Collective Labor Supply, Divisions of Domestic Work and Intra-household Bargaining

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Abstract

This paper analyzes the impact of intra-household bargaining on the labor supply of heterosexual couples with different divisions of domestic work. The objective is to compare the decision-making process in families with egalitarian, traditional, and non-traditional gender role attitudes towards the division of domestic work. Data from Uruguay shows that couples of all types are sensitive to bargaining power shifts, as measured by the non-labor income difference between cohabiting partners and married couples. Results suggest that a relatively rich male has more bargaining power and supplies less labor, and the opposite is true for his partner. In addition, being married reduces the labor supply of women and increases that of men in egalitarian households. These results are robust to selection into employment correction. Finally, less gender-normative households assign a larger share of non-labor income to women after the negotiation process.

Keywords: Uruguay, Collective Models of Labor Supply, Intra-Household Bargaining, Gender, Social Norms

JEL Classification: D13, D91, J16, J22

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1 Introduction

The gender division of labor has changed since the Second World War. Women's labor supply has drastically increased, and men's has decreased at a slower and more stable rate. On the other hand, the household division of work has become less gender specialized. This latter result is explained by the interaction of different patterns regarding the increase in the educational level of women, changes in fertility, marriage, divorce patterns, and by technological advances that have allowed the goods produced in the home to be marketable (Lundberg, 2010; Greenwood et al., 2016). However, gender differences in the division of domestic work persist, with women continuing to perform most of the household chores.

The intra-household division of labor may be related to the relative resources of each partner. However, it may also reflect internalized gender norms, which define what is considered acceptable behavior for men and women (Agarwal, 1997; Pearse and Connell, 2016). Households with an egalitarian or non-traditional division of domestic labor are more likely if partners have similar economic resources or the influence of gender norms is low (Seiz, 2021).

The empirical evidence regarding the relationship between intra-household bargaining and gender division of domestic work is scarce in the economic literature and focuses on high-income countries. This paper contributes to the literature by providing evidence from a developing country on the intra-household bargaining of heterosexual couples with different gender norm attitudes towards the division of domestic work and its impact on the couple's labor supply. In particular, the aim of this paper is to compare the decision-making process in families with traditional, egalitarian, and non-traditional gender role attitudes.

The model of labor supply with distribution factors proposed in Chiappori et al. (2002) is used to identify the derivatives of the sharing rule for each household type. Two distribution factors are used in this paper: the non-labor income difference between partners and the condition of being married versus cohabiting. According to the collective model, the non-labor income difference affects the decision-making process by giving more power to the richer partner, which translates into a decreased pattern of labor supply for him/her. This variable is a direct test of the validity of the unitary model, which imposes the *income-pooling hypothesis*. This hypothesis states that the source of the income is not relevant to the final allocation of outcomes, but the total income is. The rejection of the income-pooling hypothesis implies that the unitary model is not suitable for use when analyzing the household decision process (Browning et al., 1994).

Most studies that use collective models to analyze the labor supply decisions suppose

that individuals are single or married, leaving aside cohabitation decisions. When this decision is considered, results compare labor supply responses of those who choose to be married and those who cohabit. In practice, the most significant difference in choosing marriage versus cohabitation is that the costs of household formation and dissolution are higher for married couples.

Prenuptial contracts, which define in the case of divorce how property rights are distributed between the couple, can reduce the costs of divorce (Bayot and Voena, 2015). Therefore, if no prenuptial contracts are established, marriage can be thought of as a distribution factor that protects women who specialize in domestic work from divorce (Gemici and Laufer, 2011). If this mechanism holds, the bargaining power of married women should be higher than those who are cohabiting, and the corresponding negative (positive) correlation between female (male) labor supply and being married should be observed.

This paper relates to the literature that analyzes the interactions of social norms on a variety of labor market outcomes. Fernández (2013) has developed a learning model to show how the probability of being a working mother generates an information update on the value of labor, changing the female labor market participation in the long term. The question "Do you approve or disapprove of a married woman earning money in business or industry if she has a husband capable of supporting her?" is used to compare the predictions of the model to changes in social attitudes. Bertrand et al. (2015) analyzed the correlation of social norms on women's labor force participation and gender gap in incomes using the question "If a woman earns more money than her husband, it's almost certain to cause problems"; using the same definition, Galván (2021) analyzed how gender role attitudes in Uruguay affect women's and men's probability of employment in a formal job. Goussé et al. (2017) constructed an index of family values to account for marriage decisions and intra-household bargaining regarding consumption and labor supply. More recently, Bertrand et al. (2021) have studied the interactions between economic opportunities, gender norms and marriage rates among skills groups to account for the diverging patterns in labor supply participation of married women in a pool of developed countries. To measure gender norms they use two questions: "When jobs are scarce, men have more right to a job than women" (from the World Value Survey) and "A man's job is to earn money; a woman's job is to look after the home and family" (from the International Social Science Program). However, none of these studies have directly analyzed the correlation between social attitudes towards the division of domestic work and the intra-household bargaining process. I measure these social norms in Uruguay using the question "Is she/he the one

who mainly does the household chores?".[1]

Uruguay has a long history in terms of women's rights, being the first country in Latin America to grant a divorce by the sole will of the woman throughout the territory in 1913. It was also the first to grant women fully equal civil and universal suffrage in the constitutional reform of 1917, though this suffrage wasn't exercised until the national general elections of 1938. In recent years, there have been several legislative advances such as the gender-based violence law (2004), cohabitation union law (2006), quota law (2009), gender identity law (2009), voluntary interruption of pregnancy law (2012), and parental leave law (2013), among others.

In Uruguay, the average level of literacy, life expectancy, and gross per capita income is above the median of other Latin American countries. It has a high level of human development (Human Development Index of 0.817, 2017) and has been considered a high-income country according to the World Bank since 2013 (PNUD, 2020). However, there are still significant gaps in the Gender Inequality Index (GII) with Uruguay's value of 0.288 placing it in 62nd place out of 148 countries (PNUD, 2020). According to Batthyány et al. (2015), the challenges in Uruguay to close the remaining gaps are related to promoting policies that guarantee women's access to the labor market, stable and quality jobs, and policies that encourage cultural change within households in the distribution of domestic work between men and women.

In this context, we would expect that households with traditional gender role attitudes conform more with the "breadwinner" hypothesis, which gives more power to men, and therefore, the power of women in the negotiation process is lower than in egalitarian or non-traditional households. Furthermore, according to the collective model of labor supply, a shift in the bargaining power of women should increase the domestic work of both spouses.

This paper contributes to the literature on gender role attitudes by analyzing the decision-making process within families with different social norms. In particular, it provides new evidence on the relationship between labor supply choices and the bargaining power within households, the difference between partners' non-labor income and whether or not they are married. It also supports collective rationality in a non-developed country and rejects the "income pooling" hypothesis. This has a direct impact on policy design, since shifts in distribution factors such as a conditional cash transfer, will affect the bargaining power of household members, leading to changes in the labor supply choices of each

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[1]Uruguay's *"Encuesta Continua de Hogares"* survey asks this question to all household members over 14 years of age.

household member.

The layout of the paper is as follows. Section 2 presents the collective model of labor supply with distribution factors, the collective rationality tests, and the derivatives of the sharing rule. Section 3 describes the empirical approach, the data and the variable that approximates the measure of social attitudes regarding the division of domestic work, as well as the descriptive statistics. Section 4 discusses the results of the collective model of labor supply among household types and presents a sensitivity analysis of selection into employment. Finally, Section 5 concludes.

