



Discussion Paper No.209

**WOMEN'S OWNERSHIP OF LAND AND
THE TIME ALLOCATION DECISIONS OF SPOUSES
IN RURAL FARM HOUSEHOLDS IN PERU**

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March 2018

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Submitted for the GSID Discussion Paper Series
Nagoya University, Japan

March 26th, 2018

I thank the feedback provided by the participants of the Research Seminar Series on Economic Development at GSID Nagoya University on October 2017. All errors are my own

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1 Introduction

A number of analytical and qualitative case studies have documented the importance of formal land ownership for women's economic security and the improvement of their positions within their households (Deere and León 2001a; Deere and Doss 2006; Abraham, Gaspart, and Stevens 2005; Agarwal 1994, 2003). This expectation is rooted in the assumption that female land rights will increase women's bargaining power.¹ Redistributions of property rights to land towards women via the formal titling of their land or via the inclusion of their names as co-proprietors in deeds previously held by their husbands alone, the theory predicts, can affect the distribution of other household resources and participation in paid employment.

This paper challenges the conventional wisdom about the bargaining power hypothesis, which would make us expect a more equal distribution of domestic and market activities between the spouses that share ownership rights over the land they live in and work on. My main argument is that the impact of women's land ownership on wives and husbands' time allocation outcomes is heterogeneous and contingent upon size of the farm as well as upon the broader social and regional framework.

Using data on a representative sample of couples in landed and formally titled agricultural households drawn from the 2000 Living Standards Measurement Surveys (LSMS), I estimate the effect of female land rights on the time allocation decisions of couples in Peruvian rural farms households, for each spouse separately and also in relation to one another, and find that the larger the farm, the longer the hours landowning women spend working on the farm but there is no tradeoff with their housework hours, resulting in considerable increases in their weekly workloads. In contrast, the workloads of the husbands tend to decrease, significantly so among larger farms, in part via reductions in their hourly dedication to farm work.

Among minifundios, farms between $\frac{1}{4}$ and $3\frac{1}{2}$ hectares, female land rights (FLR) are associated with negligible alterations in women's time allocation patterns. Among small farms, which are those between $3\frac{1}{2}$ and 10 hectares, my results indicate that FLR significantly increase wives' total hours of work (paid and unpaid), both overall and relative to their husbands. FLR seem to create incentives for women to raise their participation in farm work, but there is no tradeoff with housework. Women continue to provide the bulk of housework in the household, and to that they add hours of work on the farm. These results appear to give little support to the notion that female land rights improve women's bargaining power with respect to time allocation, perhaps because in the case of rural Peru FLR do not improve women's "exit" options and cultural norms regarding female domestic work make it relatively inflexible.

¹ In the context of household decision-making, bargaining power refers to the influence a household member has over a household decision in relation with the influence of other household members.

Rural Peru provides an interesting case in which to look at the intrahousehold gender dynamics and test the hypothesis that land ownership affects women's time allocation because, unlike other Latin American countries where women with land rights tend to be lone heads of households, the large majority of Peruvian female landowners are married or in a consensual union (Deere et al. 2004). Among principal women, 90 percent are partnered.² Divorced or single people are the exception.

This paper is organized as follows: in section 2 I provide an analytical framework for this study, with a brief overview of the main economic approaches to bargaining power. Comparing the stylized facts, assumptions, and theoretical predictions of these models, I examine how each of them deals with the issue of evaluating the effect of FLR on time allocation. This section also discusses the empirical evidence associated with such theoretical models, particularly regarding the role of FLR in bargaining over time allocation in Latin America.

Section 3 addresses a number of conceptual and methodological issues crucial in the analysis of household decision-making processes, including the problems of defining and measuring women's time use. In Section 4, I present my sample and examine the observed time allocation behavior of couples in Peruvian rural farm households, focusing upon the differences in the patterns of time use by FLR status and by size of the farm. Section 4 also seeks out the underlying factors contributing to these differences by delving into the relationship between wealth and the chosen observable time outcomes. The empirical strategy carried out in this paper to tackle the problems of endogeneity and selection bias are sketched out in Section 5, which also presents the results of the estimation of the effect of FLR on several outcomes of time allocation, such as the observed workload differential between spouses and the distribution of farm work between the spouses. Lastly, in Section 6 I offer the contributions of my analysis and some concluding remarks.

On the one hand, female rights over land seem to promote a more gender equal distribution of farm work between spouses; on the other hand, they seem associated with a longer overall workday. If labor outcomes of landowning women are a reflection of their increased bargaining power, one interpretation of the results of this paper is that bargaining power might be happening at the cost of women's overwork. Yet, the relative length of total work day is not the only measure of bargaining power. Landowning women may have more say in household decisions, or more discretionary income, even though they work longer hours—which unfortunately cannot be assessed with this data.

2 Modeling the relationship between the intrahousehold distribution of property rights, bargaining power, and family behavior

The early formalization of intrahousehold resource allocation relied on the unitary economic approach, which conceptualizes the household as an undifferentiated unit where all the members have a common set of preferences and a joint utility function (Becker 1965). Household outcomes are interpreted as results of the maximization of a unified utility function subject to a single budget constraint, containing the pooled income and factor supply for the entire household. The pooled budget constraint of the standard model implies that time, a

² Principal woman, in the context of a couple, refers to the wife or spouse within a household, to distinguish her from other women that might be present in the house (daughters, aunts, nieces, granddaughters, grandmothers). In the context of a lone head of household, the principal woman refers to a mother, or a grandmother, or the woman that the other household members recognize as the main decision-maker.

component of the household budget, is also allocated by a joint decision. Therefore, under the standard model, family decisions are based on factors relevant to efficiency, such as the productivity of each household member in non-market work and their market wages. The share of income or wealth of individuals within the household is not predicted to affect outcomes.

The development of bargaining models of the household challenged the foundations of this unitary approach on both theoretical and empirical grounds. The pioneer work of Manser and Brown (1980) and McElroy and Horney (1981) enriched household modeling by formalizing the heterogeneity of preferences and interests of the individuals comprising the family. The outcomes of the household are modeled as the solution to a Nash bargaining game in which each individual's fallback position or threat point is given by their exit options, i.e. their respective utilities if negotiation failed. The model typically refers to a married couple negotiating over resource allocation within the household, with the threat point for each spouse defined by their utility outside the marriage. Stronger fallback positions translate into more bargaining power in negotiations. The Nash bargaining model predicts that a redistribution of property rights of land towards women will raise women's threat point and increase their relative bargaining power. As a result, women's position at home improves, taking the form of greater participation in decision-making and/or greater control over the household's income and resources.³

Like the unitary model, this bargaining model assumes that household members pool resources and allocate them jointly (Doss 1996). In contrast to the unitary model, this bargaining model interprets the intrahousehold allocation of resources as a reflection of the distribution of bargaining power in the household, rather than a reflection of preferences. Allocations, hence, are dependent on the identity of the family member who generates or controls resources, and on the factors influencing the threat point of individuals. Property rights over land affect the balance of power within the household.

Subsequent developments of the bargaining framework introduced the role of social norms in the determination of intrahousehold allocations. Lundberg and Pollak (1993) developed a "separate spheres" model in which spouses bargain over distributional issues from within their socially assigned gendered spheres of action, which therefore constitute their respective fallback positions. Rather than the dissolution of the marriage, the failure of cooperation or agreement between spouses leads to a default equilibrium in which gender roles determine each individual's activities and contributions to the household. In line with this approach, some allocation outcomes are not reflections of preference or productivity differences between husband and wife, and are not achieved through bargaining power and negotiation (Lundberg and Pollak 1996).

The theory of bargaining predicts that differences in the asset endowments of wives and husbands affect the relative bargaining power of spouses during marriage depending on the division of assets upon divorce (cooperative model) or on the relative control during marriage (non-cooperative model). Early contributions to the literature on bargaining in agrarian societies emphasized the issue of ownership versus control of the land, arguing that it is not just land rights, but land rights combined with effective control over production that lead to better outcomes for women (Agarwal 1994). In that tradition, much of the empirical work on assets and

³ Even if FLR do not effectively lead to an increase in a woman's bargaining power, the strengthening of her fallback position and exit option may nonetheless be realized. Regardless of her abilities to bargain with her partner, a woman with land rights is in a better situation than a woman without land rights because her husband is aware that if the marriage fails she will be able to keep part of the land. This potentially translates into better conditions for the wife.

bargaining power has proxied bargaining power with assets brought to marriage or assets controlled by each spouse in marriage. Recent research, however, is turning to indicators of the value of assets to be taken upon divorce as proxies for bargaining power, with interesting results.

For the African case, for instance, Fafchamps and Quisumbing (2005) and Lim et al. (2007) had access to data sets that allowed them to create a measure for assets brought to marriage, a measure for control of assets during marriage, and a measure for assets each spouse would take with him/her in case of divorce. Both studies found that assets brought to marriage and assets controlled during marriage had no effect on household outcomes. Assets as exit option did. Presumably, in households with FLR women have more control when they are the sole owners of a piece of land (inherited from her parents, perhaps, or from a previous husband).

The separate spheres approach brings in cultural norms, and is perfectly consistent with the possibility that norms are sticky. As identities and cultural norms are difficult to change, women's ownership of land is not necessarily conducive to improvements in their status in the short run. FLR may have lagged effects; it might take years for increased bargaining power to change cultural norms.

What is the conceptual basis for the hypothesis that FLR affect time allocations through bargaining power? The standard unitary framework presupposes efficient productive resource allocation, which means that household members make decisions influenced primarily by the productivity of the farm unit. In this context, FLR should not make any difference whatsoever. In contrast, in the bargaining model, the presence of FLR in the household alters the incentives and relative bargaining power of both spouses. The wife gains influence over household decisions and she may gain a larger share of market income which could induce her to work longer hours in paid employment in order to further increase her consumption. Alternatively, she could use the increased bargaining power to do less housework or to reduce her labor hours overall. The exact outcome is theoretically indeterminate.

