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Abstract

This paper explores the determinants of female land rights and their impact on household income levels among owner-operated farms in Brazil, Paraguay and Peru. Previous studies in Latin America suggest that the gender of the household head is not a significant predictor of household income, not unsurprising given the ambiguities with which self-declared headship is associated. We hypothesize that female land rights, by increasing women's options, are a positive determinant of household income, but given the disadvantages that they face as farmers, that their land rights will more likely impact upon off-farm rather than farm income. Regression analysis indicates that female land rights are positively related to off-farm income in Peru and Paraguay, but significantly so only in the case of dual-headed households in Peru where the bargaining power thesis is operative. They are negatively associated with farm income in both countries and with farm revenue in Brazil.

Introduction

Do women's land rights make a difference in terms of welfare outcomes for women and their families? Feminist theory strongly supports this proposition. As Agarwal (1994) has argued and Deere and León (2001) and others elaborated upon, women's lands rights should enhance their welfare, efficiency and bargaining power and hence contribute to their empowerment as well as their attainment of real equality with men. Yet in the case of Latin America the quantitative empirical evidence supporting these propositions is relatively thin. This paper thus explores the impact of female land rights on household income levels in three South American countries—Brazil, Paraguay and Peru—addressing the question of whether female land rights contribute to higher rural household incomes and if so, if their impact is through farm or off-farm income.

There is a growing literature showing the importance of off-farm income and specifically, non-agricultural income, to rural households in Latin America. Reardon, Berdegué and Escobar (2001), summarizing household surveys undertaken for twelve countries in the 1990s, report that non-agricultural income accounts for a weighted average of 40 percent of rural household incomes. But only a few of the econometric studies that investigate the determinants of the level and composition of rural household income have taken gender into account. Those that do only consider the gender of the self-declared household head. Studies of Chile, Nicaragua, and Peru suggest that the gender of the household head is not a significant predictor of total household income levels (Berdegué, et. al. 2001; Escobal 2001; Corral and Reardon 2001).

This result is not too surprising given the ambiguities with which self-declared headship is associated (Rosenhouse 1994; Rogers 1995; Buvinic and Gupta 1997). For example, a female-headed household does not necessarily mean that no male is present or that the principal, adult female of the household does not have a partner. Similarly, a male-headed household does not always correspond to one where the man is the main income earner or contributor to the household. Cultural norms in Latin America, backed by legal codes until recently, have supported the practice of considering the husband the head if a household includes a married couple. Nonetheless, sometimes other factors, such as temporary male absence or even if a man is present, the woman's higher earnings or greater ownership of assets or age lead women to declare themselves the household head. Such cases are not uncommon and may be related to the prevalence of consensual unions rather than formal marriages. All of these factors suggest that self-declared headship is a problematic variable for the investigation of gender differences among rural households.

Few household surveys until recently inquired into the ownership of assets such as land and the gender of the owner. The usual assumption in the agrarian studies literature is that owner-operated farms are the property of the household head. As Deere and León (2001, 2003) argue, this is an unsatisfactory assumption for several reasons. First, a "family farm" is often made up

of a number of parcels, each which may have different ownership. These parcels may be owned independently by the husband or wife, jointly by them, or in co-ownership with other family members or others. Second, legal property rights within marriage are defined according to the marital regime under which a couple contracts marriage.[2] In most Latin American countries couples may choose among several options and the default regime (that which governs if no option is declared) varies by country. Moreover, consensual unions are quite prevalent in rural areas of a number of Latin American countries and their legal status and hence, property rights, also vary by country.

In this study we go beyond previous work on the determinants of rural household income levels by testing for the impact of female land rights on income levels among households with owner-operated farms. We also distinguish between dual-headed households (characterized by the presence of a couple consisting of an adult man and woman), those with a self-declared female head, and those female-headed households with no adult male present.[3] Following the recent literature, we employ the term "dual-headed" or "two-headed" as a demographic category, one that makes no assumptions about power relations within the household, to distinguish them from households with only a single working-age adult or head (Hamilton 1998). This convention also conforms to recent legal changes in Latin American civil codes that vest formal headship on both husband and wife for purposes ranging from household representation, to management of the community property of the couple, to control over and responsibility for children (Deere and León 2001).

We hypothesize that female land rights should have a positive impact on all types of households since land ownership should improve the options of all rural women. Specifically, female land rights should increase women's economic autonomy by allowing them greater choice in whether to concentrate their efforts on agricultural production or to diversify into off-farm activities. To the extent that off-farm opportunities are available, we expect that women's ownership and control of assets might allow them to undertake more remunerative off-farm activities either because of a credit effect (due to the role of land as collateral) or because women landowners are able to rent or sharecrop their land and use this income as capital for off-farm activities.

A bargaining power hypothesis is only directly relevant to dual-headed households, those that have both an adult man and women present. In this case we expect female land rights, by enhancing their fall-back position, to increase women's bargaining power within the household and for their greater bargaining power to result in a greater efficiency of household labor

[2] Until recently, the bargaining power literature largely ignored the property rights implications of different marital regimes. See Fafchamps and Quisumbing (2002) for an insightful analysis of the importance of this variable in Ethiopia.

[3] We exclude truly male-headed households (where no adult female is present) from our analysis since our interest is in testing the impact of female land rights.

allocation. Greater bargaining power should result in women's greater participation in household decision-making allowing them, for example, to overcome chauvinistic male preferences regarding their participation outside the home. Women's greater participation in decision-making could also result in more efficient decisions because these are based on a higher degree of consensus. Increases in women's bargaining power may also impact positively upon household income indirectly, by increasing labor productivity as a result of the greater attention paid to health care and education in maternal spending patterns.

The bulk of the literature inspired by a bargaining power framework has focused on the intra-household allocation of resources (Haddad, Hoddindot and Alderman 1997). The main hypothesis that has been tested empirically in the Latin American case is that the enhanced bargaining power of women within the household as a result of their owning land leads to different expenditure patterns, reflecting gender-based preferences. Katz and Chamorro (2003), for example, show that female land rights in Honduras and Nicaragua lead to small, but positive and significant increases on expenditures on food and child education attainment.

Here we test a different hypothesis: that female land rights in dual-headed households should impact positively upon net household income primarily because women's increased bargaining power results in higher levels of off-farm income. We expect off-farm income, rather than farm income, to be positively influenced by women's land rights due to the noted disadvantages faced by women farmers—less access to land, inputs, credit, technical assistance, etc. (Deere and León 2001). Unfortunately, data limitations do not allow us to explore the precise mechanisms that promote greater efficiency in household labor allocation.

The recent availability of three data sets that include information on the gender of the landowner allow us to test the general hypothesis and to investigate the determinants of women's land rights. The Paraguayan and Peruvian data are from the nationally representative Living Standard and Measurement Surveys (LSMS), sponsored by the World Bank The Brazilian data are from a national survey of commercial farmers.[4] Our analysis focuses on the sub-set of owner-operated farm households.[5] The three countries are all South American middle-income countries with per

[4] The Paraguayan LSMS is known as the 2000-01 MECOVI (Mejoramiento de las Encuestas de las Condiciones de Vida) and was carried out by the Ministry of Agriculture and Livestock, Asunción. It includes information on 8,131 households, 40.5 percent of which are rural. The Peruvian LSMS is the 2000 ENNIV (Encuesta Nacional de Niveles de Vida) and was carried out by the Instituto Cuanto, Lima. It consists of 3,977 households, 34.2 percent of which are rural. The Brazilian farm survey, the Censo Comunitario Rural 2000, was carried out by the Confederação Nacional Agraria and includes 39,904 commercial farms, defined as proprietors with farms larger than 50 hectares.

[5] Outliers with respect to farm size and/or net household income (defined as being greater than five standard deviations from the mean) were excluded from the three sub-samples. In addition,

capita incomes below the regional mean, and with an important share of their rural population with incomes below national poverty lines.[6] In addition, they all have the same default marital regime, that of partial community property, known as *gananciales* (participation in profits).[7]

In the next section we define our various measures of women's land rights and control over land and set the stage for the comparative analysis. The third section addresses how women acquire land and here we develop a Logit model of the determinants of women's land rights. The fourth section presents estimates of net household income and its composition. In the fifth section we present regressions on the determinants of household, farm, and off-farm income. The final section offers some tentative conclusions.

Our main finding is that female land rights have heterogeneous effects in the three countries, but rarely is the gender of the self-declared household head a significant variable. Only in the case of Peru do we find a large, positive and significant association between female land rights and net household income. In both Paraguay and Peru female land rights are positively associated with higher off-farm income levels, but only significantly so in the case of dual-headed households in Peru where the bargaining power thesis is operative. In Peru female land rights, evaluated at the mean, increases off-farm income by over 400 percent and net household income by 47 percent. In both Paraguay and Peru female land rights are negatively associated with the level of farm income, but only significantly so in the case of Paraguay; in Brazil, female land rights are negatively associated with the level of farm revenue.

Measures of Women's Land Rights and Control

Of the three surveys, land rights are defined most precisely with respect to gender in the Peruvian case since data on ownership was gathered at the parcel rather than at the household

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the Brazilian sample was truncated at 2,020 hectares in order to provide some degree of comparability between the three case studies since the Brazilian sample (by design) excludes farms smaller than fifty hectares.

[6] Gross National Income per capita for Latin America and the Caribbean in 2001 was $3,560; the corresponding figures are $3,060 for Brazil, $2,000 for Peru and $1,300 for Paraguay (World Bank 2003: 234-35). In Peru (1997 data), 64.7 percent of the rural population was below the national poverty line; in Brazil (1990), 32.6 percent; and in Paraguay (1991), 28.5 percent (Ibid.: 236-37).