2   Theoretical framework

This section presents the basic model of collective labor supply with distribution factors as described by Chiappori et al. (2002), which is applied to households with traditional, egalitarian and non-traditional social norms. The household is composed of two individuals with different preferences and utility functions, which in general, are assumed to be altruistic. These agents know each other's preferences, interacting in a stable decision process, which leads to Pareto-efficient outcomes. The individuals of working age have a general utility function that depends on consumption and leisure of both partners:

$$U^i = U^i(1 - h^f, C^f, 1 - h^m, C^m, \mathbf{z}), \quad i = f, m \tag{1}$$

where f=female and m=male, U^i are strictly quasi-concave functions, increasing and continuously differentiable, h^i is the member i's labor supply (with $0 \leq h^i \leq 1$), C^i is the member i's consumption of a Hicksian composite good whose price has been normalized to one, and $\mathbf{z}$ is a vector of preference variables, which include individual and family characteristics. The household budget constraint is:

$$C^f + C^m \leq w_f h^f + w_m h^m + y \tag{2}$$

where w_i is the wage rate of individual i, and y is the household non-labor income. Under the collective model, the decision process is Pareto efficient, which implies that for any given set of $(w_f, w_m, y, \mathbf{z}, \mathbf{s})$, there exists a weighting factor $\mu(w_f, w_m, y, \mathbf{z}, \mathbf{s}) \in [0, 1]$, that

solves the following maximization program:

$$\max_{\{h^f, h^m, C^f, C^m\}} \mu(w_f, w_m, y, \mathbf{z}, \mathbf{s})U^f + (1 - \mu(w_f, w_m, y, \mathbf{z}, \mathbf{s}))U^m \tag{P1}$$

$$\text{s.t. } C^f + C^m \leq w_f h^f + w_m h^m + y$$

$$0 \leq h^i \leq 1, \quad i = f, m$$

where $\mathbf{s}$ is a vector of distribution factors -i.e., variables that affect the bargaining position within the household- that does not affect preferences or the budgetary restriction of the household (Browning et al., 2014). As the solution is Pareto-efficient, an increase in μ reflects a movement along the Pareto frontier, in the same direction that gives more utility to the female member of the household. Thus the Pareto weight can be considered a direct interpretation of power within the family. At the same time, these weights do not imply that both members have to agree on every decision. Pareto weights ensure that whatever the final solution is, no resource will be unused. The final solution in the Pareto frontier depends on the value of the parameters involved: the individual i's wage ($w_i, i = f, m$), the non-labor income of the family (y), the individual and family characteristics ($\mathbf{z}$) and the distribution factors ($\mathbf{s}$), and therefore, the Pareto weight.

When preferences are egoistic each partner takes their own preferences into account.[2] The utility function of member $i = f, m$ is $U^i(1 - h^i, C^i, \mathbf{z})$, where U^i is strictly quasi-concave, increasing and continuously differentiable. Chiappori (1992) shows that the solution to (P1) is equivalent to the following decentralized program[3]:

$$\max_{\{h^i, C^i\}} U^i(1 - h^i, C^i, \mathbf{z}) \tag{P2}$$

$$\text{s.t. } C^i \leq \phi^i + w_i h^i$$

$$0 \leq h^i \leq 1$$

where $\phi^f = \phi$ represents the female's share of non-labor income y, while the male's share is given by $\phi^m = y - \phi$. The equivalence between program (P1) and program (P2) is provided by the second fundamental welfare theorem, so that for any solution $(w_f, w_m, y, \mathbf{z}, \mathbf{s})$ of program (P1), there exists a *sharing rule* (ϕ) for which $(w_f, w_m, y, \mathbf{z}, \mathbf{s})$ is also the solution of the program (P2). According to (P2), the decision process is done in two steps: in

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[2]The model allows extensions for caring preferences and public goods, e. g., Blundell et al. (2005).
[3]Proposition 2 in Chiappori et al. (2002).

the first, members of the family decide how much of the non-labor income is allocated to each member, and in the second, each individual chooses their own labor supply and private consumption. The sharing rule can be positive or negative because it can include the allocation of both labor and non-labor income between partners.

The solution to program (P1) yields the following set of Marshallian labor supply equations:

$$h^f = h^f(w_f, w_m, y, \mathbf{s}, \mathbf{z})$$
$$h^m = h^m(w_f, w_m, y, \mathbf{s}, \mathbf{z})$$

Whereas, the Pareto-efficient decision to (P2) gives the following set of Marshallian labor supply functions:

$$h^f = H^f(w_f, \phi(w_f, w_m, y, \mathbf{s}, \mathbf{z}), \mathbf{z}) \tag{3}$$
$$h^m = H^m(w_m, y - \phi(w_f, w_m, y, \mathbf{s}, \mathbf{z}), \mathbf{z}) \tag{4}$$

The results in equations (3) and (4) show that only own wage matters when determining the individual's demand for leisure. The wage rate of the partner, the non-labor income (y), and distribution factors ($\mathbf{s}$) affect the demand for leisure only through the sharing rule, based on an income effect, being leisure a normal good. Therefore, factors that improve a woman's bargaining power reduce her labor supply and increase her partner's supply.

When the specified model uses at least two distribution factors, collective rationality can be empirically tested. Browning et al. (1994) and Bourguignon et al. (2009) show that the necessary and sufficient conditions for a collective model are:

$$\frac{\partial h^f / \partial s_\ell}{\partial h^f / \partial s_1} = \frac{\partial h^m / \partial s_\ell}{\partial h^m / \partial s_1}, \quad \text{for } \ell = 1, ..., L \tag{5}$$

where s_ℓ is a distribution factor. Equation (5) told us that the marginal rate of substitution between labor supply and any given pair of distribution factors has to be proportional between the two members of the couple.[4] The proportionality test holds if the distribution factors only affect the decision process through the one-dimensional function ϕ. If conditions in equation (5) are not rejected, the allocation of resources between partners is consistent with a static definition of efficiency (Chiappori and Mazzocco, 2017).[5] There is

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[4]Proposition 1 in Chiappori et al. (2002).
[5]This is equivalent to saying that it is a test for Pareto efficiency, the main assumption in the collective

another test for collective rationality which imposes restrictions on the Slutsky matrix, but it is only testable when panel data with price variation is available (Browning et al., 2014).

Chiappori (1988, 1992) and Chiappori et al. (2002) have proved the conditions to recover the sharing rule up to an additive constant, from the observation of individual labor supply as a function of wages, non-labor income and distribution factors. Under the assumption that the sharing rule is increasing in non-labor income, and if the partial derivative of the sharing rule to the distribution factors are different from zero $\left(\partial \phi / \partial s_\ell \neq 0, \text{ i.e., } \frac{\partial h^f / \partial s_\ell}{\partial h^f / \partial y} \neq \frac{\partial h^m / \partial s_\ell}{\partial h^m / \partial y}, \text{ Browning et al. (2014)} \right)$, the following relationships holds:[6]

$$\phi_{w_f} = \frac{\dfrac{h^m_{w_f}}{h^m_y} \cdot \dfrac{h^f_{s_\ell}}{h^f_y}}{\dfrac{h^m_{s_\ell}}{h^m_y} - \dfrac{h^f_{s_\ell}}{h^f_y}}, \quad \phi_{w_m} = \frac{\dfrac{h^f_{w_m}}{h^e_y} \cdot \dfrac{h^m_{s_\ell}}{h^m_y}}{\dfrac{h^m_{s_\ell}}{h^m_y} - \dfrac{h^f_{s_\ell}}{h^f_y}}, \quad \phi_y = \frac{\dfrac{h^m_{s_\ell}}{h^m_y}}{\dfrac{h^m_{s_\ell}}{h^m_y} - \dfrac{h^f_{s_\ell}}{h^f_y}}, \quad \phi_{s_\ell} = \frac{\dfrac{h^f_{s_\ell}}{h^f_y} \cdot \dfrac{h^m_{s_\ell}}{h^m_y}}{\dfrac{h^m_{s_\ell}}{h^m_y} - \dfrac{h^f_{s_\ell}}{h^f_y}}, \quad \forall \ell = 1, ..., L$$

(6)

Then, for a given empirical specification of the labor supply functions, we can recover the sharing rule as an additive function of these partial derivatives.

In the empirical literature, different proxies have been used for distribution factors: local sex ratios, divorce laws, abortion legalization, relative age, relative non-labor income, married (vs. cohabiting), relative incomes, relative wages, relative education, background family factors, control of land, previous children, reported influence within the household, single parents benefits, etc. (Chiappori et al., 2002; Oreffice, 2007; Rapoport et al., 2011; Haddad, 2015; Oreffice, 2011). Some of these distribution factors will be used in the following sections to analyze the bargaining power within households with different divisions of domestic work.

The division of domestic and market work may in part be linked to the relative resources of each partner, although it may also reflect internalized gender norms. Furthermore, different specialization patterns within the family affect the outside options, which, in turn, affect the negotiation process. Analyzing the bargaining process in households with traditional, egalitarian, and non-traditional gender norms will give some insights into the balance of power within each household type.