If a woman dislikes household work, or prefers more leisure overall, an improvement in her bargaining power should lead to a reduction in her hours of housework.⁴ Yet, a growing body of literature suggests that FLR do not decrease women's time doing domestic work. One interpretation is that FLR are not conducive to the fortification of women's bargaining power and the improvement of their fallback position. Another interpretation is that notwithstanding the strengthening of women's bargaining power, social roles still assign them the bulk of the housework (or that regardless of their bargaining power women specialize in housework because of comparative advantages). As a result, women may opt for greater consumption, rather than greater leisure.

The empirical evidence throughout the world is that while bargaining power is relevant for some household outcomes, there is little flexibility of housework hours for women, regardless of their FLR status, income, wealth, and social standing. Married women in particular, landowning or not, are likely to show modest variations in their time allocations to domestic work. In a study on flower workers in Ecuador, Newman (2002) finds that when both the man and the woman work in the flower industry, the domestic labor time of the man increases slightly, but women's time devoted to domestic work does not decline at all. For urban adults in Bolivia,

⁴ This could happen via the reduction of her workload in absolute terms (less housework produced in the household) or on account of other household members sharing out in domestic activities (redistribution towards other members).

the gender inequality in the allocation of time seems to be centered on the paid vs. unpaid work-time distinction. Medeiros, Osorio, and Costa (2007) describe a gender-based division of labor unequal not so much because of who does what type of work but because of how much work of each type each gender does: women's entry into the labor market generates only a partial trade-off between paid and unpaid work, as women usually end up engaging in a double shift of paid and unpaid work.

Total workload might be a better indicator of women's bargaining power, in the sense that it does not present the 'stickiness' that housework displays because of the influence of social norms. It is not possible, however, to make claims a priori about whether there is a direct or an inverse relationship between FLR and total hours worked. Furthermore, a number of other factors come into play. Smaller workloads, for example, are arguably indicators more of household wealth than of bargaining power. Everything else equal, less hours of work for either husband or wife usually denote the household is better off (as a result of the wealth effect).

It is difficult to distinguish the effects of increased assets themselves from bargaining power effects on labor supply, as the claim of a relationship between land ownership and bargaining power is complicated by problems of endogeneity, selection, and omitted variables, which poses challenges to the accurate estimation of the FLR effects. Indeed, time outcomes I interpret to be expressions of women's bargaining power (such as a redistribution of domestic work between the spouses) could actually be a wealth effect. Farms of different sizes are likely to organize and allocate their resources in substantially different ways. For example, owning little land might mean that one or two members of the household are enough to deal with all the farm activity and the other members ought to look for work off the farm, or simply end up increasing their hours of housework. On the other hand, households with bigger land holdings might require more members to take care of the farm.

A number of studies have found that as household wealth grows, rural households tend to replace hired labor for family labor (Kabeer 2012; Crabtree 2002, de la Peña 2000; Escobal and Agüero 1999). Wealthier farms are more able than other farms to meet expenses such as hiring outside labor, sending their children to school, and/or keeping a stay-at-home wife. A wealth effect could lead wives in the more affluent households to display lower labor force participation rates and/or fewer non-domestic hours worked (perhaps the same should be observable for men, although men's labor time is less flexible). It would not be surprising, then, to find principal women engaging in more hours of housework in wealthier households in relation to poorer ones. The workload of one spouse relative to the other spouse would be a better indicator of bargaining power. However, empirical studies have shown that there are a number of economic and cultural factors weakening the FLR-BP relationship. The strength of the BP-FLR relationship is conditional on a number of factors. Land ownership probably gives women more bargaining power, but if husbands nonetheless control the households' decision-making processes due to well established cultural practices, husbands can effectively prevent their wives' control of the land, neutralizing any potential influence of FLR on household decisions.

The reverse scenario is also possible. Married women without explicit land rights can nonetheless exert control over land as a result of marriage norms and/or of laws associated with marriage which confer some legal rights over land. In the Peruvian case, however, since under the default marital regime only property acquired during the marriage is considered joint property (if not acquired via inheritance), a woman married to a man who

had land prior to the marriage does not give her any rights in that land. Both the positive and negative scenarios illustrate the point that legal land ownership does not necessarily give women any additional rights— cultural norms could override property rights. Nonetheless, since there is no indirect land claim through marriage, the existence of direct claim through title matters a lot.

While plausible, FLR stand also as a problematic measure of women’s bargaining power in the household. For one, there is an uncertain path of causality between the two; FLR are arguably conducive to greater bargaining power for women, but the causality could also go the other way around: women’s bargaining power could be what led to FLR in the first place. The intrahousehold distribution of property rights on land as a measure of the relative bargaining power of wives and husbands is likely to be endogenous with respect to the bargaining power of the spouses. In particular (or specifically), women’s acquisition of FLR could be correlated with unobservables that also affect women’s bargaining power. For example, unobservable women's individual characteristics – including those relevant to their bargaining power – might improve their access to land. Households or individuals with different levels of FLR may have different characteristics, preferences, etc., and these differences may determine simultaneously FLR and the household behavior being examined. While it may appear that women’s title to property confers them bargaining power, consideration of unobservables sometimes shows that a third factor (for example, higher wealth or better geographic location), causes both.

Failing to take account of the potential endogeneity of FLR can well lead to a substantial under or over estimation of the FLR effect. If women who acquired FLR are unobservably more assertive and independent than average rural women to begin with and are therefore more motivated or empowered, or are better positioned (socially, geographically, etc.) to be economically active compared to wives without FLR, then a positive effect of FLR on female labor force participation may be overstated. The regression will yield an estimated FLR effect that is biased up. On the other hand, if wives with FLR have an unobservable higher preference or likelihood to stay home, then a positive effect of FLR on female labor force participation may be understated.

The following sections, by comparing the FLR-differences in the time use patterns of individuals otherwise similar in human capital, assets/wealth, other household characteristics, and geographic location, aims to identify adverse or favorable selection into FLR in dual-headed households.

3 Issues in the measurement of women’s time use and task allocation using the 2000 Peruvian LSMS

This section considers the difficulties involved in defining and measuring key variables, such women’s work, and then assesses the merits and drawbacks of the measures used in this study.

It is difficult to accurately define and measure women’s market work because it is often informal, seasonal, or unpaid. One main problem in measuring rural women’s work is the simultaneity of women’s activities. Describing the gender division of labor in peasant households on the haciendas of Cajamarca in northern Peru, Deere (1991) indicates that in rural areas women’s allocation of labor between household and farm production is “especially interactive”, as women engage in both productive and domestic work at the same time –

grazing animals while minding the kids and spinning wool for cloth production.⁵ Although engaging in productive activities, rural women might not report those hours of work if performed while doing domestic or care work (like watching children). That is the problem of under-enumeration. There is a high likelihood of overlapping the reported hours of housework and farm work for women in any survey, particularly in the case of unremunerated family workers, for whom labor time and housework time are rarely separate categories (Deere 1990).

This raises concerns about selection problems based on female attitudes towards their own work. It would be a problem if women with higher regard for their own work (women in better position, more confident, more educated, that is, more likely to have FLR) were more likely to identify their work as non-domestic and therefore be more likely to report it as such.

Specifically regarding the Peru 2000 LSMS, aside from the common problem of the respondent's potential imprecise memory of time dedicated to various activities, there is some chance of overestimation of time dedication because the survey was conducted from May thru June, one of the busiest times of the year for farmers (harvest time). Numbers, however, are consistent with national statistics and general evidence for Peru and Latin America for that season (Velazco and Velazco 2012; Diaz, Saldaña and Trivelli 2010).

In Peru, the LSMS were an early attempt to collect time use data. The LSMS surveys are not time-use surveys but they do gather some information on how individuals allocated their time. Questions on the labor force participation rates of household members and time dedicated to domestic and non-domestic activities were typically asked of each household member 6 years old and older.

One of the first questions in the module about economic activity requests information on time dedicated to housework. Housework questions refer to the past 7 days and are reported in daily hours and weekly days. There is no disaggregation of domestic activities; which makes it difficult to get a sense of how big the problem of simultaneity might be (and under and over-estimation).

In the survey's module regarding the economically active population, the members of the household declare their principal and secondary labor activities in the past 7 days and in the past 12 months.⁶ Along with a description of the activity, individuals declare the number of hours per day, days per week and months per year allocated to such activity. This information is collected regardless of whether the occupation is paid or unpaid. The Peruvian LSMS surveys catalog the work activities reported by respondents using a standardized international industrial classification for economic activities (CIU, Clasificación Industrial Internacional Uniforme). No pre-defined categories of farm or off-farm work are used, which facilitate the creation of ad-hoc categories. My classification of non-domestic activities includes work conducted on the farm, and off-farm

⁵ Deere (1991) in her work in Cajamarca, found in her interviews that women considered such a scenario as leisure, that is, as what they would do while 'resting' every afternoon. In general, as Deere and others argue, establishing what exactly might be "leisure" in the context of a peasant economy is difficult, particularly for women.

⁶ An economic activity is defined as the job, profession or skill carried out by a person during the survey's reference period. Principal or primary activity is the one to which the person dedicates the most hours to. Secondary activity is the activity, after the primary job, to which an individual dedicates the most time to (Cuánto S.A. 2000b, p.51). The 12-month horizon is included to capture seasonality, an important issue to account for especially in rural areas. In my sample, the 7-day and the 12-month data are the same for the majority of cases because only a small fraction of economically active people changed jobs throughout the year.

activities whether as independent workers or wage workers. I distinguish between agricultural field work and animal care as the two categories constituting what I am labeling as farm work.

From the available information, three distinctive work categories are subject to analysis: (1) unpaid domestic work (household labor), (2) unpaid non-domestic work (which includes both farm work and production for own use), and (3) paid non-domestic work (off-farm or market work, which can be agricultural or non-agricultural). With this data I calculated each spouse's weekly workload, defined as number of hours per week dedicated altogether to farm work, off-farm work, and housework. The length of one day of agricultural work was self-declared. I allowed 17 hours as maximum total daily workload. In order to ensure the comparability of time dedication across households, and to establish some uniformity in any potential overestimation bias, I use the information for the past 7 days (then this period is the same for all households, which would not be the case if I use the 12-month version instead).

