Male	-0.004	0.093	0.004	0.011	0.359	-0.006	0.005	0.005	0.063	-0.264	-0.012	-0.016
	(0.151)	(0.129)	(0.022)	(0.007)	(0.141)*	(0.077)	(0.030)	(0.008)	(0.166	(0.096)**	(0.041)	(0.016)
Mother Owns Land	-1.32	-0.511	-0.036	-0.07	-0.646	-0.06	-0.019	-0.007	0.898	0.654	0.165	0.225
	(0.918)	(0.478)	(0.140)	(0.037)†	(0.767)	(0.441)	(0.109)	(0.083)	(0.593	(0.146)**	(0.152)	(0.033)**
Land Owner	1.046	-0.022	0.012	0.015	0.362	-0.2	-0.011	0.002	-0.064	-0.226	-0.017	-0.031
	(0.422)*	(0.130)	(0.079)	(0.012)	(0.416)	(0.188)	(0.062)	(0.017)	(0.238	(0.131)†	(0.048)	(0.023)
Mother Owns Home	6.759	0.511	0.054	0.099	1.023	0.429	0.057	0.125	-0.011	-1.036	-0.041	-0.186
	(0.678)**	(0.342)	(0.468)	(0.029)**	(0.874)	(0.402)	(0.139)	(0.073)†	(0.645	(0.184)**	(0.150)	(0.041)**
Home Owner	-0.727	0.096	-0.010	-0.014	-0.497	0.248	0.011	-0.006	0.194	0.244	0.030	0.048
	(0.446)	(0.183)	(0.065)	(0.014)	(0.447)	(0.196)	(0.072)	(0.018)	(0.251	(0.139)†	(0.055)	(0.023)*
Male x Mother Owns Land	1.115	0.87	0.088	0.094	0.364	0.378	0.045	0.027	-0.810	-0.431	-0.049	-0.186
	(0.853)	(0.412)*	(0.148)	(0.029)**	(0.577)	(0.414)	(0.108)	(0.068)	(1.220)	(0.293)	(0.215)	(0.071)**
Male x Mother Owns Home	-6.416	-0.787	-0.047	-0.119	-1.224	-1.143	-0.069	-0.188	0.325	0.59	0.088	0.146
	(0.007)**	(0.324)*	(0.447)	(0.021)**	(0.827)	(0.475)*	(0.225)	(0.075)*	(1.160)	(0.391)	(0.199)	(0.073)*
No Female Income	-0.047	-0.051	-0.003	-0.007	0.234	0.128	0.014	0.01	-0.189	-0.039	-0.015	-0.021
	(0.145)	(0.139)	(0.021)	(0.008)	(0.184)	(0.085)	(0.033)	(0.010)	(0.167)	(0.100)	(0.036)	(0.016)
Female Share of Income	0.51	0.367	0.046	0.006	0.260	0.464	0.063	0.046	1.185	0.077	0.209	0.091
	(0.657)	(0.291)	(0.081)	(0.022)	(0.495)	(0.270)†	(0.097)	(0.036)	(0.611)†	(0.281)	(0.165)	(0.050)†
Dependency Ratio	0.190	-0.104	0.006	0.001	0.109	0.047	0.014	0.002	0.169	0.049	0.032	0.019
	(0.089)*	(0.115)	(0.023)	(0.003)	(0.098)	(0.046)	(0.015)	(0.004)	(0.084)*	(0.07)	(0.025)	(0.011)
Age of HH Head	0.008	0.006	0.001	0.000	0.01	0.007	0.002	0.001	0.000	0.008	0.000	0.000
	(0.007)	(0.007)	(0.001)	(0.000)	(0.013)	(0.007)	(0.002)	(0.001)	(0.007)	(0.006)	(0.002)	(0.001)
Years of Education of HH Head	0.073	0.027	0.005	0.005	0.041	0.025	0.006	0.002	0.047	0.012	0.009	0.004
	(0.029)*	(0.018)	(0.007)	(0.001)**	(0.033)	(0.022)	(0.007)	(0.003)	(0.036)	(0.021)	(0.008)	(0.003)
Observations	3560	2645	2645	3560	3540	3010	3010	3540	2505	1045	1045	2505
R-squared		0.25		0.26		0.26		0.25		0.29		0.18

*Standard errors in parentheses. Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