[7] Under this marital regime all property acquired before marriage remains the individual property of each spouse, as does property acquired through inheritance or donations during the marriage. All assets acquired via wages, salaries, rents and profits during the marriage constitute the community property (*gananciales*) of the couple. In case of dissolution of the marriage for whatever reason, the *gananciales* are divided into equal shares. In all three countries couples living in consensual unions now have almost the same property rights as legally married couples (Deere and León 2001).

level. The Peruvian questionnaire followed a two-step process to define land rights. First, it was asked if each parcel "belongs to the respondent or another household member." Then, after asking what kind of document they had for the parcel, it was asked if the title was in the name of the household head, the spouse, both of them, another family member, or in co-property with a family member or another person.[8] Restricting this sub-sample of plots further, to those whose owners reside in the household and can be identified by sex, results in information for 1,908 plots: 12.7 percent of these are owned by women, 74.4 by men, and 12.9 percent are jointly owned by the household head and spouse.

Since data on plot ownership by sex is only available for Peru (this data having been collected at the level of the farm household in Paraguay), it is necessary to convert the plot-level data into a comparable characterization of households according to land ownership. This was done by specifying all the different combinations of parcel ownership by sex at the household level-. The number of owner-operated, farming households has now been reduced due to missing information to 871. Applying the sample weights, 11.5 percent are characterized by female-only plots, 71.5 percent by male-only plots, 3 percent by mixed ownership (both female and male plots), and 14 percent by joint ownership of all plots (Table 1).

An alternative specification is to characterize these households according to whether or not the women within them have some degree of land rights. By this measure, some 28.5 percent of the Peruvian farming households are characterized by having some female land rights (Table 1). This figure is far higher than the share of self-declared female-headed households which is only 8.9 percent. The majority of women with land rights (71.4 percent) live in self-declared male-headed or dual-headed households. Nonetheless, women have land rights in only 22.3 percent of these dual-headed households, but in 91.6 percent of the self-declared female-headed households, with the difference by gender of household head being significant.[9]

Turning to the Paraguayan survey, since data on property rights was not reported for each parcel, it is only possible to characterize land ownership by sex at the level of the household. Respondents who worked in independent agricultural activities were first asked if they owned their own land, followed by in whose name was the property title, with the possibility for them to give three responses, including if the property title was not in the name of a household member.[10] The subsequent analysis is based on 1,678 farm households; of these, and applying

[8] The first query yielded information on 2,348 owner-operated parcels corresponding to 1,082 farming households. Considerable information (data on 14.4 percent of the parcels) was lost by the property rights question being limited to only those parcels with a formal document, reflecting the persistent high degree of tenure insecurity in Peru.

[9] To avoid tediousness, whenever we use the term "significant" we refer to the result being statistically significant at least at the 90 percent level of confidence.

10 A large share of the farming households (37.1 percent) do not have a title for their property, thus information on property rights by gender is lost. In an additional 7.8 percent of the households, the title is held by a non-household member whose sex is unknown.

the sample weights, 28 percent are characterized by female-only land rights, 69.2 percent by male-only land rights, and 2.8 percent by mixed or joint land rights (Table 1). Given the manner the data was collected, it is impossible to further disaggregate this latter category, as was done for Peru.

Households can be further distinguished as those with some female land rights (30.8 percent) and those without them (69.2 percent). As in Peru, the share of households with some female land rights in Paraguay is greater than the share of self-declared female-headed households, 24.6 percent, which in itself is quite high. As expected, women are more likely to have land rights in self-declared female-headed (84.8 percent) as opposed to male, or dual-headed households (13.2 percent), a difference that is statistically significant. In contrast to Peru, a majority of the 518 households with female land rights (67.6 percent) are self-declared female-headed households; one-quarter of these female heads have a male partner residing in the household.

Since the Brazilian survey was aimed at farm proprietors, the questionnaire did not delve further into property rights, beyond the land tenancy question. It is thus assumed that the proprietor is, indeed, the sole owner.[11] Hence, for Brazil, the share of households with female land rights is the same as the share of self-declared female and male household heads, 10.5 and 89.5 percent, respectively, for the sub-set of 22,805 households (Table 1). What made the Brazilian survey of particular interest was that it asked a question not addressed in the LSMS: Who is the farm manager? This is a critical question since it cannot be assumed that the farm owner is always the principal person making the decisions regarding agricultural production and its disposition. As Agarwal (1994) argues, it is not just land rights, but land rights combined with effective control over production that should lead to better outcomes for women. In the Brazilian survey 83.8 percent of the farms are managed by their owners. Female owners are much less likely (56.8 percent) to also be the farm administrator than are male owners (87 percent), a statistically significant difference. As a result, women manage only 7 percent of the owner-operated farms (Table 1).

For Paraguay and Peru the farm manager had to be deduced. After considering various approaches, we settled on a "labor theory of management," attributing control to the adult in the household who dedicated the most time to agricultural production.[12] Our manager variable

[11] This assumption ignores the fact that property rights in marriage are determined by the specific marital regime under which matrimony is contracted. Since 1977 the default regime in Brazil is partial community property (*comunhão parcial*), but prior to that date it was full community property, whereby all property irrespective of how it was acquired constituted the common property of the couple. The failure to ask about the marital regime, or if the property was jointly owned with the spouse, probably underestimates the degree of female ownership of land in Brazil.

[12] This information was taken from the EAP data of the LSMS survey and was based on the primary and secondary activity of household members engaged in independent agricultural production, whether they reported themselves to be independent producers or unremunerated

probably corresponds well to participation in day-to-day decision making, such as regarding what task is to be carried out and by whom. This measure does not necessarily capture who in the household makes the major farm decisions such as what crops to plant, the use of credit and choice of technology or marketing decisions. By this measure, in Paraguay women are the managers in 15.3 percent of the households, men in 54.5 percent, and 30.2 percent are jointly managed. The corresponding figures for Peru are 21.8, 56.1, and 22.1 percent, respectively (Table 1).

Table 1 also presents data on the average amount of land owned by households with and without female land rights and by form of title category, self-declared household headship, and farm management. The means of land owned capture some of the basic differences characterizing the agricultural sector in each country, with Brazil and Paraguay reporting much larger farms, on average, than Peru. The Brazilian survey is truncated, since the survey is limited to commercial farms above 50 hectares in size and we have capped it at 2,020 hectares. In class terms, this survey is heavily weighted towards what may be considered the rural petty bourgeoisie or minor capitalists (roughly, those in the 100-500 has. range) and the better-off peasantry (50-100 has.).

Both the Paraguayan and Peruvian surveys are nationally representative of the distribution of property ownership. Since Peru had a relatively substantive agrarian reform in the 1970s, the overwhelming number of farms are small and owned by the peasantry. In contrast, Paraguay, which has not had an agrarian reform, has a more typical Latin American profile with respect to the distribution of land by property ownership. In class terms, its agrarian structure is more heterogenous than that of Peru, and the sample includes the peasantry (roughly, those in the 0.01-50 has. range) as well as agrarian capitalists. It is thus important to keep in mind that the women landowners who are the focus of our analysis are quite heterogenous in class terms.

In both Brazil and Paraguay households with some female land rights tend to own less land than those without them, with this difference being statistically significant (Table 1). With respect to headship, self-declared female-headed households own less land on average than male or dual-headed households, with the difference in means being quite significant in the case of Paraguay, less so in Brazil and not significant at all in Peru. In terms of management, in Brazil and Paraguay the average amount of land owned by male owner-managers is significantly greater than that of female owner-managers, with this difference not of significance in Peru. Gender

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family members. If the difference in the time dedicated by each of the principal adults was one month or less the household was taken as being characterized by "joint management." In the Peruvian data set information was also available on the number of hours worked per week. In the case where there was a large difference in the number of months worked between two adults, but the number of hours worked per year suggested differently, a second procedure was followed. A ratio was created of the total number of hours worked by the two household members with the most hours employed. If the ratio exceeded 1.25, then the person with the greatest number of hours was characterized as the manager. If the ratio was less than or equal to 1.25 then the farm was characterized as being jointly managed.

inequality in land owned by these various measures thus appears to be greater in Paraguay and Brazil than in Peru.

Women's Acquisition of Land

How have women landowners acquired their ownership of land? Data on the form of acquisition is only available in the Brazilian and Peruvian surveys. Both countries conform to the pattern reported by Deere and León (2003): inheritance tends to be the primary means by which women acquire land in Latin America. In both countries market purchases follow inheritance in order of magnitude, with relatively few women acquiring land through other means, such as via agrarian reform or community distribution (Table 2).

Given that the majority of land is owned by men and that the main way that women acquire land is through inheritance, it is relevant to consider whether women are more likely to inherit land as daughters or from their husbands, as widows. Direct information on this question is not available in the surveys; however, we can drawn some inferences based on the marital status of the women landowners. Table 3 presents this data for the three countries. Whereas in Peru the overwhelming majority (70.7 percent) of women landowners are married or in a consensual union, as are the majority in Paraguay (55.8 percent), in Brazil less than one-third of them have permanent companions,[13] with most women landowners in this country being widows.

Cross tabs revealed that in Brazil 55 percent of the widows acquired their land through inheritance. For the relatively few single women in the Brazil sample (14 percent of the total female landowners), inheritance was even more important, with 60 percent acquiring their land through this means. In contrast, only one-third of the women with permanent companions inherited land, with market purchases being relatively more important among this group. The survey data conform to the qualitative literature on inheritance of land in Brazil which stresses how sons are the preferred heirs and that women become landowners primarily through widowhood[14] or as daughters if there are no male heirs (Carneiro 2002).

[13] The Brazilian data set did not distinguish between formally married women and those in a consensual union perhaps because in this country they have equivalent property rights. We use the term 'women with permanent companions' to encompass both groups.