My study is based on formally defined land rights, that is, titled land, where ownership and therefore enforceable claims are clearly established. It is probably best anyway, because potential ownership is not the same as actual ownership. While female ownership of land does not automatically translate into bargaining power, since we are dealing with titled people we can assume they are very likely to be aware of what land ownership means (therefore, closer connection between FLR and bargaining power).

Since I have information on ownership of land by gender, not on use or control of land by gender, for the purposes of my research FLR constitute a plausible measure of the spouses' relative bargaining power if conceptualizing FLR as an exit option rather than as indicating control. FLR are a good proxy for the exit option available to each spouse (threat point) as they represent for wives the possibility of keeping part of the land in the case of divorce (half where joint ownership) and can be used by women to negotiate better conditions within marriage.

4 The Peruvian rural setting: couples' time allocations in landowning farm households

This section discusses the composition of peasants' work time, that is, the combination of market activities with housework and work in the farm, by itself and in connection with the distribution of land rights in the household (FLR) and the size of the farm.

Since I am testing hypotheses regarding the work patterns of spouses, the original sample of 592 farm households in the LSMS 2000 is further reduced to those households with both husband and wife present (adult male and female present). A total of 63 cases of single women (household heads) are excluded from the regressions regarding the impact of FLR on outcomes dealing with bargaining power. Additional 16 cases with outlier values of farm size (too small or too large) are dropped, resulting in an effective cross-section of 513 landed married or common-law couples for whom there is complete information on formal ownership. Adjustments made to the sampling weights ensure the working sample is representative of landowning titled farm households in the year 2000.

4.1 Patterns of time use of wives and husbands

Table 1 establishes that both spouses work long hours in rural Peru, with a typical workload of close to 60 hours per week dedicated altogether to domestic and non-domestic activities.⁷ Not surprisingly, when domestic work is factored in, wives work more hours than do their husbands. Although over three fourths of the husbands in the sample declare they do some housework, their wives do carry on most of it. Data not presented in the table indicate that wives' domestic hours average 32 hours per week, four times the amount of housework contributed by their husbands, and more than half of the total housework produced in the household.⁸ On average, 82 percent of surveyed peasant wives report doing work other than household chores, of which about one third (28 percent of all women in couples) work in off-farm activities as independent or wage workers, receiving compensation in cash or kind for this work. As expected, a higher percentage of husbands is economically active (98 percent), and the prevalence of off-farm work among them is also higher (40 percent).

Most wives and husbands in the sample engage in only one non-domestic activity (average of 1.2 activities at the same time, with respect to the week prior to the survey), although over the course of a year nearly one third of wives and over two thirds of husbands carry out two or more economic activities. Spouses participating in the labor force work on average six days of the week. The gender differences in the number of hours per day and months per year are statistically significant, with economically active wives working on average two hours less per day and slightly more months of the year compared to their partners.

The large and significant difference in the work time structure of spouses confirms the important role gender plays in determining the proportion of domestic to non-domestic work done by individuals. Table 2 considers separately wives who did domestic work exclusively versus wives who also conducted non-domestic activities in the week prior to the survey, and verifies that female labor force participation is almost independent of specific household circumstances such as the ages of their children or the employment status of their partners. Furthermore, economically active women do not relinquish housework, dividing equally their work time into domestic and non-domestic activities. Upon closer examination of the work patterns of the women in the sample, it is apparent that their weekly workloads vary significantly depending on whether or not these women are economically active. There is a strong positive correlation between their total hours worked and their participation in the labor force.⁹ The fact that economically active wives work on average 23 more hours per week (approximately one third more) than wives who stay home and do exclusively housework suggests that in rural Peru there is a low tradeoff between the two types of work, perhaps lower than other studies have found: for every additional hour of market work, there is a 0.8 per cent reduction in domestic work.

Wives who participate in the labor force are significantly younger than economically inactive wives. Interestingly, half of them speak Quechua compared to only one fifth in the other group, which is consistent with the clumping of these women in the Sierra region and with the higher incidence of poverty among those women in the labor force (the poorer the area, the higher the female labor participation rate). In contrast, full-time homemakers are located in the better-off regions.

⁷ If a spouse did not participate in the labor force at all, her/his non-domestic hours were entered as zero.

⁸ Husbands report an average of one and a half hours of housework per day, four days a week. Wives report an average of five hours per day, seven days a week. Differences are statistically significant.

⁹ On the contrary, the workloads of husbands are quite similar irrespective of their labor force participation.

Table 3 delves further into these patterns by considering variations by geographic location, illustrating how geographic location seemingly affects the sexual division of labor in Peruvian rural households. Wives' workloads vary by region, in all likelihood reflecting different gender roles, different costs of leisure, etc. Women in the Sierra region have heavier workloads than women in the Costa or the Selva, associated with higher rates of female labor force participation.¹⁰ As a matter of fact, women in the Sierra region are more likely to join the labor force than women in the other regions. Farm production opens the opportunity of self-employment, which is less dependent on the characteristics of local labor markets. Besides, women in the Sierra have a long tradition of participation in farm production.¹¹ Notice the large differences between the Northern and Southern Sierras: in the Southern Sierra female labor force participation is much higher than in the Northern Sierra (94 percent vs. 77 percent, respectively). This might be an indication of female labor force participation in the Southern Sierra being more associated with economic need than with women's independence and bargaining power. In the Northern Sierra, on the contrary, the conditions and characteristics of female labor force participation seem more correlated with women's independence and bargaining power. Not only is the rate of female labor force participation different between Northern and Southern Sierras; the "nature" of this participation is different as well. Most of the economically active women in the Southern Sierra (78 percent of them) have animal production as their primary activity and work as unremunerated family workers in about the same proportion of the cases (77 percent). In contrast, economically active women in the Northern Sierra engage in a wider range of activities, including commerce and manufacture (in the Southern Sierra manufacture is almost non-existent). In addition, women in the Northern Sierra are self-employed and working off the farm in nearly half of the cases compared to between one fifth and one third in the rest of the regions. Also, and according to data not presented in Table 3, about one third of women in the Northern Sierra declared a primary and a secondary activity (that is, declared working two jobs) during the reference period of the survey. In contrast, only one fifth of women in the Southern Sierra region declared to be in such situation.

Another subdivision of interest is farm size, since couples are likely to organize themselves differently depending on the size of their farms (Table 4). Farms are grouped into four categories based on size: microfundios (smaller than $\frac{1}{4}$ hectare), minifundios (between $\frac{1}{4}$ and $3\frac{1}{2}$ hectares), small farms (between $3\frac{1}{2}$ and 10 hectares), and medium-size farms (above 10 hectares). Large variations in the total work-time for women and men across farm-size strata signal that beyond the sexual division of labor, group differentiation is also important. Notice the big difference between minifundios and small farms regarding the percentage of males who hold two jobs or more (30 percent versus 14 percent). This is probably so because minifundios are poorer, which is consistent with the fact that 25 percent of them are located in the Southern Sierra region while only 3 percent of small farms are.

¹⁰ Data not presented in Table 3 finds that principal women in the Southern Sierra work an average of 71 hours per week, compared to 64 in the Northern Sierra, 52 in the Northern Selva and 47 hours per week in the Southern Coast.

¹¹ Regarding the labor force participation rates of men, the regional variations are negligible.

4.2 Female land rights, farm size and the sexual division of labor

I stratify the sample by farm size. The stratification of the sample helps avoid confounding the effect of FLR with the effect of owning a farm of a certain size. I show later that this stratification is useful in elucidating the differentiated effects (in size as well as in direction) of FLR on couples' time allocations.

Graphs 1 and 2 depict a peculiar association between FLR and the couples' patterns of time allocation, an association that varies in strength and direction depending on the size of the farm. A first feature to notice is that FLR status involves different time allocation behaviors for women and men. Hardly unexpected, the rates of labor force participation for husbands are virtually the same; there are minor differences by FLR status across land size strata. There is no indication of a wealth effect for wives; and if any, it goes in the direction opposite from expected. In general, FLR do not seem connected with female participation in the labor force. In minifundios and medium-size farms, the labor force participation rates are similar between women with and without FLR, and their corresponding weekly workloads are similar as well. In minifundios (poorer than farms of larger size), household members including the wife have no other choice but to join the labor force. If a wife's participation in the labor force is already reasonably probable, FLR are not likely to raise such odds appreciably. In bigger farms (medium-size ones, for example), wives might already be doing what they prefer to do (little non-domestic work, for instance). In that case, FLR does not plausibly cut back on those hours much further, i.e. FLR are not likely to have a significant effect either.¹²

Landowning women in small farms, on the other hand, march to the beat of a different drummer. This case stands out because the prospects of landowning women to engage in non-domestic activities are far wider than those of their landless counterparts, with the latter working on average 15 more hours per week. In this land stratum, 91 percent of wives with land rights combine domestic chores with work in their own farms or with off-farm activities, while only 74 percent of wives without FLR do so. Women's participation in the labor force can certainly be thought of as an indicator of their bargaining power rather than just another control that merely reduces the time available for housework, yet for this group of farms FLR seem to imply a low tradeoff between domestic and non-domestic work. This is consistent with my earlier point that non-domestic work seems to be more flexible and changeable than housework.

Husbands' labor force participation rates and their weekly workloads are about the same irrespective of FLR status, but husbands of landowning women work fewer hours on the farm compared to the husbands of landless women. Husbands in households with FLR simply work less hours per week, that is to say, less farm hours are generated in these households (see Graph 3).¹³ There is a large tradeoff between domestic work and farm work for women with FLR in small farms. Not surprisingly, the relationship between FLR and the distribution of farm work between the spouses is positive across farm sizes, as shown in Graph 4, yet markedly so

¹² It is only among microfundios that wives with FLR display lower participation in the labor force than do wives without FLR, with the corresponding smaller workloads. Although the gap in the labor force participation rates of women with and without FLR is substantial (0.75 versus 0.95, respectively) and the workload gap between the two groups is very large as well (46 versus 62 hours per week, respectively), the small number of cases in this size stratum rests statistical validity to these differences.