Table 9. Urban Individual Regression Results

	Ages 5 to 9				Ages 10 to 14				Ages 15 to 19			
	Probit	Conditional OLS	Combined Marginal Effect	OLS	Probit	Conditional OLS	Combined Marginal Effect	OLS	Probit	Conditional OLS	Combined Marginal Effect	OLS
Log of Expenditures per capita	0.439	0.919	0.219	0.181	0.997	0.827	0.367	0.225	0.291	0.557	0.228	0.227
	(0.226)†	(0.125)**	(0.215)	(0.029)**	(0.236)**	(0.106)**	(0.144)*	(0.035)**	(0.163)†	(0.073)**	(0.113)*	(0.055)**
Log of Household Size	-0.347	-0.114	-0.078	-0.052	-0.416	0.222	-0.039	0.037	-0.416	0.054	-0.128	0.015
	(0.255)	(0.216)	(0.082)	(0.044)	(0.581)	(0.147)	(0.057)	(0.041)	(0.253)	(0.159)	(0.095)	(0.060)
Male	-0.16	-0.234	-0.042	-0.037	0.777	0.003	0.002	-0.026	0.099	-0.152	-0.023	0.046
	(0.307)	(0.146)	(0.079)	(0.037)	(0.332)*	(0.065)	(0.023)	(0.020)	(0.199)	(0.121)	(0.068)	(0.086)
Mother Owns Land		-0.525		0.182		0.021		0.035	0.325	0.46	0.189	0.327
		(0.356)		(0.222)		(0.287)		(0.075)	(0.715)	(0.577)	(0.270)	(0.209)
Land Owner	-0.089	0.152	-0.066	0.018		-0.064		-0.08	0.352	-0.104	0.013	-0.061
	(0.261)	(0.174)	(0.157)	(0.069)		(0.143)		(0.046)†	(0.201)†	(0.134)	(0.081)	(0.069)
Mother Owns Home	0.756	-0.498	0.045	-0.139		-0.154		-0.045	-0.494	-0.531	-0.143	-0.252
	(0.543)	(0.166)**	(0.122)	(0.057)*		(0.217)		(0.065)	(0.483)	(0.207)*	(0.173)	(0.106)*
Home Owner	-0.606	0.29	-0.080	0.015	-0.597	0.094	0.017	0.018	0.335	0.193	0.086	0.108
	(0.226)**	(0.105)**	(0.139)	(0.036)	(0.348)†	(0.098)	(0.077)	(0.040)	(0.171)†	(0.087)*	(0.073)	(0.048)*
Male x Mother Owns Land		-0.168		-0.41		0.273		0.229	0.024	-0.082	-0.011	-0.123
		(0.408)		(0.236)†		(0.393)		(0.186)	(0.850)	(0.604)	(0.284)	(0.227)
Male x Mother Owns Home		0.143		0.084		0.063		0.109	0.527	0.323	0.253	0.116
		(0.307)		(0.091)		(0.210)		(0.117)	(0.542)	(0.275)	(0.179)	(0.115)
No Female Income	-0.451	-0.02	0.028	-0.062	-0.073	-0.027	-0.006	-0.014	-0.167	0.105	-0.032	-0.012
	(0.184)*	(0.138)	(0.089)	(0.041)	(0.317)	(0.073)	(0.040)	(0.023)	(0.168)	(0.109)	(0.060)	(0.044)
Female Share of Income	-0.132	0.571	-0.049	0.296	0.68	0.214	0.106	0.168	0.54	-0.043	0.173	0.156
	(0.569)	(0.408)	(0.141)	(0.192)	(0.604)	(0.223)	(0.066)	(0.080)*	(0.488)	(0.262)	(0.160)	(0.107)
Dependency Ratio	0.32	0.201	0.078	0.074	0.569	0.074	0.134	0.039	0.233	0.178	0.120	0.052
	(0.108)**	(0.084)*	(0.098)	(0.031)*	(0.408)	(0.053)	(0.034)**	(0.020)†	(0.159)	(0.089)*	(0.064)†	(0.040)
Age of HH Head	0.014	0.006	-0.001	0.003	0.069	0.004	0.069	0.002	0.018	0.015	0.010	0.006
	(0.013)	(0.006)	(0.039)	(0.002)†	(0.035)*	(0.005)	(0.113)	(0.002)	(0.010)†	(0.005)**	(0.005)*	(0.003)†
Years of Education of HH Head	0.012	0.025	0.091	0.013	0.005	0.014	0.014	0.004	0.021	0.024	0.013	0.013
	(0.032)	(0.014)†	(0.170)	(0.005)**	(0.029)	(0.010)	(0.056)	(0.003)	(0.018)	(0.010)*	(0.007)†	(0.006)*
Observations	2950	2555	2555	2950	2900	2835	2835	2900	2960	1975	1975	2960
R-squared		0.54		0.43		0.47		0.42		0.43		0.35

*Standard errors in parentheses. Significance levels: † : 10% * : 5% ** : 1%*

Source: MECOVI (2001)

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