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model of labor supply.

[6]Where $h^i_j = \dfrac{\partial H^i}{\partial \phi} \dfrac{\partial \phi}{\partial j}$, with $i = f, m$ and $j = w_f, w_m, y, s_\ell$.

3 Empirical specification, data and social attitudes

3.1 Empirical specification

To estimate the collective model it is assumed that the system of labor supply equations of the household members has the following semi-logarithmic form:

$$h^f = f_0 + f_1 \log w_f + f_2 \log w_m + f_3 y + f_4 s_1 + f_5 s_2 + \mathbf{f}_6' \mathbf{z} + \epsilon_f \tag{7}$$

$$h^m = m_0 + m_1 \log w_f + m_2 \log w_m + m_3 y + m_4 s_1 + m_5 s_2 + \mathbf{m}_6' \mathbf{z} + \epsilon_m \tag{8}$$

where h^i is the hours usually worked in a week, w_i is the hourly wage of partner i, y is the total non-labor income of the household in thousands, s_1 and s_2 are two distribution factors, $\mathbf{z}$ are individual and family characteristics (preferences), and ϵ_f and ϵ_m are the error terms which may or may not be correlated. The first distribution factor (s_1) is the difference between non-labor income assignable to the male partner and the non-labor income of the female partner measured in thousands. The second (s_2) is the condition of being married, or not.[7]

According to the collective model of labor supply, the member of the family that faces a positive difference in non-labor income has more bargaining power within the household, decreasing their own-labor supply and increasing the labor supply of their partner. Thus, if males earn more non-labor income than females, the coefficient f_4 should be positive, and m_4 should be negative.

Regarding being married versus cohabiting, the bargaining power of partners can be associated with the community property regime. Bayot and Voena (2015) analyze changes in labor force participation, wages, and specialization patterns when there are prenuptial agreements in place for married couples. They found that women engaged in marriages with community property contracts participate less in the labor market, have lower wages, and the likelihood of specialization is higher than for women in a separate community regime. They suggest that community property contracts provide insurance against divorce for wives who self-select into a traditional division of work. In such a regime, females decrease their labor supply while males increase theirs. Therefore, if this mechanism holds, the coefficient f_5 should be negative while m_5 should be positive.

While no differences are expected in the sign of these distribution factors concerning

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[7]Following Browning et al. (1994) and Oreffice (2011), I use the difference between non-labor income of men and women to avoid having missing values in the ratio.

social norms on the division of domestic work, differences in magnitude may be observed due to the differences in semi specialization patterns. Specifically, traditional households are associated with the "breadwinner" norm, which results in men having a higher position in the negotiation process.

In order to test the validity of the collective model, the following necessary and sufficient condition must hold:

$$\frac{m_4}{f_4} = \frac{m_5}{f_5} \tag{9}$$

Given $\frac{\partial h^f / \partial s_\ell}{\partial h^f / \partial y} \neq \frac{\partial h^m / \partial s_\ell}{\partial h^m / \partial y}$ for at least one ℓ, the derivatives of the sharing rule are:

$$\phi_{w_f} = \frac{1}{\Delta} \frac{m_1 f_4}{w_f}, \quad \phi_{w_m} = \frac{1}{\Delta} \frac{f_2 m_4}{w_m}, \quad \phi_y = \frac{f_3 m_4}{\Delta}, \quad \phi_{s_\ell} = \frac{f_\ell m_4}{\Delta} \tag{10}$$

where $\Delta = f_3 m_4 - f_4 m_3$. To recover the sharing rule, up to an additive constant $k(z)$, we have to solve the system of differential equations in (10), resulting in:

$$\phi = \frac{1}{\Delta} \left(m_1 f_4 \log w_f + f_2 m_4 \log w_m + f_3 m_4 y + f_4 m_4 s_1 + f_5 m_4 s_2 \right) + k(z) \tag{11}$$

The conditions imposed by the theoretical model will now be tested and presented by estimating the labor supply equations of the family.[8]

3.2 Data and social attitudes towards the division of domestic work

This paper uses the Household Survey of Uruguay (*Encuesta Continua de Hogares*, ECH)), a survey undertaken annually by the National Statistics Institute (*Instituto Nacional de Estadística*, INE).[9] The survey collects information about socioeconomic characteristics of the household, including the usual hours of labor in principal and secondary occupations, the wage rate in each type of occupation, the sector of activity, and non-labor incomes for each partner, as well as a variable that reveals which members of the family do what housework. The main sample consists of heterosexual working couples (married or cohabiting) with

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[8]The sharing rule cannot be recovered because the vector given by **z** affects both preferences and the sharing rule. If we want to recover the sharing rule, we have to make additional assumptions (for example that there are not greater differences between singles and married individuals).

[9]In this study, I use cross-sectional data from the *Encuesta Continua de Hogares* from 1991 to 2019 to analyze the trends concerning the division of domestic work within households and variables related to the labor market, and data of the *Encuesta Continua de Hogares* from the year 2019 to analyse the intra-household bargaining of heterosexual couples with different gender norm attitudes towards the division of domestic work.

both partners between 23 and 64 years old, excluding extended families. Self employed individuals were excluded from the sample so that non-labor income corresponds to non-earned income (Vermeulen, 2005; Oreffice, 2011). Additionally, the sample is restricted to couples for which information is complete for both members and for which either the male of female partner self-reported the information.

The ECH reports for each person over 14 years of age in the household "Is (name) the one who *mainly* does the housework?" and the possible answers are "Yes" and "No". Using this variable, the sample is divided into families attached to traditional gender roles where only women do domestic tasks, egalitarian households where both members of the couple perform housework, and non-traditional families where the women do not perform housework. The evolution of the self-reported division of domestic work within households in Uruguay from 1991 to 2019, in the same restricted sample as used in this paper, is presented in Figure 1a. The discontinuity in 2010 reflects a change in the phrasing of the question.[10] According to the data, the percentage of households following a traditional division of labor has decreased sharply since the beginning of the nineties, while egalitarian households have emerged in their place. The stability in the proportion of households self-reported as non-traditional is noteworthy, remaining at around 5% throughout the period. The overall picture may reflect changes in internalized gender norms or at least the perception of them within the households. Similarly to in the work of Fernández (2013), Bertrand et al. (2015), Goussé et al. (2017), Bertrand et al. (2021) and Galván (2021), this paper will use the self-reported perception of division of domestic work to approximate social norms within households.

To give some insights into the possible correlation between social norms regarding the division of domestic work and the variables related to the labor market, Figure 1 includes the evolution of the raw wage gap between men and women (panel 1b), and the hours of work in the market by gender (panels 1c and 1d). The average wage gap (mean wage of females over mean wage of males) narrows from 0.77 to 0.87 between 1991 and 2019, decreasing from 0.76 to 0.84 in traditional homes, while in egalitarian households this gap narrows from 0.83 to 0.91, and in non-traditional couples from 0.81 to 0.91.