¹³ While for wives the relationship between FLR and hours of farm work varies in direction depending on farm size, for husbands the presence of FLR is always associated with less farm hours, irrespective of the size of the farm.

only in small farms.¹⁴ Although farm work remains disproportionately in the hands of husbands irrespective of property rights, FLR are associated with larger women's share of the couples' combined farm work across farm size strata, which links up FLR with lesser gender inequality in the management of the farm.

Table 5 shows a critical distinction between women with and without FLR in small farms: the remarkable difference in the predominant category of work, namely self-employed versus unremunerated family worker. Notice that there is no such difference among minifundios in connection with FLR status. Also interesting is that women with FLR in small farms are less dedicated to agricultural work as their exclusive activity (higher dedication to animal care in comparison with landless women).

These differences in the relationship between household wealth and the time allocation patterns of wives and husbands suggest that economic variables such as land rights and wealth affect women's and men's work in particular ways. It also suggests the possibility that women with land rights (or their households) have some other characteristics that explain the results. There might be unobservable factors that explain both the time allocations (length of workday) and FLR.

5 Multivariate Estimation

The LSMS data enable the construction of indicators of the intrahousehold distribution of domestic and non-domestic activities among household members, as well as indicators of the degree of specialization or diversification of each household member in domestic versus non-domestic activities. The analysis focuses on minifundios (297 cases comprising two thirds of the weighted sample) and on small farms (128 cases representing 18 percent of the weighted sample). The very few cases in the first and fourth land size categories (farms smaller than ¼ hectare and larger than 10 hectares) render it difficult to make any meaningful comparisons of prevalence rates by FLR status of the household. In particular, microfundios are of trivial interest because in addition to being few in number, they are garden plots for all intents and purposes, although sometimes if farmed intensely (i.e., with the right crop—alfalfa, for instance) they can generate high agricultural income.¹⁵

5.1 Estimation strategy

The empirical challenge is to determine whether wives with FLR might have had the same time allocation patterns even if they had no FLR. Regression results in this section indicate that the differences in time structure by FLR persist after the application of controls. The determinants of time allocation decisions are examined using different intrahousehold resource allocation models, focusing on the effects of women's ownership of land on women's intrahousehold bargaining power through their participation in domestic and non-domestic activities.

¹⁴ In fact, women's share of the couple's farm work is much higher for households with FLR among microfundios too, but the microfundio cases are too few to make any statistically significant claim.

¹⁵ There are 37 microfundios and 67 medium-size farms (8 and 7 percent of the weighted sample, respectively). Total = 529 farms.

Ideally, the estimation of FLR effects on time allocations should be based on a dataset with two points in time, before and after a woman obtained land rights, and with information on household decision-making. This would make possible to rigorously compare pre and post-FLR situations and empirically test causality. In contrast, cross-sectional data offers only correlations. The data I have is not ideal but nonetheless offers important insights.

My empirical strategy centers around a treatment outcome framework, which consists on determining what the time allocations for women with FLR would have been had they had no FLR. Operationally, this amounts to constructing the appropriate comparison group for the ‘treated’ group (Ravallion 2001; Rubin 2005); in this case wives whose households have presence of FLR. Measuring the effects of FLR via simple comparisons of the time allocation outcomes of women with and without FLR can be misleading if, as suggested by the descriptive analysis, the two groups of women are not comparable. Favorable family measures are substantially higher for households with FLR. Principal adults in households with FLR are better off in several dimensions compared to principal adults in households without FLR.

To address endogeneity and selection issues, I model selection into FLR using two methods: the selection on observables model and the propensity score matching technique. These models propose different ways to correct results for the unobservable differences between the FLR and No-FLR groups. The estimated coefficients obtained from the two models are presented side by side as a way to assess the reliability of the results. Models of selection on observables assume selection on the unobservables is zero, with the underlying key assumption being that the relevant outcome differences between any two groups of individuals are captured in their observed characteristics, such that any potential bias vanishes conditional on the selected observables (Heckman and Robb 1985). The propensity score matching (PSM) approach offers a more convincing comparison of two groups with systematic differences. Although PSM does not explicitly address unobservables bias either, it does aim at producing unbiased estimators of a ‘treatment’ by balancing out the groups being compared in terms of the covariates ruling both the selection into treatment and the outcome under study. By reducing differences in the observable characteristics of two groups via matching, the differences in their outcomes are taken as driven by their treatment status only (Rosenbaum and Rubin 1983). If women with FLR have labor patterns that differ significantly from those of women without FLR after controlling for the relevant individual, household, and geographical characteristics, then it is plausible to argue that the differences in time allocations are due to differences in FLR. In addition, to the extent that the problematic unobservables are correlated with observed covariates, then balancing out the latter may help to balance out the former.

In theory, an individual’s participation in the labor force is simultaneously determined with her/his housework activities. Time allocation between domestic and non-domestic work are not independent outcomes because both result from the same bargaining process. Although clearly not ideal, I estimate separate regressions using domestic work and non-domestic work as (separate) dependent variables, using OLS, as a first step to get a sense of the relationship between FLR and the two outcomes. The results are subsequently refined by modeling selection into FLR. Next, I estimate these regressions using a model that allows for the errors of each regression to be correlated (that is, although the outcomes are separate, the assumption is that they are related by some underlying process). This can be done with techniques such as Seemingly Unrelated Regression (SUR) to

estimate different outcomes of a joint process. In all models I run the regressions with FLR as a regressor, as if it were "given", i.e., ignoring (for now) the issue of the endogeneity of FLR.

The fact that women with FLR are a relatively small group compared to women without FLR increases the chances of finding good matches for the landowning group. There is a larger pool to choose from. The 5-1 nearest neighbor technique is used.¹⁶

5.2 Specification of the model

I estimate five different outcomes: (1) wife's participation in the labor force; (2) each spouse's weekly workload; (3) wife's number of domestic hours, in absolute terms and also as share of her total hours worked per week; (4) each spouse's farm hours; and finally (5) the distribution of farm work between wife and husband. Table 5 presented tabulations of the dependent variables to be estimated in the two size strata of interest.

Given that I am controlling for household wealth, I interpret the first outcome as a measure of women's bargaining power. The variable for female labor force participation is equal to one if the respondent was economically active (engaged in paid or unpaid employment) by the date of the survey (past 7 days actually), and zero otherwise. The second outcome arguably signals each spouse's wellbeing in terms of time. The heaviness of their workloads gives indication of how much time is left for leisure. Table 5 shows that the disparity in average workloads between husbands and wives is significantly larger among households with FLR, not controlling for other factors. As discussed earlier, this is due not only to the fact that landowning wives work more hours than wives without land rights; husbands in households with FLR work on average less hours than husbands in households without FLR. The case of small farms is remarkable, with wives working an average of 18 more hours per week than their husbands, compared to a gap of only 2 hours between spouses in households with no FLR (of the same size).

The third and fourth outcomes provide measures of the specialization of the spouses (separately) in different types of work. Housework hours as share of total workload, in particular, capture the composition of the individuals' work time and inform about the spouses' specialization or diversification between domestic and non-domestic activities. Also, non-domestic work can be interpreted as an indicator of bargaining power. Consistent with the discussion in the previous section, wives' dedication to domestic work (housework hours as share of their own total workload) is significantly lower for women with FLR among small farms. In small farms, wives with land rights are clearly less specialized in housework compared to landless wives, exhibiting noticeably higher diversification in non-domestic work, particularly towards work in their farms. This is possibly driven in large part by demographics, considering these women are older and more educated; perhaps staying home represents for them the possibility of more leisure, or less hard work.

Lastly, the fifth outcome is a measure of the division of labor between wives and husbands. The distribution of farm hours between spouses, a manifestation of the degree of gender inequality in the management

¹⁶ Non-participants are matched with "like" participants using the propensity score. a number of matching methods are available. As opposed to a one-to-one matching, a k-nearest neighbor technique means that the propensity score is used to identify the top k nearest neighbors to the query (Caliendo and Kopeinig 2008).

of the family farm, is defined as the number of farm hours worked by the wife as a percentage of the combined number of farm hours worked by the couple (differences in number of hours versus relative shares). Data not shown in Table 5 indicates that if measuring diversification in terms of hours dedicated to own-farm work in relation to off-farm work hours, households with FLR are more diversified as well. There is little variation in the off-farm hours of men. Overall, in small farms the work patterns of women are more elastic and vary more in connection with FLR, therefore the increase in diversification happens through women, and is concentrated in those households with FLR. Among minifundios, to the contrary, time structure is similar irrespective of FLR, indicating that there is no high tradeoff between domestic work and farm work for women with FLR in minifundios, or perhaps that those two types of work are blurred together.

Control variables are assumed exogenous or not related to FLR or to the process of acquisition of FLR. They might show variations but are not impacted themselves by FLR or the process of acquisition of FLR. They capture the most relevant characteristics of the regional, demographic, economic, social, institutional, and cultural context surrounding the farmers, relevant to explain wives' and husbands' labor choices. The explanatory variables are grouped into four broad categories: (i) variables associated with differences in bargaining power between spouses, including FLR, the difference in age and education between husband and wife. (ii) economic variables, which include household wealth, income per-capita quintiles, female and male education, number of working members, as well as a control for the total number of work hours produced in the household. (iii) variables related to the family's demographic characteristics and household composition, including the couple's ages, household size, number of children younger than 6 years old, as well as measures of the presence of teenage sons and daughters. I also include a quadratic term for age. Finally, (iv) regional variables.