[14] As noted earlier, until 1977 the default marital regime in Brazil was full community property (*comunhão total*) where all assets irrespective of how they were acquired were jointly owned by the couple. Upon the death of the husband 50 percent of the assets passed automatically to the widow and she could inherit up to an additional one-third of her husband's patrimony if he designated such in a will. If he died intestate she only had usufruct rights over one-quarter of his patrimony as long as she did not remarry. Since 1977 the default marital regime is that of partial community property, meaning that only assets acquired during marriage are pooled and divided in half upon termination of the union.

In Peru, where the overwhelming share of female landowners are married or in a consensual union, cross tabs on the acquisition of parcels also show that widows and single women were more likely to have inherited land than women with permanent companions (79 and 94 percent vs. 57 percent). In contrast to Brazil, however, in Peru inheritance was more important than the market as the main form of acquisition of land by women with permanent companions. Nonetheless, in both countries such women were more likely to have acquired land through the market than either widows or single women.

What factors increase the likelihood of women acquiring land? We hypothesize that female ownership of land is positively associated with whether a woman's parents are landowners, the amount of land they own, as well as the gender composition of a woman's siblings (with a woman more likely to inherit land if she has no brothers); widowhood; age (since a woman is more likely to inherit land from her parents or husband when she is older), household headship, and education. We would expect women with more education to be able to defend their potential land rights more successfully; in addition, education serves as a proxy for labor market opportunities and hence the possibility of purchasing land independently. In countries with the partial community property marital regime, marriage should also increase the likelihood of women acquiring land through the market, for if the couple is able to purchase land it should legally pertain to both of them.

Unfortunately, information is not available in our data sets on the landholdings of a woman's parents. We thus estimate a Logit model of the determinants of female land rights based on the marital status of the adult women in the sample,[15] age, and dummies for headship (1 = female

[15] We have created dummies grouping together women who are married, in a consensual union or separated, and for women who are widows or divorced, with the default dummy being single

household head) and literacy (1 = literate).[16] This specification is not without its problems, given the expected high correlation between marital status and household headship.[17]

The regression results for the three countries are presented in Table 4. While all the regressions are significant (F test), the pseudo R-squared statistics range from 0.3727 for Paraguay to 0.1531 for Peru. In the Brazilian regression, female land rights are positively and significantly associated with completion of primary education and widowhood and negatively and significantly associated with age and marriage. The negative coefficient on age is surprising. It could reflect the possibility that younger women who have more education are more likely to retain their land (not selling out to siblings or children) than older women. The negative

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women. The rationale for this grouping is as follows. Under the default marital regime of partial community property if the couple purchased land during the union, it should form part of the common property of the couple and be registered as joint property. In the case of divorce or widowhood, such purchased land should be divided equally between the two patrimonies, with this land appearing in the survey as female-only land.

[16] We chose literacy as the independent variable since we thought that the ability to read and write would be more important than actual years of schooling in determining a woman's ability to defend her land rights. Given the gender bias in the education of women that has existed in rural areas until recently, there is not always a clear correspondence between literacy and the number of years of formal education. The gender gap in education is particularly acute in Peru, less so in Paraguay (Table 8), and has disappeared in Brazil (Table 15). The Brazilian sample contains few illiterates, thus in the Logit regression we use a dummy for completion of primary school rather than literacy.

[17] This is more of a problem in Peru than Paraguay, for the latter country shows more diversity in the marital status of female household heads, with almost one-third of these having a husband or partner compared to only five percent in Peru. The main problem this high correlation leads to is multicollinearity, leading to imprecise estimates.

coefficient on marriage reflects the fact that joint titling of land to married couples is a rare practice in Brazil.

For Peru, the model predicts that households are more likely to have female land rights if they are female-headed and the woman is older, with only these coefficients being significant; the coefficient for female literacy, nonetheless, is also positive. Neither coefficient of the dummies for marital status was significant, with that for marriage being positive (probably reflecting the more frequent practice of joint titling in Peru than in the other countries) and that for widowhood negative.

For Paraguay, the results are similar to those for Peru, with whether women in the household have land rights being positively and significantly associated with female headship and a woman's age. The coefficient for female literacy again, while positive, is not significant. The coefficient on marriage is negative and significant, so marriage does not seem to be an effective strategy for acquiring land: married women are even less likely than single women (the default dummy) to acquire land rights. Since the coefficient on widowhood is also negative (although not significant), this provides indirect evidence that the main way that women might acquire land is through inheritance as daughters and that landowners may be more likely to leave land to a daughter who is single. Obviously, more rigorous work on the determinants of women's land rights will have to await the elaboration of household surveys with more appropriate data.

Female Land Rights and Household Income and its Composition

The income figures in the Brazilian survey are self-reported, monthly household income estimates and are thus not of the quality of the detailed LSMS income estimates. While they will not be the subject of econometric analysis, the results are of interest as an indicator of the diverse class composition of the three surveys and for what they reveal about gender differences. As Table 5 shows, reported annual household income is higher in the Brazilian survey of commercial farmers than in the other two countries, where the estimates are based on net household income and nationally representative household surveys. Household size was not reported in the Brazilian survey so per capita incomes cannot be even loosely compared.

The estimate of net household income per capita for Peru of $453 is considerably below the reported 2001 national income per capita of $2,000. This is consistent with the fact that almost two-thirds of rural inhabitants in Peru live below the national poverty line. Moreover, since our sub-sample includes only owner-operated farm households, we would expect the mean per capita household income to be above that for the rural population as a whole. In Paraguay, a much smaller share of the rural population live below the national poverty line so we would expect the mean per capita income of our survey to approximate the national mean of $1,300. Per capita income among survey households, $1,651, slightly exceeds this figure.

With respect to gender differences, for Brazil the difference in reported annual household income is statistically significant, with female landowners/household heads reporting lower incomes. In Paraguay, households with female land rights are also poorer than those without them, with the difference in household income being statistically significant at the 90 percent level; the difference in terms of income per capita, however, is not significant. In contrast, in Peru households with female land rights are significantly better off in terms of both net household income and income per capita. A more detailed analysis by title category revealed that this difference is primarily due to the much higher incomes of households with mixed and joint land titles.[18]

With respect to income quintiles, Table 5 confirms that in Brazil, households with female land rights (equivalent to female-headed households in this survey) are over-represented in the lower three quintiles,[19] with the gender difference being statistically significant. In Paraguay, the quintile analysis reveals no significant differences overall according to female land rights; however, households with female land rights are over-represented in the second lowest income quintile, explaining why mean incomes among households with female land rights are lower overall than those without them. The quintile analysis for Peru demonstrates that households with female land rights are over-represented among the top two quintiles and under-represented among the lower two, resulting in a significant difference in the distribution between households with and without female land rights.

In terms of self-declared household headship, in Paraguay, as in Brazil, female-headed households are significantly poorer than male-headed ones. In Peru in contrast, the difference in mean net household income is not statistically significant.

As noted earlier, one of the trends reported throughout Latin America in the 1990s was the growing importance of non-agricultural income among rural households. Our LSMS surveys conform to this trend, even though we focus on owner-operated farm households rather than all rural households. In Paraguay, farm income constitutes 44 percent of mean total net income while the contribution of agricultural wage income is miniscule, less than two percent; all told, 54 percent of total household income is generated from non-agricultural activities (Table 6). For Peru, characterized by much smaller farms than Paraguay, net farm income constitutes slightly less than one-third of total net household income; adding agricultural wage income to this figure means that only 38 percent of household income is generated via the agricultural sector, with 62 percent from non-agricultural activities (Table 7).

[18] Mean net household income in Peru for households with mixed titles is $2,740 and for joint titles, $2,665.

[19] To put the Brazilian figures into perspective, the lower quintile of the income distribution is earning approximately $100 per month, only slightly above the minimum wage in Brazil in 2000. The top quintile is earning 22.5 times that amount.

Among Peruvian land-owning households net farm income is followed in magnitude by non-agricultural wage income, income from commercial activities (of all types), income from other independent activities, and rental income. Households with and without female land rights differ only slightly in the rank ordering of the sources of household income, with the top five sources being the same. Where they differ is that households without female land rights are more dependent on farm income (33.5 percent) than those with female land rights (28.5 percent); the latter earn higher absolute net incomes from farm activities, but the differences in net farm income are not statistically significant (Table 7).

Peruvian households with female land rights are more diversified than those without them, with a significantly higher share of the former participating in non-agricultural wage labor, commerce and earning incomes from remittances. In the income-generating activities where their participation rates are higher, they tend to earn higher net incomes, with the difference in means being significant in the case of non-agricultural wage income and commerce income, in addition to other independent sources of income.

In Paraguay, farm income is followed in magnitude by non-agricultural wage income, other income (pensions and extraordinary income), and income from other independent activities (artisan production and services) (Table 6). Households with and without some female land rights exhibit the same rank ordering with respect to the top four income generating activities. Where they differ most is with respect to their dependence on farm income, this rubric comprising only slightly over a quarter of the total net income of those with female land rights but half of the total net income of households without them. Moreover, the differences in mean net farm income are significant, being over twice as large in households without female land rights. Households with female land rights are also more diversified in Paraguay, but this does not work to their advantage. While they show significantly higher participation rates in non-agricultural wage labor, other independent income, rental income, remittances and in earning other income, only in the case of remittances are their mean earnings significantly higher as compared with households without female land rights.