Figures 1c and 1d presents the evolution of usual hours of market work in Uruguay from 1991 to 2019, for females and males, respectively. The average hours of market work of females in traditional homes decreased from 37 in 1991 to 35 in 2019, whereas, in egalitarian

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[10]Until 2010, the ECH asked each person over 14 years of age in the household "Is (name) the one who does the housework?", without the adverb "*mainly*", and the possible answers were "Yes" and "No".

households it remained stable at 38 hours throughout the period. The mean hours of work of women in non-traditional homes increased from 38 to more than 40 hours of work per week. Since early 2000, this difference has widened, driving females in non-traditional and egalitarian households to work more than females in traditional ones. Males, on the contrary, show a downward tendency in the average hours of market work in all household types, but most remarkably in egalitarian and non-traditional homes, decreasing from 52 hours at the beginning of the nineties to 45 hours in 2019. Therefore, the gender gap in hours of market work has narrowed faster in egalitarian and non-traditional homes than in traditional households.
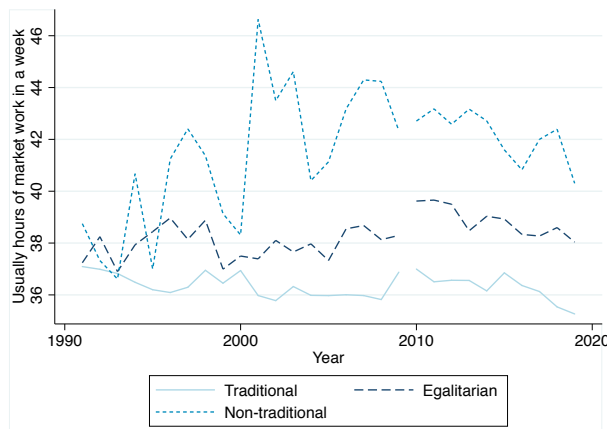
In summary, there seems to be a positive correlation between the evolution of the division of domestic work towards a more egalitarian distribution and variables related to the labor market.
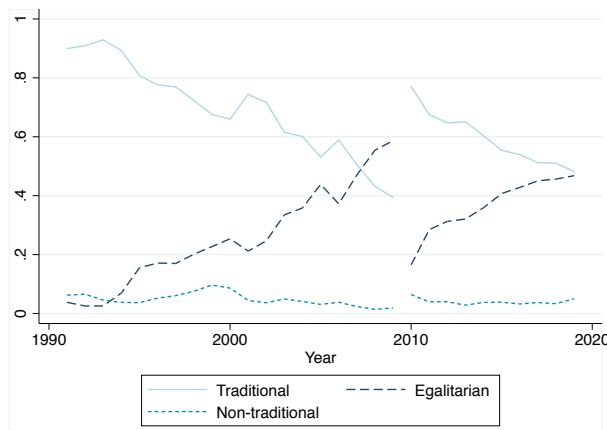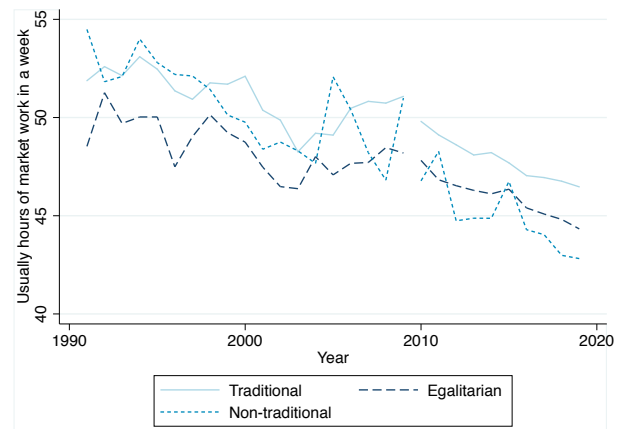
(a) Division of domestic work
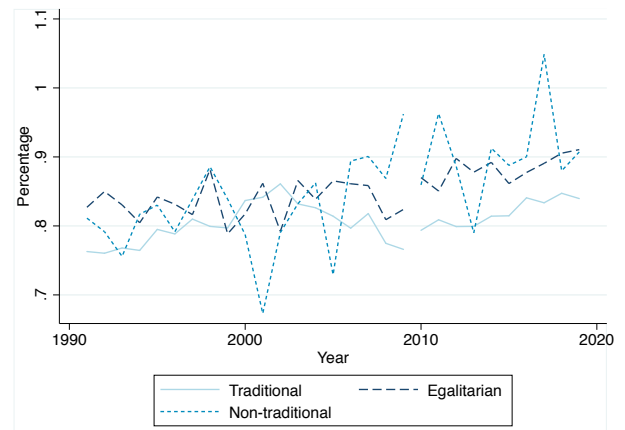
(b) Raw wage gap between men and women

(c) Hours of market work female partner

(d) Hours of market work male partner

Figure 1: Division of domestic work, raw wage gap and usual hours of work in the labor market in Uruguay, 1991-2019.

Source: Author's calculations based on *Encuesta Continua de Hogares* from 1991 to 2019.

Note: Heterosexual working couples between 23 and 64 years of age.

According to the Time Use Survey of Uruguay from 2013, *Encuesta de Uso del Tiempo (EUT, 2013)*, in households classified in this paper as traditional, 23% of the total hours of domestic work were performed by the male partner, while this share increased to 36% in egalitarian and to 42% in non-traditional households.[11] This pattern is reflected in Figure 2, where the distribution of hours of housework between partners is presented through kernel density functions of the share of hours of domestic work done by males for traditional, egal-

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[11]The EUT (2013) is representative of the Uruguayan population and is a subsample of the ECH survey. It also asks each person in the household about housework.

itarian, and non-traditional households, each shown separately. Most traditional homes are
in the lowest share levels, while egalitarian and non-traditional homes are situated to the
right. In sum, women do most of the domestic work and the share of hours of housework
of males increases from traditional, through egalitarian to non traditional homes. Although
the correlation is not perfect, I will use this proxy of the division of domestic work to ap-
proximate households with different gender norms. In general, the definition moves from
highly specialized households to less specialized: "traditional", "egalitarian", and "non-
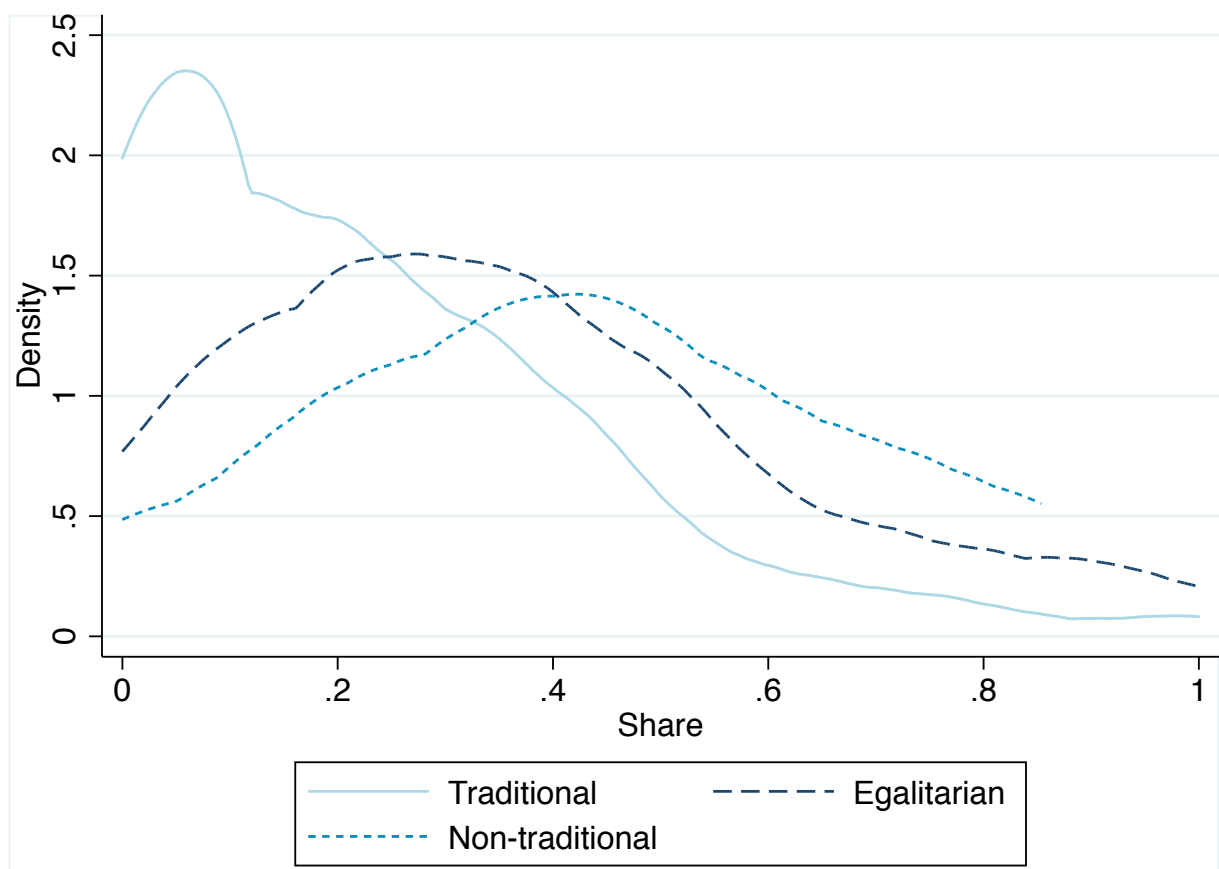traditional".