I use a 0-1 dummy variable for female land rights, equal to one if in the respondent's household the wife holds a formal title to at least part of the total farmland as of the time of the survey, and equal to zero otherwise. Education is measured as the number of years of schooling completed. Difference in education between spouses is measured as years of schooling of the husband minus years of schooling of the wife. The variables to control for wealth include farm size, household's access to basic services such as piped water, sewage and electricity; and yes/no dummies for poverty prevalence and for presence of any domestic appliance in the household. These variables serve as proxies for long-run economic status, and have the advantage of lacking the endogeneity problems of income. Also, women in households without access to basic services often spend a lot of time getting water or fuel, so it has implications for time allocation. Family composition variables, standard in any model, and indicators of household structures (nuclear, extended, etc.) assess the possibilities for task-sharing within the household. The same full set of control variables is applied in all regressions. Different outcomes have the same explanatory variables, as they are all part of an underlying process.

Besides the standard demographic, socioeconomic, and geographic controls, the matching equations explicitly formalizing the process of FLR acquisition include an indicator for whether a woman acquired land through inheritance (indicator equal to one) or through other means (indicator equal to zero).

Differences in age and education between wife and husband are expected to have a positive impact on women's weekly workloads. The greater the age difference between spouses, that is, the older the husband is with

respect to his wife, the more bargaining power he has over her. This possibly translates into more female workload, more female housework. Similar reasoning applies to differences in education.

Household size is likely to have a positive effect on women's workload. The larger the household, the greater the demand for wife's housework and market work. Family composition and age structure also matter. The younger the children or the larger the number of dependents, the more time the wife has to spend at home taking care of them, or doing market work to help support them. Daughters of any age substitute their mothers in housework production.

Table 6 reports the average values and standard deviations of the explanatory variables used in the regressions. The model is estimated for the full sample and also separately for minifundios ($\frac{1}{4}$ to $3\frac{1}{2}$ hectares) and small farms ($3\frac{1}{2}$ to 10 hectares), with robust standard errors adjusted for clustering according to survey design. Results are weighted by sample weights. In general, households with land titles that include women's names have older and more educated members than those of households with land titled in men's names only.

Tables 7 through 10 present the results, including the marginal effects of the variables at the mean of the explanatory variables. FLR have an overall effect on the spouses' weekly workloads, but this effect is different for wives and husbands in size as well as in direction. Two contrasting cases: the results for married couples in minifundios do not unambiguously support the bargaining hypothesis, while in small farms the empirical evidence is somewhat consistent with family bargaining over the individual allocation of time.

Among small farms, FLR significantly reduce the workloads of husbands and significantly increase the workloads of wives. What type of work are they adjusting? How does that affect the internal composition of their time? Is there an effect on the gender distribution of domestic, farm or off-farm work between spouses? FLR have a statistically significant impact only on the hours dedicated by spouses to farm work. The small and not significant coefficients of FLR in the regressions on housework hours confirm that economic variables such as land rights have a negligible effect on the domestic work dedication of the principal adults of the household. Full regression results (not offered in these tables) indicate that other bargaining indicators, such as the age difference between spouses, along with household composition variables and the age of the individual are the key determining factors of women's housework hours. The signs of the coefficients are also the expected ones. Wife's age has a negative sign. An older woman has more bargaining power than does less housework; she is also likely to have older children still at home who can help her out with the household chores. Wife's education has a negative sign, as more years of schooling improve the opportunity cost of the wife's housework.

I find that the amount of time women work in agriculture is inversely related to farm size. In turn, women's time dedicated to animal care has a positive relationship with the size of the farm, as women on larger farms are likely to have larger herds and spend more time on their own activities. These results on hours worked on the farm compare to those reported in Deere (1990, 1982), where women on medium-sized farms generally did not work in the fields but were more engaged in animal production activities and cooking for field hands. This pattern has generally held up in most studies (the inverse relation between farm size and female field work), attributed to male off-farm wage work.

The number of paid hours (off-farm work hours) is also virtually unaffected by FLR. With the exception of sex and schooling, nothing but geographic location seems to matter in the determination of wives' hours of market work. The large size and the high statistical significance of the coefficients of the regional variables highlight the critical importance of the specific market conditions and the available job opportunities.

In general, FLR do not have a significant effect on women's housework time. Housework hours of wives are virtually unaltered, regardless of farm size. Likewise, FLR has no effect over wives' share of time dedicated to domestic work. This share is quite similar across women, irrespective of FLR, probably because since so much of wives' time goes to domestic work, it would take a large change to alter the composition of wives' work. This implies that the Nash bargaining model does not seem consistent with the Peruvian case, which lends some credibility to the argument that economic variables such as land rights have little effect on outcomes largely defined by social or cultural factors. Non-cooperative bargaining models (such as the separate spheres framework) might be better suited for describing the interactions among household members in contexts similar to rural Peru. Cultural norms regarding domestic work make it relatively inflexible – it does not seem very responsive to changes in hours of market work or other variables, etc. Perhaps tradition and cultural norms prevent women from significantly reducing their housework hours, which results in an increase of their total workload.

5.3 Findings from econometric analysis: results for minifundios (¼ to 3½ hectares)

The main result for minifundios is that FLR are associated with negligible alterations in wives' labor force participation rates as well as in the number and composition of their hours of work. The farm hours of both spouses go down slightly, resulting in no change in the distribution of farm work between them. Reported in Table 7 are the OLS (selection on observables) and PSM estimates of the relationship between FLR and the time allocation patterns of couples in minifundios. Both sets of results coincide in the direction of the FLR effect. Nonetheless, the size and significance of the coefficients vary depending on the method used. In the case of female participation in the labor force, the matching estimate is larger in magnitude than the OLS estimate. Assuming the PSM result is more reliable, the OLS estimation understates the effect of FLR on female labor force participation.

There is also a reduction of housework hours and an increase in non-domestic hours. Regardless of the significance of the result, this could be interpreted as a tradeoff in the “desirable” direction, with the added ‘plus’ that it does not translate into overwork for women.

Conventional OLS as well as PSM results also indicate that among minifundios FLR do not significantly affect wives' weekly workloads. An almost full tradeoff between farm work and housework seems to be taking place (less farm work, more housework; both changing in almost the same number of hours). These changes, however, do not result in significant alterations of these women's time composition, as there is no effect on the share of time dedicated to non-domestic work. Contrary to expectation, the “holding” of land rights seems to make these women less interested in working in the farm. In theory, the acquisition of FLR should motivate them to work more on their farms. However, for women in minifundios, given their characteristics, it might make more

sense and be more desirable for them to leave the labor force. Given the size of the farm, the poverty level among these farms, and their location in regions where women's role in agriculture is important, landowning women in this group are probably doing as much farm work as they would like (or more farm work might not be needed). In this context, an increase in women's bargaining power could manifest itself in a reduction of work on the farm. Surprisingly, these women increase their domestic work, suggesting that among minifundios FLR tend to intensify women's reproductive role, if only slightly (the estimated effect on the share of wife's time dedicated to housework is positive but small and not statistically significant). Maybe this is not about gender roles but merely about fractions.

Table 8 compares some descriptive statistics for the full sample of minifundios and the sub-sample resulting after applying PSM. By examining the similarities between the FLR and No-FLR groups in both samples, it is possible to evaluate how effective the matching has been. Table 8 confirms that the matched sample is much more homogeneous than the unmatched sample. The gap between individuals and households with and without FLR is smaller for most of the variables in the matched sample. For example, the gap in prevalence of households in the second income quintile is 21 percent in the unmatched sample but only 8 percent for the matched sample. Similarly, the discrepancy in the fraction of households located in the poorest region, South Sierra, is -0.13 in the unmatched sample and only -0.05 in the matched sample. The difference in average women's age, nonetheless, remains significant. Prevalence in the top income-per-capita quintile is no longer significant but remains large.

5.4 Findings from econometric analysis: results for small farms (3½ to 10 hectares)

The most interesting and significant effects of FLR on the time allocations of spouses happen among small farms. Table 9 presents these results. Both the OLS and the PSM results point to a large and positive effect of FLR on wives' probability of entering the labor force. Controlling for personal and household characteristics, FLR substantially boost female labor participation rates, with estimates varying from 15 to 17 percent depending on the estimation method. Given that these women do not relinquish their housework hours (wives are virtually leaving their housework hours unaltered), their weekly workloads end up increasing significantly, in the order of 9 hours per week.¹⁷ There is a large and significant increase in the predicted workload of wives. Almost the entire increase in female workload happens through the addition of hours dedicated to farm work, which means these women are clearly increasing their involvement in the farm. Nonetheless, these changes are not large enough to alter the domestic/non-domestic structure of wives' time.

In contrast to the FLR effect on wives, husbands in households with FLR experience an overall decrease of their work hours in relation to husbands in households with no FLR. This decrease is statistically significant at eight less hours per week. Husbands sharing land rights with their wives reduce their farm work hours (though not significantly), probably because wives are taking over. In other words, husbands are leaving the farm, and their wives are replacing them. The decrease in male farm hours is equal to the increase in female hours in the farm.

¹⁷ It is possible that the positive and significant effect of FLR on female labor force participation is leading to an upward bias in the FLR coefficient in the female workload equations given that (as mentioned in the descriptive analysis) economically active women have noticeably heavier workloads. This issue needs to be explored further.

Although the changes in the farm hours of both spouses are not large enough to alter their individual compositions of time, FLR significantly affect the distribution of farm work between wives and husbands. From initial descriptive statistics we know that wives do around 40 percent of the total number of farm hours generated by the couple in households with FLR, and around 28 percent in households without FLR. Controlling for the relevant individual and household characteristics, the presence of FLR brings a 13 to 15 percent shift in the redistribution of the combined farm work of both spouses toward the wife (statistically significant result).

Table 10 compares the means of the regressors before and after matching for small farms. Several significant differences remain. The large discrepancies raise the possibility that among small farms part or even the entire gap in time outcomes is due to selection bias. Given the relatively high degree of selection into FLR among small farms on the basis of observable traits (especially wealth indicators), the estimated coefficients may reflect unobserved differences between women with and without FLR rather than actual effects on labor force participation and workload, and should be interpreted with caution.

6 Conclusions

A better understanding of the mechanisms by which the time allocation decisions of individuals are affected by the ownership of assets is critical to determine in what ways and to what degree women's formal ownership of land increases their wellbeing and economic empowerment within the household. This paper formalizes FLR as a determinant of the labor allocation patterns of wives and husbands in rural Peru using available data on land ownership.