Finally, in terms of the gender of the household head, in both Paraguay and Peru the lower net household income of self-declared female-headed households is largely explained by their much lower net farm incomes, with this difference being significant for both countries. In both, female-headed households rely more on non-agricultural incomes. But in Peru there is no apparent difference by gender in participation rates in non-farm activities. In contrast, in Paraguay, female-headed households show significantly higher participation rates in agricultural wage employment, commerce activities and in remittance incomes. Nonetheless, this translates into a significant income advantage only in the case of remittances. In Peru female-headed households earn significantly more on average than male-headed households only in the case of other incomes but this difference is also insufficient to overcome their disadvantage in terms of farm incomes.

Regression Analysis of the Determinants of Household, Farm and Off-Farm Income Levels

We hypothesize that female land rights should be positively related to the level of net household income because women with land rights have greater options, and if in dual-headed households, greater bargaining power within households. Their greater bargaining power should result in their greater participation in household decisions, resulting in better and more efficient decisions with respect to labor allocation.

Following the recent literature (Berdegué, Ramírez and Reardon, 2001; Corral and Reardon, 2001; de Janvry and Sadoulet, 2001), we posit that net household income is a function of household characteristics (gender of household head, household size, and the number of economically active adult members); human capital assets (years of schooling of each of the two principle adults); farm assets (the value of land, animal stocks and equipment, and farm size); distance to market (for Peru); and a regional dummy. What is unique about our model is the inclusion of dummy variables for female land rights (1= some female land rights, FLR), for female-headed households with no adult male present (1 = NoMale) as well as self-declared female-headed households (1 = SexHead). The log of net household income is the dependent variable.[20]
We estimate household income using a generalized least squares procedure (survey regression) to account for the use of survey weights that may compromise the independence of observations. Model 1 includes all households in the sample. In order to specifically test the bargaining power hypothesis we ran the same regression on a restricted sample of those households with both adults present or the dual-headed households. In Model 2 SexHead and NoMale are dropped since they are no longer relevant. The income regression means for Paraguay and Peru are presented in Table 8.

For Paraguay, both regressions are significant (F test) with reasonably high (0.376, 0.397) adjusted R-squares (Table 9). The coefficient for female land rights is negative but not significant in either model. As expected from the discussion of the descriptive statistics, the coefficient for sex of the household head (1 = female) is negative in Model 1, but not significant. Somewhat surprising is that, holding all else constant, NoMale is positively and significantly (if weakly) associated with higher net household income. However, assets are not equally distributed; households without a male own $46,000 less in assets leading to much lower average income levels among these households.

[20] The log transformation restricts the sample size, since households with negative incomes must be excluded. However, the log transformation normalizes the distribution of net household income while at the same time facilitating the interpretation of the results, since the estimated coefficients are elasticities. Since there may be unobserved household preferences which are correlated between women's land rights and the generation of household income we tested for endogeneity but did not find it to be a problem in the regressions for either Paraguay or Peru.

In Model 1 the coefficients of the value of farm assets and the years of schooling attained by the principal adult male and female of the household are positive and strongly significant. The coefficients for household size and the number of economically active adults are also positive while more weakly significant; in Model 2 these coefficients, while still positive, lose significance.

By region, the Minifundia zone (the oldest settled part of the country, centered on Asunción) is the default. Only the coefficient for the Chaco region shows an increase in income over the Minifundia zone. Farms in the Colonization region, in which the agrarian structure of the Minifundia zone has been replicated without the infrastructure of the latter, have significantly lower net household incomes. The results for the Frontera region (on the frontier bordering Brazil, where export-oriented agriculture is concentrated) are contrary to expectations, showing a negative sign, but the coefficient is not significant.

Turning to the income determination regressions for Peru (Table 10), these are also significant although the adjusted R-squares are lower than for Paraguay, suggesting that the models explain less of the variance in income levels for this country. The coefficient for female land rights is positive, large and significant in both Model 1, where we control for sex of the household head and households without an adult male, and in Model 2, for the dual-headed households. In Model 1, both female household headship and the absence of an adult male are negatively associated with net household income, but neither coefficient is significant.

In both models net household income is positively and significantly associated with the number of working adults, the years of female schooling, and the value of farm assets, and negatively and significantly associated with distance to market. In terms of regions, since the Coast is the default region, the coefficients for the Sierra and Selva regions are negative, as expected, although only that for the Sierra is significant, as the much poorer region.

In sum, among peasant farmers in Peru, where the great majority of households are land-constrained, female land rights are strongly associated with better outcomes for owner-operated farming households, at the mean, adding $572 (49.6 percent) to net household income in Model 1 and $558 (47.4 percent) in Model 2. In the more diverse farm sector of Paraguay, female land rights make virtually no difference.

1. The Determinants of Farm Income.

Net farm income is posited to be a function of the same independent variables as net household income, but several additional explanatory variables are included: the number of crops (as a proxy for intensity or dedication to farming); and a dummy for whether a household member belongs to some form of agricultural organization (as a measure of social capital). In addition, two additional sets of regressions include dummies for our constructed management variables

(based on labor time dedicated to agricultural production): joint management and female management (Models 3 and 4).[21] (See Table 8 for means).

As shown in Table 11, the farm income regressions for Paraguay are significant (F test) with a very high adjusted R-squared. The results are more conclusive than the household income regressions for the coefficients for female land rights in Models 1 and 2 are significantly negative. In Model 1, female households heads are at a disadvantage in terms of farm income levels, but this coefficient is not significant; neither is the coefficient for NoMale although it is positively associated with the level of farm income.

The coefficients of farm size, the value of farm assets, the number of crops, and membership in a farmers' organization are all positive and significant in both models. The number of working adults is also positive in both but only significant in Model 1. Years of female schooling is always positive but significant only in Model 2, for dual-headed households. Surprisingly, the coefficient for household size is negative but not significant. By region, the Minifundia zone has the lowest farm income with all the other regions having significantly higher farm incomes.

The negative impact of female land rights on farm incomes is quite large. Estimated at the mean, female land rights reduces net farm income by 19.4 percent (Model 1) or 25.3 percent (Model 2). Clearly women face enormous challenges in making their land rights pay off. The inclusion of the farm management variables (models 3 and 4, otherwise identical to models 1 and 2, respectively) reduces the size of the negative impact of female land rights, and removes the significance of the estimates. Whereas joint management is positively, female management is negatively associated with net farm income, but neither coefficient is significant in either model. Female schooling is positive and significant in both models 3 and 4 while the significance of farmers' organizations and the number of crops is weakened in these latter models.

Turning to Peru, the farm income regressions are significant (F-test) but the adjusted R-squares are low, only slightly larger than those for net household income, suggesting that the models explain little of the variance in farm incomes, even when the management variables are included (Table 12). All four models produce similar results with respect to the coefficient for female land rights which is now negative, but not significant. The coefficient for female household heads is also negative but only significant in Model 3, when the management variables are

[21] We run separate regressions with the management variables since the number of observations is reduced substantially once these are included. The missing observations correspond to cases where either the information on the EAP was incomplete or where the respondents were over 65 years of age and thus the time that they dedicate to economic activities was not registered in the survey.

included. In contrast to the case with net income, NoMale is positively related to the level of farm income in models 1 and 3, although the coefficients are not significant.

In all the models net farm income is positively and significantly related to farm assets, farm size, and the number of crops grown. The coefficients for household size, the number of working adults and membership in a farm organization switch signs in the various models, but are never significant. As expected, the distance to market is negatively associated with farm income, but this coefficient was also not significant. Female, but not male schooling, is positive related to farm income, but the coefficients are not significant. The regional variables perform according to expectations, with the coefficient for the Sierra always being significantly negative. In models 3 and 4, both management variables are negative but the coefficients are not significant.

What is surprising is that for neither country did the management variables improve the explanatory power of the regressions of farm income levels. Moreover, only for Paraguay was joint management positively associated with farm income, although the coefficient was not significant. In both countries female-headed households are associated with lower levels of farm income, but significantly so only in the case of Peruvian Model 3, a result similar to that obtained by Corral and Reardon (2001: 440) for Nicaragua. Worth exploring further is why the coefficient for female-headed households without a male is positively (but not significantly) associated with farm income levels.

2. The Determinants of Off-Farm Income

The off-farm income regressions are similar to those for net household income; we compare a regression for the full sample (Model 1) with the restricted sample of dual-headed households (Model 2). For Paraguay both regressions are significant (F test) with moderate adjusted R-squares (Table 13). The coefficient for female land rights is positive in both models but not significant. As in the net income model, the coefficient for female heads in Model 1 is negative whereas for NoMale it is positive, but in the case of off-farm income these are not significant.

The coefficients with the largest significant impact on off-farm income were the number of economically active adults, which was positive, and the size of the farm, which was negative. As expected, years of female and male schooling as well as the value of farm assets were positive and significant contributors to off-farm income, since schooling and assets should lead to greater income-earning opportunities off-farm. Regional variations were important with households in the frontier and colonization zones having significantly smaller levels of off-farm income than those in the minifundia zone. This result makes sense, since in these fairly remote regions opportunities for off-farm income earnings are relatively scarce.

For Peru both off-farm income regressions are significant (F test) but report very low adjusted R-squares (Table 14). We tested for and found endogeneity was present in our survey regression estimates. We thus present results for an instrumented model, using instrumented variable

survey regression.[22] The coefficient for female land rights is large and positive but significant only in Model 2. This indicates that in dual-headed households, where female land rights can be associated with greater female bargaining power, female land rights contribute to generate higher levels of off-farm income. Evaluated at the mean, female land rights add an additional $1,542 (404.4 percent) to off-farm income. In Model 1 female-headed households and those without a male are negatively associated with off-farm income levels, but neither coefficient is significant.

The other variables perform similarly in the two models. Off-farm income levels are positively and significantly associated with household size, the number of economically active adults, and inversely associated with the distance from the main market. Both male and female schooling, while positive, are not significant. As in Paraguay, non-farm income levels are negatively associated with farm size, but for Peru this coefficient is not significant. As expected, off-farm income levels are lower in the sierra and selva than on the coast, but only significantly so in the former case.