Figure 2: Share of male hours of housework on total hours of housework, EUT (2013).

Source: Author's calculations based on *Encuesta de Uso del Tiempo*, 2013.
Note: Heterosexual working couples between 23 and 64 years of age.

3.3 Descriptive statistics

Table 1 presents the descriptive statistics for the full sample, composed of a total of 4,276 heterosexual couples, as well as the descriptive statistics for the sample split according to the division of domestic work between females and males within the household. The dependent variable is the usual weekly hours of work in the labor market spent on all occupations for each member of the couple. Females work on average 36.3 hours per week, while males work 45.8. The number of hours of market work for females in households that are more attached to traditional gender roles is lower than in egalitarian and non-traditional homes. Among non-traditional couples, the mean hours of market work for females is 40.2 while males work 41.7, in egalitarian couples females work on average 37.7 hours and males 43.9, while in traditional households females work 34.6 and males almost 46 hours per week.

The wage variable includes all individual earnings related to work (in cash or in-kind, valued on the information provided by the survey), expressed all in US dollars as of 2019. In all types of households, the hourly wage of men is higher than that of women, but it narrows when we move from couples with traditional gender roles to those with a non-traditional division of domestic work. The non-labor income variable includes profits, interests, rents, and non-labor income assignable to each member of the couple, net of transfers to other households. The average non-labor income is $64 per month, and it is higher in households with a non-traditional distribution of domestic work.

The non-labor income assignable to each member of the couple is computed as the difference between that of the man and that of the woman. This variable includes capital gains, transfers from contributory programs (e.g., pensions, unemployment insurance, maternity leave), noncontributory pensions, voluntary transfers from other households (grants, subsidies, or donations), family allowances (conditional cash transfers-CCT), and food transfers. CCT and food transfers are means-tested programs. The CCT program consists of a cash transfer targeted at households with children younger than eighteen years of age and is conditional on school attendance and health assessments. The food transfer program, *Tarjeta Uruguay Social*, is a transfer made through a debit card that allows households to purchase food and personal hygiene products. These two programs are targeted at vulnerable homes.

The overall non-labor income difference between males and females is negative and calculated to be $3 per month. In traditional and egalitarian homes, women have on average higher non-labor incomes than men. Conversely, in homes with a non-traditional gender division of domestic work, the mean difference is positive, at approximately $25. The non-

labor income difference is directly related to the *income-pooling hypothesis*, which states that only household income matters for the final allocation of outcomes and not the source of the income (Browning et al., 2014). The rejection of this hypothesis implies that the unitary model is not suitable for use when analyzing the household decision process (Browning et al., 1994).

Married couples make up 51% of the sample while the remaining 49% cohabit. The marriage rate is similar between traditional and non-traditional homes, whereas it decreases in egalitarian households to 48%. Cabella and Fernández Soto (2017) analyze changes in the profile of young cohabitants in Uruguay between 1990 and 2015. They show that this type of union is more common amongst young people, its prevalence decreases with age and there are no differences among educational groups. In 1990 the proportion of individuals aged 20 to 24 living in consensual unions accounted for 20% of the total number of young people in a partnership, whereas in 2000 this proportion rose to almost 50%, and reached 90% in 2015. For individuals aged 40 to 44, these consensual unions increased from 10% in 1990 to approximately 40% in 2015 (Cabella and Fernández Soto, 2017).

A law of cohabitation unions was enacted in 2006. This law ensures that spouses in cohabitation unions have the same rights as married couples. To form a legal cohabitation union it is necessary to prove five years of prior cohabitation, and follow legal procedures. In Uruguay, the default regime of property at the time of marriage or legal cohabitation is community property rights. Before marriage or legal cohabitation, the division of joint property can be established. According to a financial survey carried out in 2016 in Uruguay (*Encuesta Fianciera de los Hogares Uruguayos*, EFHU-2), only 10.4% of individuals who are in a union have separate contracts rights, with rates of 12% among married people and 3.6% among cohabitants. The proportion of separate contract rights rose to 23.5% and 15.8% among individuals divorced from a previous marriage or separated from cohabitation.[12] In this setting, marriage can be a proxy for insurance against divorce and thus may play a significant role as a distribution factor.

Regarding socioeconomic characteristics, the mean age of women in the sample is 40.3, while it is 42.7 for men. Of all respondents, 87% of them report themselves to be white. The average number of years of education is 12.0 and 10.8, for females and males, respectively. As in Goussé et al. (2017), the sample shows that more educated, younger, and richer individuals tend to have a more egalitarian division of domestic work, i.e., are less attached

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[12]The EFHU-2 does not have information on the labor market outcomes of the couples. For this reason, this survey is not suitable for use in the analysis of premarital contracts as a distribution factor.

to gender roles. The mean number of children the couple has together is 0.82, while the mean number of children belonging to only the female partner is 0.13, and to only the male partner 0.02. Overall, females own the home in 8.3% of the sample, whereas males own it in 6.4% of cases. This difference widens, in favor of women, in non-traditional homes in which women own the home in 11.4% of the households and men 7.3%. Approximately 61% of the sample is located in the capital city or its metropolitan area, while almost 15% is from the North, and the remaining 25% is from the South. Traditional gender roles prevail in the South and North regions. Finally, the data reports which partner responded to the survey. Since this variable biases the estimates, it was introduced as an additional control.[13] In the whole sample, the female partner responded to the survey in 67% of cases. This rate decreased to 51% in non-traditional and 61% in egalitarian homes, while it reached almost 74% in traditional households.

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[13] Amábile et al. (2021) show the importance of accounting for respondent gender when only one individual reports the information from household members.

Table 1: Summary statistics.

	All couples		Traditional		Egalitarian		Non-traditional	
Hours usually work in a week (Labor market)								
Female	36.298	(12.27)	34.585	(12.96)	37.717	(11.4)	40.155	(10.36)
Male	44.807	(10.49)	45.959	(10.35)	43.900	(10.11)	41.720	(13.87)
Income (in US dollars)								
Female hourly wage	6.380	(4.3)	6.027	(4.49)	6.619	(3.93)	7.727	(5.32)
Male hourly wage	7.510	(12.72)	7.208	(8.52)	7.699	(16.13)	8.825	(10.31)
Non-labor income/1000	0.064	(0.46)	0.082	(0.45)	0.037	(0.45)	0.129	(0.65)
Distribution factors								
Non-labor income difference/1,000	-0.003	(0.26)	-0.006	(0.23)	-0.003	(0.29)	0.025	(0.33)
(Male-Female, US dollars)								
Married (1=Yes)	0.512	(0.5)	0.545	(0.5)	0.475	(0.5)	0.539	(0.5)
Age								
Female	40.303	(9.39)	41.215	(9.43)	39.410	(9.27)	39.674	(9.32)
Male	42.650	(9.76)	43.664	(9.69)	41.622	(9.7)	42.326	(10.14)
Race (1=White)								
Female	0.864	(0.34)	0.864	(0.34)	0.863	(0.34)	0.876	(0.33)
Male	0.873	(0.33)	0.887	(0.32)	0.863	(0.34)	0.829	(0.38)
Education (in years)								
Female	12.000	(3.79)	11.440	(3.78)	12.480	(3.68)	13.088	(4.01)
Male	10.762	(3.74)	10.268	(3.79)	11.185	(3.58)	11.720	(4.09)
Household characteristics								
N. children of both partners	0.822	(0.89)	0.821	(0.89)	0.821	(0.87)	0.855	(1.05)
N. children of female partner	0.133	(0.44)	0.133	(0.44)	0.138	(0.45)	0.083	(0.34)
N. children of male partner	0.023	(0.19)	0.021	(0.19)	0.026	(0.19)	0.021	(0.14)
House Owner (1=Yes)								
Female	0.083	(0.28)	0.080	(0.27)	0.084	(0.28)	0.114	(0.32)
Male	0.064	(0.24)	0.064	(0.25)	0.063	(0.24)	0.073	(0.26)
Number of rooms	3.571	(1.1)	3.599	(1.09)	3.536	(1.07)	3.627	(1.43)
Region								
Montevideo and Metropolitan area[a]	0.605	(0.49)	0.529	(0.5)	0.671	(0.47)	0.756	(0.43)
North[b]	0.145	(0.35)	0.200	(0.4)	0.090	(0.29)	0.124	(0.33)
South[c]	0.250	(0.43)	0.271	(0.44)	0.239	(0.43)	0.119	(0.32)
Respondent (1=Female)	0.669	(0.47)	0.736	(0.44)	0.614	(0.49)	0.513	(0.5)
Observations	4,276		2,087		1,996		193	

Notes: The table reports the mean and standard deviations of the main variables of the empirical analysis. The sample is restricted to working couples were both members are between 23 and 64 years of age.