My results contribute to the modeling of household decision-making in the context of gender inequality in the intrahousehold distribution of assets. While insightful and relevant in some contexts, cooperative bargaining models of the household tend to overestimate the expected positive link between FLR and women's welfare wherever social and institutional factors undermine this connection and cultural norms override property rights. My findings have practical implications as well, particularly for the formulation of policy recommendations regarding equitable access to land in minifundios, which in the case of Peru constitute the majority of agricultural units.

For the most part, the available economic perspectives on household behavior tend to overestimate the positive effects of FLR on women's welfare. Cooperative bargaining models of the household overlook key economic and cultural barriers that undermine the expected positive connection between FLR and women's position within their households. Land ownership might not be sufficient to guarantee women their economic independence; cultural norms can override property rights in both positive and negative ways. Non-cooperative models might be better suited for describing the interactions among household members.

The different predictions of each model imply contrasting interpretations for the distributions within marriage and for observed family behavior. I outline scenarios representing variations in the form of the

bargaining game (cooperative and non-cooperative bargaining models) and show that FLR have differentiated effects.

My research offers three main findings. First, FLR have a heterogeneous effect depending on the farm size category. FLR are relevant for women's time allocations on small farms (3½ to 10 hectares). The most significant effects for women take place in these farms. Unfortunately, the degree of positive selection on the observables that determine FLR and the time outcomes for this group (female labor participation in particular) is sufficiently large that selection bias cannot be ruled out as the full explanation for the FLR affects. The unobservable interplay of economic and cultural forces in shaping the labor patterns, and in general the livelihood strategies of peasant farmers, need to be explored further.

A second important result is that the presence of FLR in the household affects wives and husbands differently. Land ownership does not necessarily bring the same benefits to women and men. In fact, shared legal land rights have opposite effects on female and male weekly workloads, in general associated with an increase in wives' workloads and a decrease in husbands' workloads. The larger the farm, the larger the gender workload gap between spouses, to the detriment of wives. In small farms in particular, FLR significantly lead to wives' overwork, increasing their weekly workloads in the order of approximately 9 hours, which more than compensates for their partners' workload reduction. This finding could reflect selection effects, as hard-working women are more likely to demand and get land rights. If we take the labor outcomes (specifically higher labor force participation) of landowning women as a reflection of their choices (that is, as result of their increased bargaining power) then higher bargaining power might be happening at the cost of women's overwork. Therefore, it is not clear that women are worse off or better off with more work and arguably more participation in the farm (more visibility of their work, etc.) but less leisure.

Third, and in connection with the above, FLR have mixed effects on the division of labor by gender. Whereas the alterations in the individual structure of work time associated with FLR are negligible in both minifundios and small farms, I find that women's ownership of land significantly changes the relative distribution of farm work between husbands and wives in small farms.

While the fundamental importance of land ownership as a source of social and economic security for women is beyond discussion, the formal ownership of land does not seem to yield significant measurable effects on workload. Institutional and structural factors mediate the transition of formal land ownership from an abstract right to an economic right for women, measurable by concrete household outcomes and gender results within the family. The analytical and methodological quest to identify the barriers hindering the potential positive impact of FLR on women's welfare, as well as the factors that enhance it, lies ahead. In the meantime, it seems clear that women, particularly those in impoverished rural areas, face disadvantageous conditions that cannot be reversed simply by giving them formal ownership of land and including their names in the deeds.

Table 1: Work Patterns of Couples, Differences by Gender (weighted results)¹

(with respect to past 7 days)	All Spouses	Wives	Husbands	Diff ²
	b/sd	b/sd	b/sd	b/se
Average weekly workload	57.9 (19.6)	59.8 (21.9)	56.0 (16.7)	3.8 (1.3)**
Prevalence of domestic work	0.88 (0.32)	0.99 (0.08)	0.77 (0.42)	0.22 (0.02)***
Labor force participation rate (economically active)	0.90 (0.30)	0.82 (0.39)	0.98 (0.12)	-0.16 (0.02)***
Work time composition				
% total time to domestic work	0.36	0.58	0.15	0.44***
% total time to farm work	0.46	0.30	0.61	-0.31***
% total time to off-farm work	0.18	0.12	0.24	-0.12***
<hr/>				
N	1026	513	513	
<i>Non-domestic work</i>				
Average number of hours/day	6.7 (2.4)	5.5 (2.4)	7.8 (1.9)	-2.2 (0.2)***
Average number of days/week	5.6 (1.6)	5.5 (1.7)	5.6 (1.4)	-0.1 (0.1)
Average number of months/year	10.4 (2.9)	10.6 (2.9)	10.2 (3.0)	0.4 (0.2)*
Incidence of off-farm work	0.38 (0.32)	0.35 (0.48)	0.40 (0.49)	-0.05 (0.1)
People with two or more jobs (percentage)	0.24 (0.15)	0.17 (0.11)	0.27 (0.18)	-0.1 (0.1)
<hr/>				
N	917	408	509	

Source: Peru 2000 LSMS.

Notes: ¹ Sample means and standard deviations are weighted by selection probability. (domestic and non-domestic work hours different from zero).

² Unpaired (two-sample) t test on the equality of means.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 2: Wives' Characteristics by EAP Status (weighted results)

	All Wives b/sd	Wives EAP b/sd	Wives No-EAP b/sd	Diff ¹ b/se
Age (in years)	43.2 (14.2)	42.0 (13.7)	48.6 (15.2)	-6.7 (1.8)***
Illiteracy rate	0.34 (0.48)	0.34 (0.47)	0.38 (0.49)	-0.04 (0.06)
Quechua-speaking	0.43 (0.49)	0.48 (0.50)	0.20 (0.40)	0.28 (0.05)***
Labor force participation of husbands	0.97 (0.16)	0.98 (0.15)	0.96 (0.20)	0.02 (0.02)
Childless	0.11	0.09	0.16	-0.07
Children under 6 years old	0.43	0.46	0.33	0.13*
Children 6-15 years old	0.28	0.29	0.23	0.06
Children 16 y.o. and up	0.18	0.16	0.28	-0.12*
	1	1	1	
Average weekly workload	59.8 (21.9)	63.9 (20.7)	41.3 (17.4)	22.7 (2.3)***
Weekly hours of housework	31.9 (14.8)	29.8 (13.3)	41.3 (17.4)	-11.5 (2.1)***
Household located in Costa	0.10	0.08	0.17	-0.09*
Household located in Sierra	0.67	0.71	0.58	-0.13**
Household located in Selva	0.23	0.21	0.35	-0.14**
	1	1	1	
Poor	0.61 (0.49)	0.63 (0.48)	0.54 (0.50)	0.09 (0.06)
N	525	408	117	

Source: Peru 2000 LSMS.

Notes: ¹ Unpaired (two-sample) t test on the equality of means. Two-sample data were not assumed to have equal variances (results were similar assuming equal variances).

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 3: Time Allocation Differences, by Geographic Region (weighted results)

	All b/sd	North Coast b/sd	South Coast b/sd	North Sierra b/sd	Center Sierra b/sd	South Sierra b/sd	North Selva b/sd	South Selva b/sd
Some Market Activity (women)	0.82 (0.39)	0.80 (0.41)	0.48 (0.51)	0.77 (0.42)	0.89 (0.32)	0.94 (0.24)	0.63 (0.49)	0.86 (0.35)
<u>Workload women</u>				#	obs	=	509	
Less than 50 hours/week	0.36	0.38	0.58	0.29	0.44	0.16	0.51	0.36
50 hours/week or more	0.64	0.62	0.42	0.71	0.56	0.84	0.49	0.64
Total	1	1	1	1	1	1	1	1
<u>Workload males</u>				#	obs	=	529	
Less than 50 hours/week	0.37	0.55	0.33	0.47	0.34	0.14	0.50	0.41
50 hours/week or more	0.63	0.45	0.67	0.53	0.66	0.86	0.50	0.59
Total	1	1	1	1	1	1	1	1
<u>Incidence of off-farm activ</u> for women [N=408]	0.35 (0.12)	0.40 (0.22)	0.19 (0.11)	0.55 (0.28)	0.27 (0.14)	0.27 (0.08)	0.38 (0.11)	0.32 (0.12)
<u>Sector (women)</u>								
Agriculture	0.26	0.28	0.50	0.12	0.31	0.08	0.38	0.55
Animal Production	0.51	0.37	0.31	0.49	0.48	0.78	0.44	0.21
Manufacture	0.04	0.05	0.00	0.16	0.01	0.02	0.00	0.00
Commerce/Services/Other	0.19	0.30	0.19	0.24	0.19	0.12	0.18	0.24
Total	1	1	1	1	1	1	1	1
<u>Category (women)</u>								
Self-employed	0.30	0.30	0.38	0.47	0.29	0.22	0.20	0.29
Unremuned Family W	0.67	0.63	0.63	0.53	0.68	0.77	0.72	0.66
Wage Worker	0.03	0.07	0.00	0.00	0.04	0.02	0.08	0.05
Total	1	1	1	1	1	1	1	1
<u>Sector (males)</u>				#	obs	=	509	
Agriculture	0.36	0.39	0.52	0.17	0.44	0.19	0.55	0.58
Animal Production	0.48	0.56	0.33	0.57	0.42	0.64	0.36	0.32
Commerce/Service/Other	0.16	0.06	0.15	0.26	0.14	0.18	0.09	0.10
Total	1	1	1	1	1	1	1	1