Both Paraguay and Peru, hence, provide evidence that female land rights contribute to higher off-farm income although only in the case of dual-headed households in Peru is this result statistically significant. The analysis of the descriptive statistics of the composition of income suggest that this positive effect is primarily because households with female land rights are more diversified than those without them. What remains to be examined in future analyses is the precise ways in which women with land rights use their bargaining power to achieve higher off-farm incomes. Are they using their enhanced bargaining power to carry on their own more remunerative activities off the farm? Alternative, does their stronger bargaining power allow them to stay at home, while their spouses pursue non-farm work? In this paper we cannot explore the precise mechanisms, but the regression results suggest that these are fruitful questions to pursue.

The Determinants of Farm Revenue in Brazil

[22] We use the predicted values of the logit estimation of the determinants of female land rights, with marital status as the instrument (see Table 4). We realize that this is not the ideal instrument, but because of data limitations had little choice.

As noted earlier, the Brazilian survey focused only on farm activities rather than household income generation. Moreover, while the Peruvian and Paraguayan surveys included prices and costs of production, the Brazilian survey did not; a proxy for gross farm income was thus calculated using monthly, state-level prices for fifteen crops and milk production.[23] The data set was reduced to include only those farms that produced some combination of the fifteen crops and milk.[24] In order to distinguish between the estimates for Brazil and those for the other two countries, the following discussion will refer to farm revenue rather than income.

The Brazil farm revenue regressions also differ slightly in the explanatory variables. What made this data set of particular interest was that information on owner-managed farms and the gender of the owner and manager was elicited directly. Thus dummy variables for owner-managers and female owner-managers are included in Models 1 and 2. Due to the design of the Brazilian survey, the sex of the household head is equivalent to the sex of the farm owners and there is little information about family level EAP or total farm assets. However, the data do indicate the number of children of the owner working on the farm.[25] The means of the variables are presented in Table 15. As in the case of the other countries, two models are presented, one with the full sample (Model 1) and then for married farmers only (Model 2) (Table 16).26 Both regressions are significant at the 99 percent level of confidence and have adjusted R-squares of .40.

The estimated coefficient of the female land rights dummy variable (FLR) is negatively signed in both models, but only significantly so in Model 1. The impact is considerable; in the full sample, evaluated at the mean, female land rights reduce farm revenue by 33.2 percent. The lack of significance of this coefficient in Model 2 suggests that married women farm owners may be

[23] Neither municipal-level prices nor prices for all types of reported farm activities were available. The rationale for choosing a subset of fifteen crops was due to the set of crop prices available as well as the frequency of production. The following were included: corn, beans, rice, soya, wheat, cotton, sugar, potatoes, onion, coffee, cocoa, sisal, cashew fruit, tobacco, and manioc. Monthly state-level prices were obtained from the Fundação Getúlio Vargas (www.fgv.com.br) and averaged over the period in which the survey was administered, between January 1998 and December 1999.

Livestock production presented a severe problem for not enough information (such as the age of the herd or its stage of production) is reported to calculate revenue, or the available prices did not correspond to the measures provided. Thus only milk production is included in the revenue estimates. Limited availability of prices for all crops in each of the states further reduced the sample to 9,906 households; of these, 10.2 percent are female-owned farms and 89.8 percent are male-owned.

[25] It is unknown how much or in what capacity the children are employed, or if they are paid or unpaid family workers.

[26] Robust standard errors are used to correct for heteroskedasticity. Since the data are not weighted, survey regression (GLS) is not warranted. While omitted variable bias is a problem, female land rights were tested for endogeneity but did not demonstrate this problem.

better off than female farm owners in general. Certainly, women's restricted access to productivity enhancing inputs and technical assistance warrants further investigation.

The general management variable (MGR) is both significant and negatively signed. In Model 1, owner-managers generate on average 31.6 percent less farm revenue, while in Model 2 they earn 45.1 percent less than farms managed by others. Presumably, the latter are capitalist farms with a hired manager over-seeing wage workers. Without attention to the crop mix or the levels of mechanization and use of other productivity enhancing inputs, however, it is unwise to draw firm conclusions. The coefficient of the female owner-manager dummy variable (F-MGR) is not significant in either model, but does change sign. In the full sample, the coefficient is positive while for dual-headed households, the coefficient becomes negative.

The results for both female land rights and the management variables should be interpreted with care because in the regressions we have not accounted for the costs of production, crop mix or the composition of the household.27 However, the outcomes with respect to both sets of variables are provocative. In Model 1, where the estimated coefficient of FLR is negative and significant, the coefficient of F-MGR is positively signed. In Model 2, FLR is negative but not significant while the coefficient of F-MGR is negatively signed. The more general story of Model 1 seems to be that female owners who manage their own farms are better able to overcome their lack of access to productive inputs and smaller farm sizes than married women owner-managers. There is some suggestion that the latter either make different choices or that they can rely on fewer resources than when their husbands are the owner-managers. It is beyond the scope of this analysis to speculate further on gender-based preferences and disadvantages as they relate to marital status; however, there are important topics worthy of further exploration.

In both models the main variables positively and significantly associated with farm revenue are membership in a farm organization and the number of crops. The former indicates that the social capital provided by unions, cooperatives and associations are important to revenue generation. The positive relationship between the number of crops and farm revenue is consistent with the expectation that diverse production is associated with year-round production and therefore, higher revenue generation.[28]

With respect to education, both male and female schooling is positively associated with farm revenue. The estimated coefficient for male schooling is significant in both models, while that for female schooling is only significant in Model 1. In neither case are they of much

[27] In alternative specifications of the models not reported here, the number of tractors and harvesters owned were included as independent variables. Controlling for the degree of mechanization, the coefficient of FLR was not significant in either model while the coefficients estimated for the MGR and F-MGR dummy variables were essentially the same as described above.

[28] The surprisingly large coefficient should be interpreted with a grain of salt. Likely, the problem of omitted variables underpins a large upward bias.

consequence; an additional year of female education, holding other factors constant, increases farm revenue by only 4.3 percent.

The impact of the log of farm size and the squared term are as expected. The log of farm size is always positively signed while the squared term is negative, but significant only in the case of Model 2. At face value, this indicates that returns to scale diminish as farm size increases but the lack of data on livestock revenue likely overstates the effect of farm size on revenue for larger farms. Of the regional dummies, it was expected that the North, Northeast and Center would be regions of lower revenue but that the coefficient on the Southeast would be positively signed because of its similarities to the region of reference (the South). The signs on the regional dummy variables are as anticipated except in the case of the North, which was positively signed. This may in part be due to the truncation of the data forced by the restricted availability of prices. While this means that the generalization of these results for all Brazilian farmers would be inappropriate, a closer inspection of the crop mix should shed light on this outcome.

Preliminary means testing of farm revenue revealed sharp differences between male and female farmers and between female owner-managers and other farms, an outcome confirmed by the negatively signed and significant coefficient estimated for FLR in Model 1. However, it is apparent that other factors are also important, and omitted variable bias may overestimate the negative impact of female land rights on farm revenue. Our results are inconclusive regarding the impact of female land rights on intrahousehold bargaining power, but it is apparent that future research should examine the extent to which women gain access to productivity enhancing inputs and training. The consistently significant and positive relationship between social capital and the number of crops grown and the inconsistent results with respect to FLR and F-MGR lends support to the hypothesis that women are not inherently less productive or less successful than male farmers (Quisumbing 1996), but that they face different constraints than male farmers that may undermine the extent to which land rights impact upon bargaining power.

Conclusions

This paper has demonstrated that although female land rights are not always associated with higher household income levels, in certain contexts, such as among smallholders in Peru, they contribute to significantly higher household income levels. Results for both Peru and Paraguay indicate that the positive impact of female land rights works primarily through off-farm income generating activities. The largest and most significant impact of female land rights was on off-farm income levels among dual-headed households in Peru.

Our main hypothesis with respect to dual-headed households was that female land rights should lead to higher household income levels primarily because the greater bargaining power of women landowners should lead to better household decision-making processes, thus improving

the efficiency of labor allocation. The results for Peru, where the majority of female landowners reside in dual-headed households, support this proposition. Unfortunately, our surveys do not provide data on household decision-making processes. Future work with these data sets, however, can explore the allocation of time of the adult couple to farm versus off-farm activities, providing a more comprehensive analysis of how female land rights impact upon labor allocation.

The determinants of the different sources of non-farm income also need to be examined in more detail in future work. The descriptive statistics for Peru suggest that households with female land rights have both higher participation rates and earn higher mean incomes from non-agricultural wage employment, commerce and other independent sources of income than households without them. In the case of Paraguay, the only source of income in which households with female land rights have the advantage over those that do not is with respect to remittances, suggesting that very different processes might explain why female land rights contribute to higher levels of off-farm income. It may be, for example, that in Paraguay, given fewer opportunities for female off-farm employment, female land rights lead to higher off-farm income levels primarily because women with land can attract partners who are willing to migrate seasonally and send home remittances, or because mothers have greater bargaining power over their children who migrate to do the same. In contrast, in Peru female land rights might be what make the difference in rural women being able to pursue high productivity versus the low productivity off-farm activities so often associated with female off-farm employment (Lanjouw 2001; Elbers and Lanjouw 2001).