[a] Montevideo, Canelones and San José.

[b] Artigas, Paysnadú, Río Negro, Rivera, Salto, and Tacuarembó.

[c] Cerro Largo, Colonia, Durazno, Flores, Florida, Lavalleja, Maldonado, Rocha, Soriano, and Treinta y Tres.

4 Empirical results

4.1 Main findings

The system of unrestricted labor supply on equations (7) and (8) is estimated using seemingly unrelated regression models (SURE) to allow for possible correlation on between the errors of the two equations.[14] The labor supply regressions for all couples, split according to the gender roles in the division of domestic work, are presented in Table 2.

The correlation between hours of market work and own-wage rate is negative in all household types. A one-percentage-point increase in the own-wage rate of females in traditional and egalitarian homes is associated with a reduction of approximately 5.7 and 5.2 hours of market work per month respectively. This correlation in non-traditional homes is not significant. Moreover, a one-percentage-point increase in the own-wage rate of males is associated with a reduction of 5.5 hours in traditional homes, while this magnitude is 5.1 in egalitarian and 6.4 in non-traditional households.[15] Regarding the cross-wage effects, the wage rate of females does not have any significant effect on the labor supply of males. Instead, the wage rate of men significantly increases the labor supply of women in traditional homes. The non-labor income is negatively correlated with the labor supply of males and females, but is only non-significant in the case of males in egalitarian homes and females in non-traditional households.

The non-labor income differences between males and females and married versus cohabiting partners have opposite correlations with the labor supply of women and men. An increase of \$1000 in the non-labor income difference between males and females shifts the bargaining power of males, reducing the hours of market work for males and increasing it for women. This correlation is higher among traditional than egalitarian households, and it is not significant in non-traditional homes.[16] Therefore, the *income pooling* hypothesis of the unitary model is rejected in the sample of all couples, as well as in traditional and egalitarian households.

The dummy variable that accounts for the difference between married and cohabiting couples shows that being married empowers women in the full sample, reducing their labor

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[14]Unfortunately, the ECH does not have information on parental education, religion, or other valid instruments to correct the endogeneity of wages and non-labor income. The second wave of the EFHU's survey has these variables, but it does not report the labor supply of the partner nor the wage rates.

[15]Rapoport et al. (2011) estimate similar labor supply equations that showed significant negative own-wage effects for females and males, whereas the estimation presented in Chiappori et al. (2002) indicates significant negative own-wage effects for men and significant positive effects for women.

[16]Oreffice (2011) found similar results over same-sex and heterosexual couples.

supply and increasing that of men. This correlation is significant in the full and egalitarian samples, only significant for men in non-traditional homes, and not significant in traditional homes. Thus, the insurance effect of marriage against divorce is present when members of the couple are less attached to a traditional division of domestic work. In traditional households, there is no significant difference between being married and cohabiting. This finding may reflect that in homes with traditional gender roles, women will be more specialized, regardless of the nature of their union.

Regarding the other variables included in the estimations, the results are similar to those found in the literature of collective models. The labor supply of males and females increases with an increase in own-age, but this variable is only significant among males. Own-education has a positive and significant correlation with labor supply, while an increase in partner's education decreases own-labor supply, with this finding significant for men in traditional households. The number of joint children the couple has is associated with fewer hours in the labor market for both partners in egalitarian homes, while as the number of children belonging to only one partner increases, the number of hours in the labor market of the other partner decreases. Being white or the house owner has no significant correlation on the labor supply of men or women, whereas the number of rooms in the house has a positive and significant effect on the labor supply of both partners. Concerning regions, the number of hours in the labor market is significantly lower in the north of the country than in the metropolitan area of the capital; however, there is no robust evidence of significant differences between the latter and the southern region. In traditional homes, when the respondent's survey is completed by the female they work fewer hours than when the respondent is the male partner, and the opposite is observed when the response is supplied by men.[17]

The proportionality test presented in equation (9) is tested using the results of the estimations presented in Table 2. The test imposes that the marginal effects of each distributional factor on labor supplies are equal. Thus, each variable affects the labor supply functions only through the sharing rule. The last two rows of Table 2 report the corresponding χ^2 test and $p-values$, where the null is that this equality holds. The joint hypothesis of equality of these ratios cannot be rejected in any household type considered in the analysis.[18] These results imply that collective rationality cannot be rejected for the whole sample

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[17]The number of children of each member of the couple (from previous partners) and household ownership are often used as distribution factors. Considering that in this study the effect of these variables is not statistically significant, they are included as controls.

[18]The proportionality test is approximate because the married variable is defined as a dummy.

or any of the sub-samples of households used in this paper.[19]

The estimated results on non-labor income difference between partners and being married reject in traditional and egalitarian homes the restriction imposed by the unitary model, according to which, distribution factors do not have significant effects on household behavior, i.e., $f_4 = f_5 = m_4 = m_5 = 0$. The unitary model also requires that the data do not reject the Slutsky symmetry restriction, given by: $f_2 = f_3 = m_1 = m_3 = 0$. A Wald test of equality on the parameters associated with distribution factors to zero and a Wald test of Slutsky symmetry are both rejected for traditional and egalitarian households at 1% significance; however, for non-traditional homes, the former test is rejected at 10% and the latter at 5%. Therefore, there is no robust evidence of which model is more suitable for non-traditional homes.[20]

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[19]I also estimated the model with caring preferences, and I cannot reject the collective rationality hypothesis.

[20]These results may be due to the small sample size of this type of household.

Table 2: Estimation of the unrestricted collective model of labor supply.