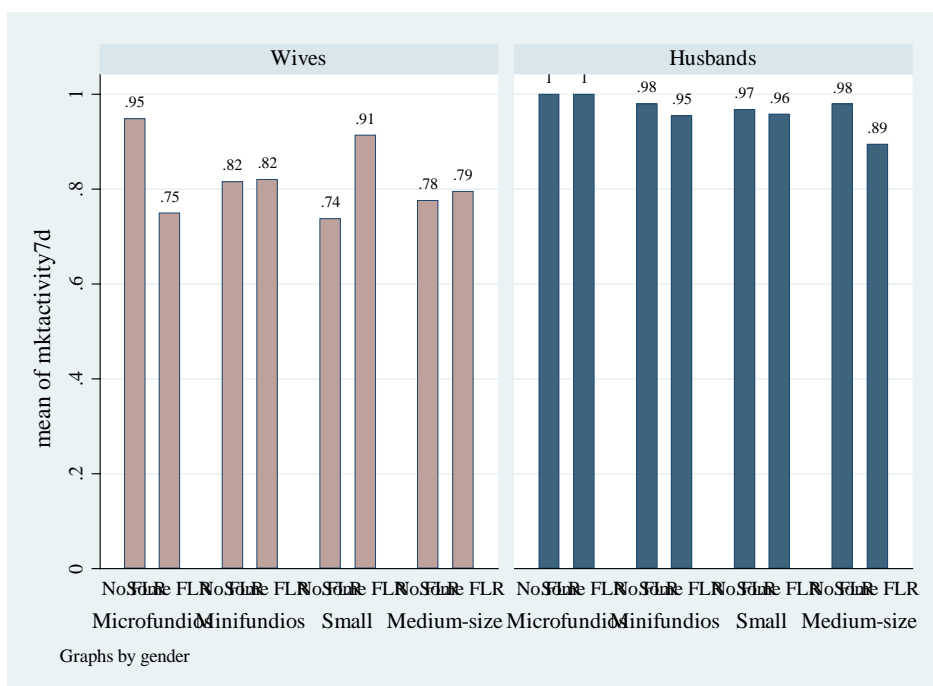
Source: Peru 2000 LSMS.

Table 4: Spouses' Time Outcomes, by Farm Size (weighted results)

	Full b/sd	Micro b/sd	Mini b/sd	Small b/sd	Medium b/sd
Female labor force participation	0.82 (0.39)	0.90 (0.30)	0.82 (0.39)	0.80 (0.40)	0.78 (0.42)
<u>Women's weekly workload</u>					
30 hours per week or less	0.09	0.15	0.07	0.09	0.20
30-50 hours per week	0.27	0.31	0.26	0.27	0.22
50 hours per week or more	0.64	0.54	0.67	0.64	0.58
	1	1	1	1	1
<u>Men's weekly workload</u>					
30 hours per week or less	0.07	0.03	0.07	0.07	0.15
30-50 hours per week	0.30	0.33	0.27	0.36	0.38
50 hours per week or more	0.63	0.64	0.66	0.57	0.47
	1	1	1	1	1
Percentage of women with two jobs	0.17	0.06	0.19	0.17	0.13
Percentage of men with two jobs	0.27	0.27	0.30	0.14	0.24
<hr/>					
N	397	19	229	96	53
<hr/>					
Wife's average age	43.2 (0.70)	44.1 (2.90)	42.6 (0.80)	44.8 (1.42)	43.4 (2.07)
Wife is illiterate	0.34 (0.02)	0.32 (0.08)	0.38 (0.03)	0.28 (0.04)	0.23 (0.06)
Household is poor	0.61 (0.02)	0.49 (0.09)	0.66 (0.03)	0.50 (0.05)	0.62 (0.06)
<u>Household is located in:</u>					
Coast	0.10	0.06	0.08	0.20	0.07
Northern Sierra	0.21	0.07	0.24	0.20	0.04
Central Sierra	0.27	0.40	0.32	0.14	0.00
Southern Sierra	0.19	0.33	0.25	0.03	0.00
Selva	0.23	0.14	0.12	0.44	0.89
	1	1	1	1	1
<hr/>					
N	513	37	297	128	67

Source: Peru 2000 LSMS.

Figure 1: Labor Force Participation of Wives and Husbands, by FLR Status and Farm Size



Source: Peru 2000 LSMS.

Figure 2: Weekly Workloads of Wives and Husbands, by FLR Status and Farm Size

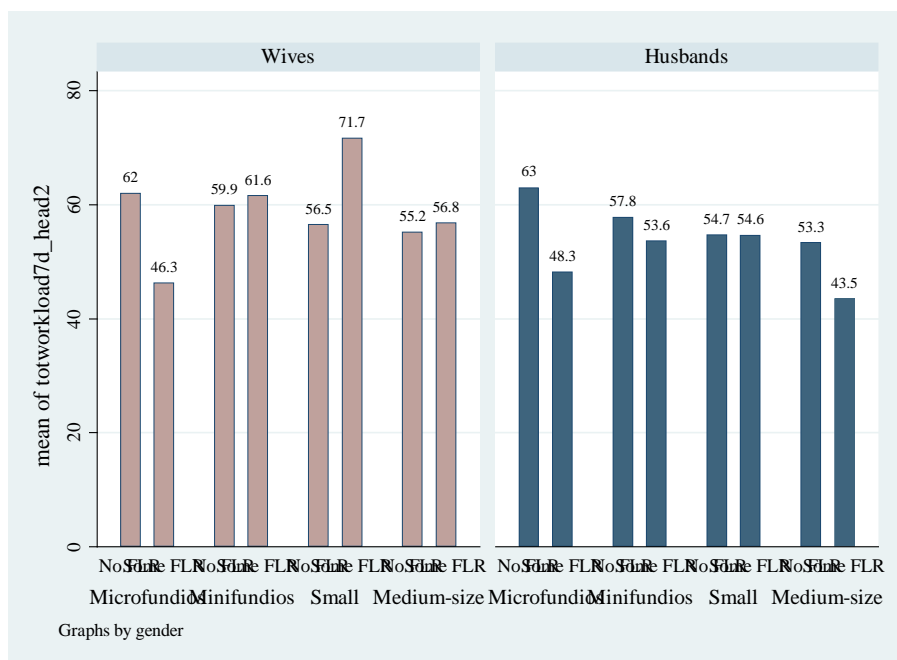


Figure 3: Farm Work Weekly Hours of Wives and Husbands, by Farm Size and FLR Status¹ (only for those economically active)

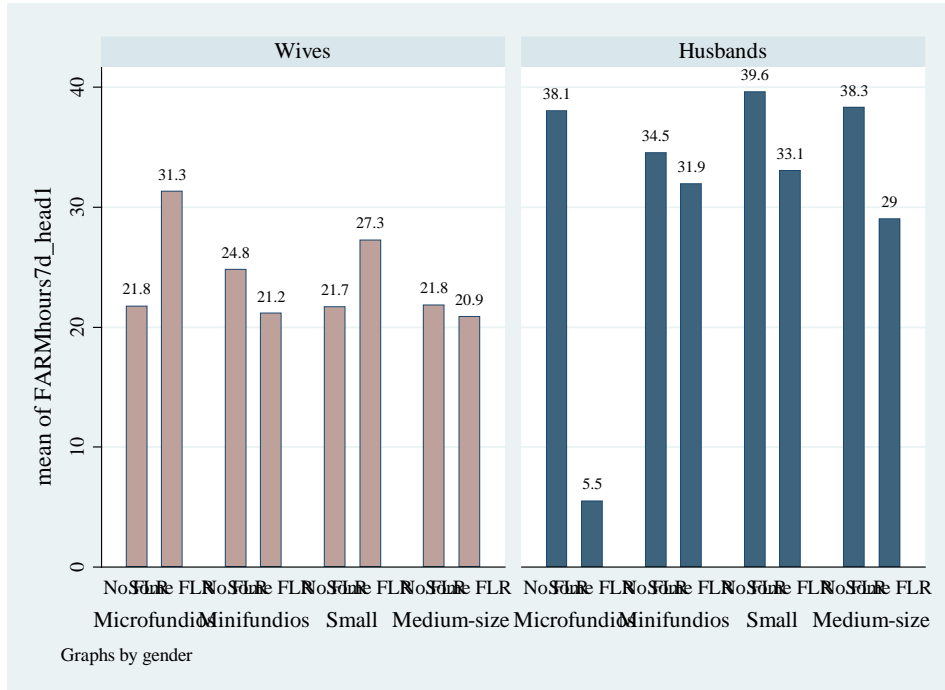
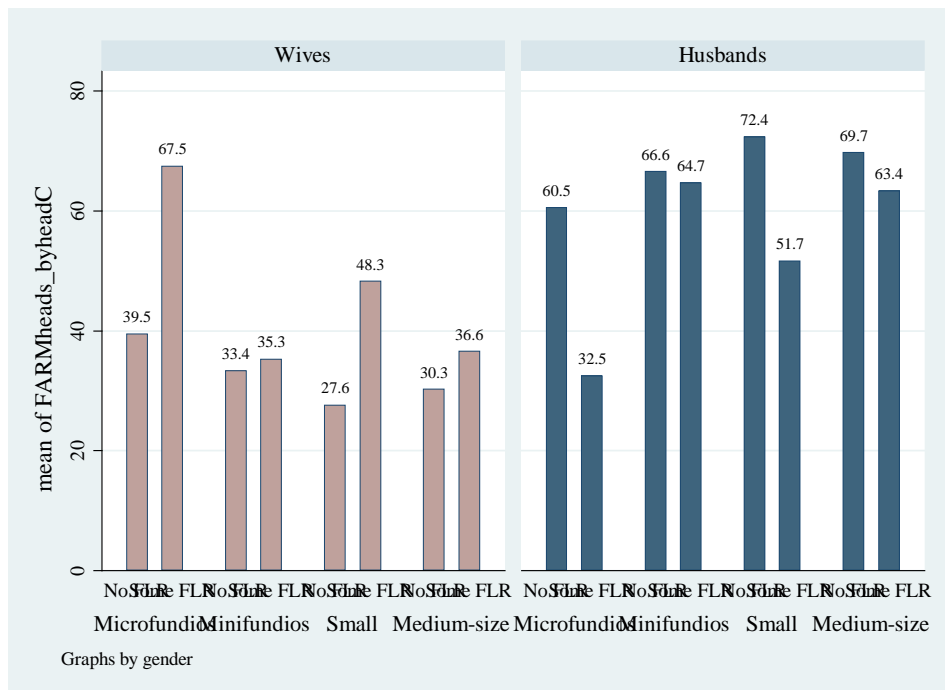


Figure 4: Distribution of Farm Work between Spouses, by Farm Size and FLR Status¹ (each spouse's share of the combined farm hours produced by the couple)



Note: ¹ Defined for households with at least one spouse economically active (with respect to past 7 days.). Sample means are weighted by selection probability.