In both Paraguay and Peru female land rights were negatively associated with the level of farm income, in Paraguay, with its heterogeneous agrarian class structure, significantly so. The results for Brazil indicate that female land rights are negatively associated with the level of farm revenue. One of our primary interests in exploring the Brazil data was to study the effect of the manager variable, since it is not only land ownership, but control over land and its uses and fruits that should lead to better outcomes for women. The results for Brazil nonetheless were inconclusive, with the coefficients for female owner-managers not being significant and changing signs in the two models. For Paraguay and Peru, where the management variable was constructed on the basis of labor time dedicated to agriculture, the coefficients for joint and female management were never significant. Nonetheless, the positive sign on joint management in the Paraguayan case is worth noting. Obviously, more rigorous work on the impact of female land rights will require better surveys that directly measure the relationship between land ownership and its control.

A surprising result was that, controlling for female land rights, female-headed households were not always at a disadvantage. The coefficient for self-declared female-headed households in both Paraguay and Peru was always negatively related to the level of net household, farm and off-farm income, but significantly so in only one case (farm income levels in Peru in Models 3 and 4). The results differed for those female-headed households with no adult male present. In Paraguay there was a positive and significant association between households with no male

present and net household income levels. But on closer inspection this positive association in Paraguay may be due to the fact that many female-headed households with no adult male present are made up of married women or those in consensual unions (15 percent of the total number of single female heads) whose partners may be only temporarily away, for these households rely heavily on remittances.[29] The Paraguayan case well illustrates the importance of scrutinizing the composition of self-declared female-headed households not only to distinguish between those that have an adult male present and those who do not, but also to distinguish those who are reliant on income transfers from absent males.

Another concern is that land rights may be endogenous to household formation, being the factor that allows some women to either remain single or to leave an unsatisfactory relationship. This makes it difficult to interpret the results with respect to the impact of land ownership on the welfare of single, female-headed households, since our sub-sample of rural households is made up only of land-owning households. The more relevant comparison in terms of household income levels would be between rural female household heads (with and without a male present) who own and do not own land.

The results on the impact of schooling confirm the importance of female education to rural household welfare, particularly where the gender gap in schooling is large. In the Peruvian and Paraguayan regressions female years of schooling was positively and significantly related to the level of household income. For Paraguay, this result held in terms of farm and off-farm income levels as well, while for Peru, while the relationship was positive, the coefficients were not significant. In the Brazilian farm revenue regressions both female and male education was positively and significantly associated with higher income in the full model, while in the case of married landowners, only the coefficient for years of male schooling was significant.

Rigorous, comparative analysis obviously depends on the quality of the data and the extent to which household data sets are comparable. While the inclusion of data that allows the estimation of female land rights in the Paraguayan and Peruvian LSMS is a step forward, the questionnaires do not illicit comparable data, with data on ownership by gender at the preferred, parcel level only being collected in Peru. Another inconsistency between these two data sets is in terms of the availability of data on how land was acquired, with this information only included in the Peruvian case. Moreover, in neither data set is information collected on intra-generational mobility, such as parents' ownership of land, hampering efforts to estimate the determinants of female land ownership.

Neither LSMS questionnaire includes any questions at all regarding household or farm decision-making, which is a severe limitation to rigorously testing the bargaining power approach. Further, until recently the household bargaining power literature had largely ignored the property

[29] Cross-tabs reveal that among female heads with no male present in the household, remittances in Paraguay are the primary income source only among married women and those in consensual unions; for widows they rank fourth and for single women, third among income sources.

rights that govern marriage. Since households may often choose among various options, it is imperative that household questionnaires ask couples under what marital regime they have married and distinguish between formally married couples and consensual unions. Finally, another problem apparent in this study is the difficulty of comparing rural households in countries with such different agrarian structures.

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List of Tables

Table 1: Key Independent Variables, Owner-Operated Farms

	Brazil		Paraguay		Peru	
Share of Households:	**Percentage**	**Mean Land Owned**	**Percentage**	**Mean Land Owned**	**Percentage**	**Mean Land Owned**
with Female Land Only			28.0%	11.1	11.5%	2.56
with Male Land Only			69.2%	21.6	71.5%	3.38
with Mixed Ownership	same as with and without		2.8%	11.3	3.0%	3.68
with Joint Ownership	land rights		_____	____	14.0%	4.53
Total			100.0%	18.4	100.0%	3.46
				**		n.s.
with Female Land Rights	10.5%	313.4	30.8%	11.1	28.5%	3.64
w/out Female Land Rights	89.5%	326.4	69.2%	21.6	71.5%	3.38
Total	100.0%	325.1	100.0%	18.4	100.0%	3.46
		*		**		n.s.
with Female Head	10.5%	313.4	24.6%	9.3	8.9%	2.81
with Male Head	89.5%	326.4	75.4%	21.4	91.1%	3.83
Total	100.0%	325.1	100.0%	18.4	100.0%	3.46
	(n=28,805)	*	(n=1,678)	***	(n=871)	n.s.
with Female Manager[a]	7.1%	304.6	15.3%	9.3	21.8%	2.71
with Male Manager	92.9%	320.9	54.5%	32.9	56.1%	4.10
with Joint Management	-	-	30.2%	18.7	22.1%	2.59
Total	100.0%	319.8	100.0%	25.0	100.0%	3.46
	(n=24,140)	***	(n=990)	***	(n=762)	n.s.

Notes:

*** Statistically significant at 99% confidence level

** Statistically significant at 95% confidence level

* Statistically significant at 90% confidence level

n.s. = Difference in means not statistically significant

[a] For Brazil, manager refers to self-declared owner-administrators; for Paraguay and Peru estimate based on "labor theory of management." In the case of the latter countries, the sample size is reduced due to missing information

Table 2: Form of Acquisition of Land by Women Landowners

	Brazil	**Peru**
Inheritance	1,435 (51.1%)	317 (54.7%)
Community	-	14 (2.4%)
Market	1,029 (36.6%)	203 (35.1%)
Agrarian Reform	13 (0.5%)	40 (6.9%)
Other	194 (6.9%)	5 (0.9%)
Multiple Forms	137 (4.9%)	-
Total	2,811 (100.0%)	579 (100.0%)

Note: For Brazil, refers to acquisition of farm; for Peru to acquisition of parcels by 248 women landowners

Table 3: Marital Status of Women Landowners							
	Single	**Widowed**	**Divorced**	**Separated**	**Married**	**Consensual Union**	**Total**
Brazil	394	1,295	171	38	913	-	**2,811**
	14.0%	46.1%	6.1%	1.3%	32.5%		**100.0%**
Paraguay	80	121	1	23	166	118	**509**
	15.7%	23.8%	0.2%	4.5%	32.7%	23.1%	**100.0%**
Peru	13	46	-	14	124	50	**246**
	5.1%	18.5%		5.7%	50.4%	20.3%	**100.0%**

Note: In the Brazilian questionnaire, married couples and consensual unions were considered as one category.

Table 4: Determinants of Female Land Rights								
BRAZIL			**PARAGUAY**			**PERU**		
Logit estimates: FLR			**Logit estimates: FLR**			**Logit estimates: FLR**		
Number of obs		8,852	Number of obs		1,563	Number of obs		816
LR chi2(4)		1,501.96	Wald chi2(5)		185.34	Wald chi2(5)		68.39
Prob > chi2		0.00	Prob > chi2		0.00	Prob > chi2		0.00
Pseudo R2		0.26	Pseudo R2		0.37	Pseudo R2		0.15
Log likelihood		-2,113.01	Log likelihood		-621.58	Log likelihood		-424.05
FLR	**Coef.**	**P>z**	**FLR**	**Coef.**	**P>z**	**FLR**	**Coef.**	**P>z**
Constant	-0.73	0.000***	Constant	-1.57	0.080*	Constant	-2.15	0.070*
			SexHead	2.84	0.000***	SexHead	3.98	0.000***
Female Age	-0.02	0.000***	FemaleAge	0.02	0.030**	FemaleAge	0.02	0.000***
Female Primary	0.19	0.090*	FemaleLiteracy	0.41	0.220	FemaleLiteracy	0.08	0.730
F-Married	-1.76	0.000***	F-Married	-1.55	0.030**	F-Married	0.16	0.889
F-Widowed	1.705753	0.000***	F-Widowed	-0.10	0.890	F-Widowed	-0.70	0.454

Notes:

n.a. = not available

*** = statistically significant at 99% confidence level

** = statistically significant at 95% confidence level

* = statistically significant at 90% confidence level

Table 5: Net Household Income, Net Income per Capita and Income Quintiles by Female Land Rights (US$)									
	BRAZIL[a]			**PARAGUAY[b]**			**PERU[c]**		
	Some FLR	No FLR	Total	Some FLR	No FLR	Total	Some FLR	No FLR	Total
Net HH Y	$6,787 (n=3,026)	$7,897 (n=25,779)	$7,780*** (n=28,805)	$5,563 (n=518)	$7,260 (n=1,160)	$6,736* (n=1,678)	$2,440 (n=244)	$1,771 (n=626)	$1,962*** (n=870)
Net HH Y per capita		n.a.		$1,475 (n=518)	$1,730 (n=1,160)	$1,651 (n=1,678)	$560 (n=244)	$411 (n=626)	$453*** (n=870)
Quintiles	**Some FLR**	**No FLR**		**Some FLR**	**No FLR**		**Some FLR**	**No FLR**	
Bottom 20%	21	20		18	21		14	22	
Second 20%	21	20		23	18		13	23	
Middle 20%	21	20		21	20		21	20	
Fourth 20%	20	20		20	20		22	19	
Top 20%	17	20		18	21		30	16	
Total	100 (n=3,026)	100 (n=25,779)		100 (n=518)	100 (n=1,160)		100 (n=248)	100 (n=623)	
	***			n.s.			***		

Notes:

n.a. = not available

*** = statistically significant at 99% confidence level

** = statistically significant at 95% confidence level

* = statistically significant at 90% confidence level

[a] Based on exchange rate of US$ = 1.82 Reais, average of 1999-2000; from IMF (2001:301).