	All couples		Traditional		Egalitarian		Non-traditional	
	Female	Male	Female	Male	Female	Male	Female	Male
Log of wage of female	-5.243***	0.204	-5.774***	0.662	-5.271***	-0.158	-2.056	2.205
	(0.437)	(0.370)	(0.641)	(0.504)	(0.621)	(0.545)	(1.765)	(2.230)
Log of wage of male	0.572	-5.323***	1.774***	-5.545***	-0.108	-5.141***	-1.883	-6.439***
	(0.411)	(0.351)	(0.631)	(0.500)	(0.558)	(0.492)	(1.589)	(2.037)
Non-labor income/1000	-1.754***	-1.351***	-1.679***	-2.087***	-1.708***	-0.688	-2.127	-5.385***
	(0.421)	(0.356)	(0.641)	(0.502)	(0.616)	(0.540)	(1.456)	(1.845)
Non-labor income	1.949***	-1.432**	1.987*	-3.634***	1.766*	-0.191	4.058	0.925
difference/1,000	(0.708)	(0.603)	(1.194)	(0.944)	(0.930)	(0.820)	(2.528)	(3.248)
Married (1=Yes)	-1.132***	1.010***	-0.745	0.426	-1.485***	1.020**	0.296	5.404**
	(0.419)	(0.352)	(0.637)	(0.497)	(0.568)	(0.494)	(1.804)	(2.236)
Age	0.287*	0.582***	0.306	0.735***	0.374	0.452**	0.333	0.580
	(0.169)	(0.144)	(0.253)	(0.204)	(0.237)	(0.205)	(0.645)	(0.818)
Age squared	-0.004*	-0.007***	-0.003	-0.008***	-0.005	-0.005**	-0.004	-0.007
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.008)	(0.009)
Race (1=White)	0.249	0.067	-0.229	-0.468	0.870	0.627	-1.393	-2.443
	(0.532)	(0.466)	(0.810)	(0.685)	(0.719)	(0.635)	(2.333)	(2.531)
Education of female	0.708***	-0.122**	0.744***	-0.144*	0.582***	-0.022	0.665***	-0.438
	(0.068)	(0.058)	(0.104)	(0.082)	(0.092)	(0.081)	(0.251)	(0.319)
Education of male	-0.019	0.226***	-0.036	0.324***	-0.001	0.067	-0.254	1.019***
	(0.065)	(0.056)	(0.099)	(0.078)	(0.090)	(0.079)	(0.254)	(0.322)
N. children both	-1.046***	-0.186	-1.275***	0.262	-0.921***	-0.696**	0.043	0.136
	(0.238)	(0.199)	(0.358)	(0.278)	(0.335)	(0.288)	(0.802)	(1.009)
N. children female	-0.195	-0.307	-0.625	0.297	0.171	-1.110**	-0.020	0.520
	(0.444)	(0.373)	(0.672)	(0.523)	(0.602)	(0.522)	(2.221)	(2.829)
N. children male	-1.194	0.828	-0.019	1.247	-2.780**	1.027	-1.945	-2.483
	(0.967)	(0.825)	(1.416)	(1.122)	(1.342)	(1.181)	(5.357)	(6.742)
House Owner (1=Yes)	1.071	0.072	0.401	0.072	1.411	0.072	2.001	0.072
	(0.678)	(0.636)	(1.043)	(0.891)	(0.922)	(0.900)	(2.388)	(3.789)
Number of rooms	0.816***	1.123***	0.768***	0.911***	0.962***	1.305***	0.114	1.465*
	(0.188)	(0.160)	(0.284)	(0.225)	(0.264)	(0.232)	(0.672)	(0.876)
North	-3.353***	-2.107***	-2.818***	-2.804***	-2.416***	-1.901**	-1.340	-4.861*
	(0.548)	(0.466)	(0.749)	(0.591)	(0.897)	(0.787)	(2.356)	(2.937)
South	-1.318***	-0.104	-0.420	-0.565	-1.852***	0.142	0.687	-5.077*
	(0.448)	(0.380)	(0.676)	(0.531)	(0.606)	(0.534)	(2.282)	(3.005)
Female respondent	-1.414***	1.011***	-1.372**	0.970*	-0.480	0.499	-2.573*	-0.590
(1=Yes)	(0.394)	(0.336)	(0.632)	(0.498)	(0.524)	(0.463)	(1.495)	(2.005)
Constant	30.432***	36.413***	26.988***	34.439***	31.009***	39.068***	37.945***	27.130
	(3.413)	(3.037)	(5.243)	(4.417)	(4.646)	(4.210)	(13.019)	(17.176)
Proportionality test $\chi^2(1)$	0.06		0.30		0.74		0.03	
$p-value$	0.80		0.58		0.39		0.87	
Observations	4,276		2,087		1,996		193	

Notes: ***; **; * significant at 1%, 5% and 10%. Estimated coefficient and robust standard errors in parenthesis.

4.2 Results of the Collective model of Labor Supply

This subsection presents the results and implications of the collective model for the whole sample, as well as for traditional, egalitarian and non-traditional homes. Table 3 shows the estimates of the restricted collective model when the equality in equation (9) is imposed, while Table 4 tests whether distribution factors are relevant for the sharing rule. Tables 5 and 6 present the derivatives of the sharing rule and the wage and income elasticities for each household type respectively.

The results reported in Table 3 imposes the condition $m_4/f_4 = m_5/f_5$, which states that marginal effects of the income difference between the members of the couple should be equal to the ratio of marginal effects of being married on labor supplies. The estimation of the restricted model yields similar results to those found in Table 2. In particular, the distribution factors do not significantly change when imposing the collective rationality assumption.[21]

Table 3: Estimation of the restricted collective model of labor supply.

	All couples		Traditional		Egalitarian		Non-traditional	
	Female	Male	Female	Male	Female	Male	Female	Male
Log of wage of female	-5.241***	0.206	-5.775***	0.656	-5.273***	-0.161	-2.354	2.290
	(0.437)	(0.37)	(0.641)	(0.504)	(0.621)	(0.545)	(1.767)	(2.23)
Log of wage of male	0.571	-5.320***	1.770***	-5.542***	-0.100	-5.122***	-1.787	-6.46***
	(0.41)	(0.351)	(0.631)	(0.5)	(0.558)	(0.492)	(1.598)	(2.037)
Non-labor income/1000	-1.741***	-1.335***	-1.686***	-2.091***	-1.609***	-0.555	-1.173	-5.650***
	(0.418)	(0.353)	(0.64)	(0.502)	(0.605)	(0.518)	(1.321)	(1.836)
Non-labor income	1.861***	-1.514***	2.183*	-3.550***	1.373*	-0.721	0.409	1.951
difference/1,000	(0.603)	(0.504)	(1.161)	(0.935)	(0.802)	(0.516)	(0.913)	(3.176)
Married (1=Yes)	-1.186***	0.965***	-0.360	0.586	-1.623***	0.852*	1.090	5.204**
	(0.367)	(0.305)	(0.316)	(0.436)	(0.548)	(0.453)	(1.741)	(2.232)
Observations	4,276		2,087		1,996		193	

Notes: ***; **; * significant at 1%, 5% and 10%. Estimated coefficient and robust standard errors in parenthesis.

An additional condition must hold to recover the sharing rule up to an additive constant, i.e., at least one of the following conditions must hold: $f_4/f_3 \neq m_4/m_3$ or $f_5/f_3 \neq m_5/m_3$. This restriction implies that the ratio of marginal effects of each distribution factor and non-labor income should be different between partners. As distribution factors only affect the labor supply equations through the sharing rule, the signs should be opposite for females and males; whereas the marginal effect of non-labor income in the labor supply should be positive since leisure is a normal good. Hence, if the distribution factor "ℓ" increases

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[21]Table A.1 in the Appendix presents the complete table.

the bargaining power of females, the ratio f_{s_ℓ}/f_3 should be positive and m_{s_ℓ}/m_3 should be negative. Table 4 contains the estimated difference between these ratios, standard errors (in round brackets), and the value of the $\chi^2(2)$ Wald test estimates (in squared brackets). Results indicate that the sharing rule can be recovered up to an additive constant, for the whole sample, traditional, and egalitarian homes. However, the sharing rule is not identified for non-traditional households.

Table 4: Proportionality tests of the effect of non-labor income difference and being married.

	All couples	Traditional	Egalitarian	Non-traditional
$f_4/f_3 - m_4/m_3$	-2.171***	-2.925***	-1.312	-1.736
	(0.707)	(1.035)	(1.363)	(1.399)
	[9.42]	[7.98]	[0.93]	[1.54]
$f_5/f_3 - m_5/m_3$	1.393***	0.648	2.354*	0.864
	(0.427)	(0.47)	(1.429)	(0.99)
	[10.64]	[1.90]	[2.71]	[0.76]
Observations	4,276	2,087	1,996	193

Notes: ***; **; * significant at 1%, 5% and 10%. Estimated difference of coefficients and standard errors in parenthesis. Test of equality of these ratios between females and males (χ^2 values) in squared brackets.

Table 5 reports the results of estimated coefficients and marginal effects for all couples and households with different gender role attitudes.[22] According to equation (10), the marginal change in one variable reflects its impact on the non-labor income that goes to the female partner after the bargaining process has been completed. An increase in the log wage rate of the females member of the couple significantly increases her intra-household bargaining power in traditional and egalitarian homes, while a shift in the log wage rate of the male member significantly decreases her bargaining power only in traditional households. When these marginal changes are computed with respect to the wage rate and evaluated using sample means, the female in traditional homes significantly decreases her bargaining power, leaving her with a lower non-labor income.

The non-labor income impact on the sharing rule is significant in traditional and egalitarian households. A marginal increase of $1 in non-labor income is estimated to give around $0.52 to women in the full sample, almost $0.57 in traditional households and $0.60

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[22]The estimation for the non-traditional homes is illustrative, but it is not valid.

in egalitarian. Therefore, the share of non-labor income allocated to women in traditional homes is slightly smaller than in egalitarian, but the difference is not significant. Browning et al. (2014) show that when domestic work is introduced into the collective model, and if the production function of the household admits complementarities between the number of hours of domestic work of both members, the result of higher bargaining power of women results in more housework for both members. Although the estimations in this study do not account for an accurate measure of leisure, as it does not introduce the number of hours of domestic work, the evidence seems to be in line with this theoretical result.