Table 5: Spouses' Time Outcomes, Minifundios and Small Farms (weighted results)

	Minifundios			Small Farms		
	w/FLR	w/o FLR	Diff	w/FLR	w/o FLR	Diff
	b/sd	b/sd	b/se	b/sd	b/sd	b/se
Female labor force participation	0.82 (0.39)	0.82 (0.39)	0.00 (0.05)	0.91 (0.29)	0.76 (0.43)	0.15 (0.10)*
Wives' average workload per week	61.6 (19.4)	59.9 (21.2)	1.8 (2.8)	71.7 (27.5)	56.5 (19.1)	15.2 (5.8)*
Wives' hours of domestic work per week	33.2 (15.6)	30.4 (14.7)	2.8 (2.2)	34.9 (14.0)	34.6 (14.2)	0.3 (3.4)
Wives' hours of farm work per week	17.4 (17.2)	20.3 (20.5)	-2.9 (2.6)	24.9 (17.8)	16.4 (17.4)	8.5 (4.1)+
<u>Category of work¹</u>						
Self-employed	0.32	0.34	0.00	0.42	0.17	0.25**
Unremunerated fam worker	0.60	0.64	-0.04	0.58	0.80	-0.22**
Wage worker	0.08	0.02	0.06	0.00	0.03	-0.03
	1	1		1	1	
<u>Wives' economic sector</u>						
Agriculture	0.28	0.20	0.08	0.16	0.43	-0.27**
Animal production	0.42	0.54	-0.12	0.60	0.44	0.16
Manufacture, commerce, etc.	0.30	0.26	0.04	0.24	0.13	0.11
	1	1		1	1	
Husbands' average workload per week	53.6 (17.2)	57.8 (16.4)	-4.1 (2.4)+	54.6 (17.9)	54.7 (14.4)	-0.1 (3.6)
Husbands' hours of farm work per week	31.2 (20.7)	34.1 (20.9)	-2.9 (3.0)	32.4 (23.9)	39.3 (18.8)	-6.9 (5.3)+
N	77	219	296	29	96	125

Source: Peru 2000 LSMS

¹ Principal job, with respect to the 7 days prior to the survey

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 6: Descriptives of Regressors --- Dual-Headed Households (weighted results)

	Minifundios			Small Farms		
	w/ FLR	w/o FLR	Diff	w/ FLR	w/o FLR	Diff
	b/sd	b/sd	b/se	b/sd	b/sd	b/se
Wife speaks Quechua	0.43 (0.50)	0.49 (0.50)	-0.06 (0.07)	0.28 (0.46)	0.31 (0.46)	-0.03 (0.11)
Wife inherited land	0.35 (0.33)	0.04 (0.02)	0.31 (0.06)***	0.31 (0.28)	0.06 (0.04)	0.25 (0.10)*
Household located in peasant community	0.10 (0.30)	0.23 (0.42)	-0.13 (0.05)**	0.12 (0.33)	0.15 (0.36)	-0.03 (0.08)
Presence of conflict in the household	0.26 (0.22)	0.14 (0.11)	0.12 (0.06)*	0.30 (0.28)	0.12 (0.10)	0.18 (0.11)+
Woman's age	46.5 (13.6)	41.2 (13.9)	5.3 (1.93)**	45.6 (13.6)	44.5 (14.2)	1.1 (3.2)
Household has domestic appliances	0.48 (0.50)	0.27 (0.44)	0.21 (0.07)**	0.61 (0.50)	0.27 (0.45)	0.34 (0.11)**
Household is not poor	0.45 (0.50)	0.30 (0.46)	0.15 (0.07)*	0.61 (0.50)	0.45 (0.50)	0.16 (0.12)
Household is in bottom income per capita quintile	0.19	0.23	-0.04	0.02	0.19	-0.17***
Household is in top	0.29	0.12	0.17**	0.51	0.22	0.29*
Hh is located in CostaN	0.04	0.06	-0.02	0.11	0.11	0.00
Hh is located in CostaCS	0.02	0.03	-0.01	0.09	0.08	0.01
Hh is located in SierraN	0.43	0.17	0.26***	0.42	0.12	0.30*
Hh is located in SierraC	0.26	0.34	-0.08	0.12	0.14	-0.02
Hh is located in SierraS	0.15	0.28	-0.13*	0.06	0.02	0.04
Hh is located in SelvaN	0.04	0.10	-0.06**	0.08	0.27	-0.19**
Hh is located in SelvaCS	0.06	0.03	0.03	0.12	0.25	-0.13*
N	77	220	297	29	99	128

Source: Peru 2000 LSMS

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 7: Probit/OLS versus Matching Time Allocation Results, Minifundios (¼ to 3½ hectares)

	Selection on Observables, Probit/OLS		Propensity Score Matching	
	FLR Coeff. ¹	Outcome Mean	FLR Coeff. ¹	Outcome Mean
Wife's labor participation rate ²	-8.203	0.80	-12.719+	0.70
N	173		112	
Wife's total weekly workload	-2.41	60.1	-4.574	59.5
Husband's total weekly wkld	-1.497	56.1		
Wife's housework hours	4.722	30.3	5.352	30.2
Wife's farm hours	-4.829	18.3	-6.357+	17.3
Husband's farm hours	-2.049	32.7		
Wife's housework hours as share of total hours worked	4.991	0.55	7.729	0.56
N	173		136	
Wife's share of combined farm work of the couple ³	2.670	0.32	2.141	0.31
N	149		117	

Source: Peru 2000 LSMS

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

All specifications include standard controls: couples' education and ages, wealth variables, household size, family composition variables, and regional dummies. As an additional control, for each outcome of one spouse I included the corresponding outcome of the other spouse.

¹ For discrete change of dummy variable from 0 to 1.

² Coefficient is expressed in marginal terms and has been multiplied by 100 for ease of interpretation.

³ Defined for households with at least one spouse economically active.

Table 8: Means of Selected Regressors, Minifundios (¼ to 3½ hectares)

		Unmatched Sample	Matched Sample
Peasant communities	No FLR	0.23	0.19
	Some FLR	0.10	0.11
	Difference	-0.13	-0.08
Female inheritance	No FLR	0.04	0.05
	Some FLR	0.35	0.13
	Difference	0.31	0.08
Woman is Quechua-speaker	No FLR	0.49	0.55
	Some FLR	0.43	0.43
	Difference	-0.06	-0.12
Wife's age	No FLR	41.2	41.7
	Some FLR	46.5	44.6
	Difference	5.3	2.9
Presence of domestic appliances in household	No FLR	0.27	0.30
	Some FLR	0.48	0.43
	Difference	0.21	0.13
Household is not poor	No FLR	0.30	0.30
	Some FLR	0.45	0.35
	Difference	0.15	0.05
Household is located in North Sierra	No FLR	0.17	0.21
	Some FLR	0.43	0.40
	Difference	0.26	0.19
Household is located in South Sierra	No FLR	0.28	0.24
	Some FLR	0.15	0.16
	Difference	-0.13	-0.08
N		297	226

Source: Peru 2000 LSMS

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 9: Probit/OLS versus Matching Time Allocation Results, Small Farms (3½ to 10 hectares)

	Selection on Observables, Probit/OLS		Propensity Score Matching	
	FLR Coeff. ¹	Outcome Mean	FLR Coeff. ¹	Outcome Mean
Wife's labor participation rate ²	15.020**	0.80	17.032***	0.70
N		190		121
Wife's total weekly workload	9.198+	59.5	8.735+	57.6
Husband's total weekly wkld	-8.639*	54.3		
Wife's housework hours	-1.036	34.3	-0.168	33.6
Wife's farm hours	9.321*	19.6	7.348	17.9
Husband's farm hours	-4.011	37.1		
Wife's housework hours as share of total hours worked	-7.441	0.62	-7.144	0.62
N		198		134
Wife's share of combined farm work of the couple ³	15.222**	0.33	13.191*	0.30
N		180		114

Source: Peru 2000 LSMS

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

All specifications include standard controls: couples' education and ages, wealth variables, household size, family composition variables, and regional dummies. As an additional control, for each outcome of one spouse I included the corresponding outcome of the other spouse.

¹ For discrete change of dummy variable from 0 to 1.

² Coefficient is expressed in marginal terms and has been multiplied by 100 for ease of interpretation.

³ Defined for households with at least one spouse economically active.

Table 10: Means of Selected Regressors, Small Farms (3½ to 10 hectares)

		Unmatched Sample	Matched Sample
Wife's age	No FLR	43.3	44.8
	Some FLR	46.2	43.6
	Difference	2.9	-1.2
Wife's literacy rate	No FLR	0.36	0.30
	Some FLR	0.20	0.22
	Difference	-0.16*	-0.08
Number of children under 6 years old	No FLR	0.9	0.7
	Some FLR	0.4	0.6
	Difference	-0.4*	-0.1
Household is not poor	No FLR	0.45	0.53
	Some FLR	0.64	0.50
	Difference	0.19*	-0.03
Household is in bottom income per capita quintile	No FLR	0.19	0.09
	Some FLR	0.06	0.10
	Difference	-0.13*	0.01
Household is in top income per capita quintile	No FLR	0.20	0.26
	Some FLR	0.49	0.34
	Difference	0.29**	0.08
Household is located in North Sierra	No FLR	0.14	0.22
	Some FLR	0.45	0.29
	Difference	0.31**	0.07
Household is located in North Selva	No FLR	0.25	0.18
	Some FLR	0.07	0.12
	Difference	-0.18***	-0.06
N		198	134

Source: Peru 2000 LSMS

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

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