[b] Based on exchange rate of US$ = 3,768.9 Guaranis, average for 2000-01; from www.fxhisty.com

[c] Based on exchange rate of US$ = 3.48 Soles, average during survey period in 2000; from www.mef.gob.pe

Table 6: Composition of Net Household Income by Female Land Rights, Paraguay						
	Female Land Rights		No Female Land Rights		TOTAL	
INCOME SOURCE	No. Farms (incidence)	Mean (composition)	No. Farms (incidence)	Mean (composition)	No. Farms (incidence)	Mean (composition)
Net Farm Income	518	$1,471.42 ***	1160	$3,665.84 ***	1678	$2,988.98 ***
	100.0%	26.5%	100.0%	50.5%	100.0%	44.4%
Agric.Wage Income	59	$94.53	103	$117.23	162	$110.22
	11.5%	1.7%	8.9%	1.6%	9.7%	1.6%
Non-Ag Wage Income	209	$1,336.48	414	$1,226.32	623	$1,260.30
	40.4% *	24.0%	35.6% *	16.9%	37.1% *	18.7%
Commerce Income	134	$421.25	288	$365.43	422	$382.64
	25.9%	7.6%	24.8%	5.0%	25.1%	5.7%
Other Independent Income	174	$682.05	320	$420.17	494	$500.94
	33.6% **	12.3%	27.5% **	5.8%	29.4% **	7.4%
Rental Income	468	$81.04	1009	$103.05	1477	$96.26
	90.5% **	1.5%	86.9% **	1.4%	88.1% **	1.4%
Remittances	210	$456.72 ***	279	$217.67 ***	489	$291.41 ***
	40.7% ***	8.2%	24.0% ***	3.0%	29.2% ***	4.3%
Other	366	$1,019.37	754	$1,144.09	1120	$1,105.62
	70.8% **	18.3%	64.9% **	15.8%	66.7% **	16.4%
Net Household Income	518	$5,562.85 *	1160	$7,259.79 *	1678	$6,736.38 *
	100	100.0%	100.0%	100.0%	100.0%	100.0%

Notes:

*** Means (or X2 test of incidence) are statistically significant across categories at the 99% confidence level

** Means (or X2 test of incidence) are statistically significant across categories at the 95% confidence level

* Means (or X2 test of incidence) are statistically significant across categories at the 90% confidence level

Table 7: Composition of Net Household Income by Female Land Rights, Peru						
	Female Land Rights		No Female Land Rights		TOTAL	
INCOME SOURCE	No. Farms (incidence)	Mean (composition)	No. Farms (incidence)	Mean (composition)	No. Farms (incidence)	Mean (composition)
Net Farm Income	244***	$695.26	627***	$595.95	871***	$624.23
	100.0%	28.5%	100.0%	33.5%	100.0%	31.8%
Agric.Wage Income	36	$111.75	95	$124.54	131	$120.90
	14.8%	4.6%	15.2%	7.0%	15.0%	6.2%
Non-Ag Wage Income	60**	$525.19**	101**	$276.77**	161**	$347.47**
	24.6%	21.5%	16.0%	15.5%	18.5%	17.6%
Commerce Income	52**	$338.38*	110**	$203.38*	162**	$241.80*
	21.3%	13.9%	17.5%	11.5%	18.6%	12.3%
Other Independent Income	78	$280.27**	169	$173.36**	247	$203.79**
	32.0%	11.5%	27.0%	9.7%	28.4%	10.4%
Rental Income	233	$213.18	600	$178.95	833	$188.69
	95.5%	8.7%	95.7%	10.1%	95.6%	9.5%
Remittances	22**	$81.10	34**	$62.77	56**	$67.99
	9.0%	3.3%	5.0%	3.5%	6.4%	3.5%
Other	186	$195.00	498	$161.37	684	$170.95
	76.2%	8.0%	79.4%	9.1%	78.5%	8.7%
Net Household Income	244***	$2,440.14***	627***	$1,770.96***	871***	$1,961.54***
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Notes:

*** Means (or X2 test of incidence) are statistically significant across categories at the 99% confidence level

** Means (or X2 test of incidence) are statistically significant across categories at the 95% confidence level

* Means (or X2 test of incidence) are statistically significant across categories at the 90% confidence level

Table 8: Income Regression Means									
Paraguay					Peru				
	All Households		Dual Households			All Households		Dual Households	
Variable	Obs	Mean	Obs	Mean	Variables:	Obs	Mean	Obs	Mean
Net HH Income (US$)	1552	$6,918	1267	$7,392	Net HH Income (US$)	815	$1,992	740	$2,026
Net Farm Income (US$)	1548	$3,081	1263	$3,497	Net Farm Income (US$)	815	$638	740	$663
Net Off-Farm Income (US$)	1548	$3,845	1263	$3,903	Net Off-Farm Income (US$)	815	$1,354	740	$1,363
Female Land Rights (FLR)	1552	33.0%	1267	19.7%	Female Land Rights (FLR)	815	30.4%	740	24.3%
Female Household Head	1552	26.7%	1267	10.2%	SexHead	815	9.5%	740	0.6%
Household Size	1552	5.06	1267	5.28	Household Size	815	5.19	740	5.33
Economically Active Adults	1552	3.68	1267	3.81	Economically Active Adults	815	2.36	740	2.41
Joint Managers	903	31.9%	797	33.6%	Joint Managers	714	22.9%	740	24.1%
Male Managers	903	51.4%	797	52.4%	Male Managers	714	54.5%	653	57.7%
Female Managers	903	16.7%	797	14.0%	Female Managers	714	22.6%	653	18.2%
Female Years of Schooling	1552	5.28	1267	5.42	Female Years of Schooling	815	5.01	740	5.18
Male Years of Schooling	1267	5.91	1267	5.91	Male Years of Schooling	815	7.09	740	7.79
No Male in HH	1552	18.4%	1267	0.0%	No Male in HH	815	9.0%	740	0.0%
Value of Assets	1552	$41,922	1267	$50,358	Value of Assets	809	$4,592	734	$4,316
Farm Size (hectares)	1552	20.28	1267	22.73	Farm Size (hectares)	815	3.79	740	3.89
Cropped Area (hectares)	1552	6.63	1267	7.86	Cropped Area (hectares)	788	4.00	720	4.23
Number of Crops	1552	4.03	1267	4.42	Number of Crops	815	3.75	740	3.85
Members of Farm Orgs.	1552	2.0%	1267	1.7%	Members of Farm Orgs.	815	42.1%	740	42.8%
Distance to Market (minutes)	n.a.	n.a.	n.a.	n.a.	Distance to Market (minutes)	815	72.39	740	71.87
Minifundia	1552	58.1%	1267	56.8%	Sierra	815	69.0%	740	69.1%

Table 8: Income Regression Means, continued									
Paraguay					**Peru**				
Colonizacion	1552	14.8%	1267	15.7%	Selva	815	0.2%	740	0.2%
Frontera	1552	25.6%	1267	25.9%	Coast	815	30.8%	740	30.8%
Chaco	1552	1.5%	1267	1.5%					

Note:

n.a. = not available

Table 9: Net Household Income Regression Results, Paraguay				
	1	**Prob > F**	**2**	**Prob > F**
F	55.67	0 ***	46.41	0 ***
Deg Freedom	606		564	
R-squared	0.373		0.388	
logNHHY	Coef.	P>t	Coef.	P>t
Constant	6.746	0 ***	6.754	0 ***
FLR	-0.036	0.716	-0.075	0.494
SexHead	-0.189	0.186		
logHHSize	0.256	0.065 *	0.200	0.196
logAdultEAP	0.241	0.065 *	0.142	0.347
logFSchool	0.039	0 ***	0.046	0 ***
logMSchool	0.066	0.001 ***	0.065	0.004 ***
NoMale	0.283	0.065 *		
logAssets	0.077	0.004 ***	0.105	0.001 ***
logFarmSize	0.026	0.292	0.014	0.616
logFarmSizeSQR	0.059	0 ***	0.059	0 ***
Colon	-0.179	0.013 **	-0.164	0.034 **
Frontera	-0.064	0.372	-0.004	0.967
Chaco	0.279	0.017 **	0.421	0.001 ***

Notes:

*** Statistically significant at 99% confidence level

** Statistically significant at 95% confidence level

* Statistically significant at 90% confidence level

Table 10: Net Household Income Regression Results, Peru				
	1	**Prob > F**	**2**	**Prob>F**
F	19.89	0.000***	19.52	0.000***
Degrees of Freedom	763		696	
R-squared	0.228		0.216	
logNHHY	Coef	P>t	Coef	P>t
Constant	6.473	0.000***	6.533	0.000***
FLR	0.403	0.000***	0.388	0.000***
SexHead	-0.135	0.795		
logHHSize	0.137	0.168	0.051	0.650
logAdultEAP	0.408	0.000***	0.410	0.000***
logFSchool	0.036	0.008***	0.039	0.008***
logMSchool	0.013	0.459	0.012	0.491
NoMale	-0.056	0.918		
logAssets	0.131	0.000***	0.145	0.000***
logFarmSize	0.041	0.217	0.040	0.270
logFarmSizeSQR	0.016	0.064*	0.015	0.145
logDistance	-0.130	0.001***	-0.135	0.001***
Sierra	-0.718	0.000***	-0.711	0.000***
Selva	-0.147	0.214	-0.151	0.232

Notes:

*** Statistically significant at the 99% confidence level

** Statistically significant at the 95% confidence level

* Statistically significant at the 90% confidence level

Table 11: Farm Income Regression Results, Paraguay								
	1	**Prob>F**	**2**	**Prob>F**	**3**	**Prob>F**	**4**	**Prob>F**
F	176.3	0***	185.31	0***	86.05	0***	74.29	0***
Deg Freedom	589		546		397		375	
R-squared	0.756		0.767		0.643		0.629	
logFarmIncome	**Coef.**	**P>t**	**Coef.**	**P>t**	**Coef.**	**P>t**	**Coef.**	**P>t**
Constant	4.372	0***	4.670	0***	4.725	0***	4.747	0***
FLR	-0.216	0.071*	-0.291	0.079*	-0.008	0.959	-0.030	0.851
SexHead	-0.274	0.329			-0.052	0.661		
logHHSize	-0.280	0.19	-0.349	0.137	-0.197	0.296	-0.264	0.175
logAdultEAP	0.550	0.031**	0.497	0.102	0.370	0.145	0.448	0.111
MgrJoint					0.080	0.219	0.071	0.321
MgrFemale					-0.500	0.103	-0.513	0.158
logFSchool	0.008	0.561	0.019	0.081*	0.021	0.044**	0.018	0.075*
logMSchool	-0.020	0.237	-0.020	0.224	-0.004	0.794	0.000	0.983
NoMale	0.353	0.296			0.159	0.296		
logAssets	0.227	0***	0.207	0.001***	0.211	0.093*	0.202	0.122
logFarmSize	0.313	0***	0.349	0***	0.363	0***	0.394	0***
logFarmSizeSQR	0.045	0***	0.039	0***	0.037	0***	0.032	0***
logNCrops	0.070	0***	0.067	0***	0.009	0.595	0.011	0.58
FarmOrg	0.351	0.011**	0.384	0.011**	0.253	0.133	0.332	0.08*
Colon	0.309	0.002***	0.321	0.001***	0.192	0.038**	0.219	0.019**
Frontera	0.206	0.041**	0.216	0.038	0.137	0.128	0.157	0.092*
Chaco	0.403	0.188	0.545	0.12	0.467	0.336	0.484	0.353

Notes:

*** Statistically significant at the 99% confidence level

** Statistically significant at the 95% confidence level

* Statistically significant at the 90% confidence level

Table 12: Farm Income Regression Results, Peru								
	1	**Prob>F**	**2**	**Prob>F**	**3**	**Prob>F**	**4**	**Prob>F**
F	20.94	0.000***	20.47	0.000***	16.4	0.000***	16.59	0.000***
Deg Freedom	659		609		586		541	
R-squared	0.292		0.302		0.279		0.287	
logFarmIncome	**Coef.**	**P>t**	**Coef.**	**P>t**	**Coef.**	**P>t**	**Coef.**	**P>t**
Constant	3.875	0.000***	3.839	0.000***	4.266	0.000***	4.095	0.000***
FLR	-0.136	0.356	-0.190	0.203	-0.105	0.517	-0.148	0.370
SexHead	-0.510	0.210			-0.648	0.057*		
logHHSize	0.053	0.673	-0.002	0.991	-0.031	0.810	-0.089	0.543
logAdultEAP	-0.036	0.793	0.023	0.872	-0.008	0.959	0.037	0.814
MgrJoint					-0.069	0.679	-0.056	0.744
MgrFemale					-0.136	0.354	-0.069	0.660
logFSchool	0.026	0.127	0.029	0.111	0.020	0.253	0.026	0.174
logMSchool	-0.012	0.596	-0.014	0.549	0.000	0.989	-0.004	0.866
NoMale	0.148	0.759			0.366	0.393		
logAssets	0.312	0.000***	0.336	0.000***	0.281	0.000***	0.323	0.000***
logFarmSize	0.108	0.014**	0.129	0.007***	0.134	0.004***	0.145	0.005***
logFarmSizeSQR	0.025	0.08*	0.026	0.147	0.029	0.052*	0.027	0.152
logNCrops	0.374	0.000***	0.371	0.000***	0.265	0.017**	0.274	0.016**
FarmOrg	0.032	0.788	-0.009	0.940	0.002	0.985	-0.042	0.746
logDistance	-0.037	0.508	-0.065	0.245	-0.031	0.594	-0.059	0.316
Sierra	-0.980	0.000***	-0.933	0.000***	-0.819	0.000***	-0.791	0.000***
Selva	-0.229	0.235	-0.244	0.236	-0.148	0.454	-0.155	0.466

Notes:

*** Statistically significant at the 99% confidence level

** Statistically significant at the 95% confidence level

* Statistically significant at the 90% confidence level

Table 13: Net Off-Farm Income Regression Results, Paraguay				
	1	**Prob > F**	**2**	**Prob > F**
F	26.28	0 ***	25.32	0 ***
Deg Freedom	600		557	
R-squared	0.203		0.211	
logOffFarmIncome	**Coef.**	**P>t**	**Coef.**	**P>t**
Constant	5.671	0.000 ***	5.491	0.000 ***
FLR	0.145	0.357	0.176	0.281
SexHead	-0.071	0.781		
logHHSize	0.188	0.353	0.086	0.709
logAdultEAP	0.415	0.036 **	0.427	0.074 *
logFSchool	0.068	0.000 ***	0.083	0.001 ***
logMSchool	0.094	0.001 ***	0.088	0.004 ***
NoMale	0.353	0.164		
logAssets	0.112	0.010 *	0.162	0.003 ***
logFarmSize	-0.256	0.000 ***	-0.298	0.000 ***
logFarmSizeSQR	0.048	0.000 ***	0.049	0.000 ***
Colon	-0.485	0.006 ***	-0.543	0.005 ***
Frontera	-0.359	0.016 **	-0.335	0.055 *
Chaco	0.048	0.877	0.187	0.593

Notes:

*** Statistically significant at the 99% confidence level

** Statistically significant at the 95% confidence level

* Statistically significant at the 90% confidence level

Table 14 : Net Off-Farm Income Regression Results, Peru				
	1	**Prob>F**	**2**	**Prob>F**
F	6.76	0.000***	6.8	0.000***
Degrees of Freedom	787		717	
R-squared	0.146		0.160	
logOffFarmIncome	**Coef.**	**P>t**	**Coef.**	**P>t**
Constant	5.865	0.000***	5.897	0.000***
FLR	1.674	0.214	1.618	0.048**
SexHead	-0.428	0.726		
logHHSize	0.444	0.028**	0.389	0.034**
logAdultEAP	0.471	0.048**	0.496	0.010***
logFSchool	0.011	0.461	0.007	0.622
logMSchool	0.014	0.620	0.018	0.509
NoMale	-0.250	0.748		
logAssets	0.017	0.830	0.027	0.663
logFarmSize	-0.051	0.227	-0.049	0.264
logFarmSizeSQR	0.007	0.511	0.007	0.586
logDistance	-0.173	0.002***	-0.190	0.001***
Sierra	-0.512	0.002***	-0.480	0.006***
Selva	-0.170	0.309	-0.133	0.460

Notes:

*** Statistically significant at the 99% confidence level

** Statistically significant at the 95% confidence level

* Statistically significant at the 90% confidence level

Table 15: Farm Revenue Regression Means, Brazil				
	Model 1		Model 2	
Variable	Obs	Mean	Obs	Mean
Farm Revenue	6987	$183,374.87	5681	$201,028.80
Flr	6987	0.10	5681	0.04
F-Mgr	6987	0.06	5681	0.03
Mgr	6987	0.86	5681	0.89
Age	6987	60.49	5681	60.31
EAPchild+.001	6987	1.02	5681	1.07
F-School	688	2.87	199	3.03
M-School	6299	2.84	5482	2.86
FarmOrg	6987	0.60	5681	0.62
N-Crops	6987	2.96	5681	3.01
Farm Size (Ha)	6987	306.92	5681	301.82
Farm Size SQ	6987	202819.30	5681	196919.13
Southeast	6987	0.14	5681	0.14
Center	6987	0.17	5681	0.17
Northeast	6987	0.44	5681	0.43
North	6987	0.03	5681	0.03

Table 16: Farm Revenue Regression Results, Brazil							
Model 1				**Model 2**			
OLS_Robust		**Prob > F**		**OLS_Robust**		**Prob > F**	
F	463.61	0.00	**	F	371.23	0.00	***
DF	6971			DF	5665		
Adj R-squared	0.40			**Adj R-squared**	0.40		
Log Farm Revenue	Coef.	P>t		**Log Farm Revenue**	Coef.	P>t	
Constant	2.48	0.07	*	**Constant**	2.22	0.14	
Flr	-0.40	0.05	**	**Flr**	-0.12	0.77	
Mgr	-0.27	0.02	**	**Mgr**	-0.32	0.01	**
F-Mgr	0.10	0.69		**F-Mgr**	-0.37	0.43	
Log Age	-0.13	0.38		**Log Age**	0.01	0.94	
logEAPchild	0.00	0.88		**logEAPchild**	0.01	0.44	
Log F-School	0.04	0.04	**	**Log F-School**	0.04	0.44	
Log M-School	0.02	0.00	***	**Log M-School**	0.02	0.01	**
FarmOrg	0.41	0.00	***	**FarmOrg**	0.48	0.00	***
Log N-Crops	3.75	0.00	***	**Log N-Crops**	3.71	0.00	***
Log Size	0.80	0.08	*	**Log Size**	0.66	0.19	
Log Size SQ	-0.09	0.02	**	**Log Size SQ**	-0.08	0.09	*
Southeast	0.09	0.48		**Southeast**	0.06	0.67	
Center	-1.11	0.00	***	**Center**	-1.18	0.00	***
Northeast	-1.49	0.00	***	**Northeast**	-1.62	0.00	***
North	0.70	0.01	**	**North**	0.66	0.02	**

Notes:

*** Statistically significant at the 99% confidence level

** Statistically significant at the 95% confidence level

* Statistically significant at the 90% confidence level