In the case of the non-labor income difference between males and females, there are significant results in the full sample and in traditional households (as expected from the results presented in Table 4). An increase of \$1000 in favor of men will translate into a transfer of \$550 to males in the full sample and \$735 in traditional homes. Once again, there are no significant differences between traditional and egalitarian homes and intra-household bargaining appears to be highest for egalitarian women. Finally, being married has a positive and significant effect in the full sample and in egalitarian homes. This result implies that the females' share of non-labor income is higher among those who are married than those who cohabit.

Empirical evidence shows that bargaining power forces are relevant to intra-household bargaining in the whole sample, as well as in traditional and egalitarian homes. Regarding non-labor income, the magnitude is comparable to those found in the literature. For instance, Chiappori et al. (2002) found for a sample of households of United States, that a marginal increase of \$1 increases the bargaining power of women by almost \$0.68, and similar results are found in France by Rapoport et al. (2011). Oreffice (2011) using data from the US Census of the 2000s, estimates a marginal effect of non-labor income of \$0.33 in heterosexual married couples and \$0.56 in heterosexual cohabiting couples. Campaña et al. (2018) show that the marginal effect of non-labor income in the bargaining power of women is positive in Colombia, whereas it is negative in Mexico.

The results of the present study also suggest the rejection of the income pooling hypothesis, as has been found in many studies in for developed countries (Schultz, 1990; Lundberg et al., 1997; Lyssiotou, 2017; Oreffice, 2014). Oreffice (2011) uses a similar definition of the non-labor income difference between partners, and she rejects the income pooling hypothesis for heterosexual cohabiting and married couples for the United States. The overall magnitude of non-labor income difference in Uruguay is of a similar magnitude to that found for cohabiting couples in the United States.

Despite the diverging patterns in marriage and cohabitation, most papers that employ collective labor supply models do not distinguish between these types of unions, and those that do, analyze results on sub-samples of cohabiting and married couples (Oreffice, 2011). This paper uses marriage as a distribution factor to directly account for the differences in bargaining power among these types of unions. Blau and Kahn (2007) analyze the changes in labor supply of married women in the United States. They show that the higher propensity for cohabitation does not account for the fall in labor supply elasticities of married women.

Moreover, since marriage significantly increases the bargaining power of women in egalitarian households but not in traditional, self-selection into marriage does not appear to be a relevant issue.[23] Being married compensates for more specialization in egalitarian households by providing additional non-labor income to women after the bargaining process.

The age gap between males and females, the difference in educational attainment between partners, and sex ratios have all been explored as additional distribution factors. No significant effect was found of any of these variables on the labor supply of Uruguayan couples.

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[23]Figure A.1 in the Appendix shows that the main differences in participation rates and hours of market work are more associated with gender-role attitudes in the division of domestic work than with being married or cohabiting. The gap in labor participation rates among women with different social norms in the division of household chores reaches 20 percentage points, while the gap in the number of hours of market work is on average 8 hours per week. On the other hand, there are no significant differences in these variables between married and cohabiting women.

Table 5: Sharing rule coefficients and marginal effects for total, egalitarian and traditional couples.

	All couples		Traditional		Egalitarian		Non-traditional	
	Coeff.	$\partial\phi/\partial$Variable[a]	Coeff.	$\partial\phi/\partial$Variable[a]	Coeff.	$\partial\phi/\partial$Variable[a]	Coeff.	$\partial\phi/\partial$Variable[a]
Log of wage of female	0.075	0.010	1.943***	0.018	1.978*	-0.015	-212.7	5.6
	(0.136)	(0.018)	(0.711)	(0.015)	(1.082)	(0.051)	(41,552)	(1,088)
Log of wage of male	-0.169	-0.019	-0.596**	-0.067**	0.038	0.004	-161.0	-18.3
	(0.129)	(0.015)	(0.29)	(0.033)	(0.21)	(0.024)	(31,527)	(3,572)
Non-labor income		0.515***		0.567***		0.604**		-105.9
/1,000[b]		(0.131)		(0.185)		(0.290)		(20,761)
Non-labor income[b]		-0.550***		-0.735**		-0.515		36.9
difference/1,000		(0.177)		(0.300)		(0.370)		(7,174)
Married[b]		0.351***		0.121		0.609*		98.5
		(0.107)		(0.098)		(0.329)		(19,133)
Observations		4,276		2,087		1,996		193

Notes: ***; **; * significant at 1%, 5% and 10%. Robust standard errors in parenthesis.

[a] The marginal effects are computed with respect to w_f and w_m, not with respect to $\log w_f$ and $\log w_m$, evaluated at the sample means.

[b] The sharing rule is linear on non-labor income and distribution factors, which leads to the equality between estimated coefficients and marginal effects.

Table 6 presents the wage and non-labor income elasticities in the restricted general collective model.[24] At the sample mean, the women's and men's elasticities to own wages are negative and significant, except for women in non traditional homes. Women's own-wage elasticities vary from -0.167 in traditional households to -0.140 in egalitarian; while men's range from -0.155 to -0.117. In summary, the own-wage elasticities are larger for women than men in traditional and egalitarian households, but the opposite is true in non-traditional homes.

The cross-wage elasticity of females in traditional households is positive and significant, suggesting that these females may have incentives to move on to a more egalitarian division of labor. Non-labor income elasticity of both members of the couple is negative and of a similar magnitude to -0.003 across household types, but it is not significant for males in egalitarian households or females in non-traditional homes.

The results regarding labor supply elasticities are similar to those found for Colombia and Mexico (Campaña et al., 2018). Most of the empirical evidence for developed countries found that own-wage elasticities are negative for males but positive for females, and that cross-wage elasticities are negative (Chiappori et al., 2002; Oreffice, 2014; Lyssiotou, 2017; Goussé et al., 2017; Bloemen, 2019).

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[24]Estimates of the unrestricted model are not different from those presented in this section. Full estimations are available upon request.

Table 6: Wage and non-labor income elasticities.

	All couples		Traditional		Egalitarian		Non-traditional	
	Female	Male	Female	Male	Female	Male	Female	Male
w_f	-0.144***	0.005	-0.167***	0.014	-0.140***	-0.004	-0.059	0.055
	(0.012)	(0.008)	(0.019)	(0.011)	(0.016)	(0.012)	(0.044)	(0.053)
w_m	0.016	-0.119***	0.051***	-0.121***	-0.003	-0.117***	-0.044	-0.155***
	(0.011)	(0.008)	(0.018)	(0.011)	(0.015)	(0.011)	(0.04)	(0.049)
y	-0.003***	-0.002***	-0.004***	-0.004***	-0.002***	-0.0005	-0.004	-0.017***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.0004)	(0.004)	(0.006)
Observations	4,276		2,087		1,996		193	

Notes: ***; **; * significant at 1%, 5% and 10%. Robust standard errors in parenthesis.

4.3 Selection into employment correction

The empirical analysis is extended to account for selection into employment, where one of the spouses specializes in household production. In the collective model, specialization takes place when the potential wage of one of the spouses is lower than his/her marginal productivity in housework and lower than his/her marginal rate of substitution between leisure and consumption. In this case, the distribution of domestic work between partners depends on the technology used in household production. Again, if there are complementarities to housework, a change in distribution factors that gives more bargaining power to women will increase the amount of time spent in household production for both (Browning et al., 2014).

The selection into employment correction allows the inclusion of households in which one of the two partners is out of the labor force. Households in which neither partner is in the labor force are not included. Figure 3a and 3b shows that the evolution of participation rate of females and males has narrowed among all household types. The participation rate of females has increased over the period, whereas that of males has remained stable in traditional and egalitarian households, and declined in non-traditional homes. As usual, the participation rate of females is lower than that of males. Differences in the participation rates between males and females are even more remarkable once the households' social norms regarding the division of domestic work are introduced.

The participation rate of women is the lowest, while men's is highest, in traditional homes. At the other extreme, the labor force participation of females in non-traditional households has increased, exceeding that of men at the end of the 2010s. Egalitarian homes

are in the middle of the distribution of participation rates for males and females.
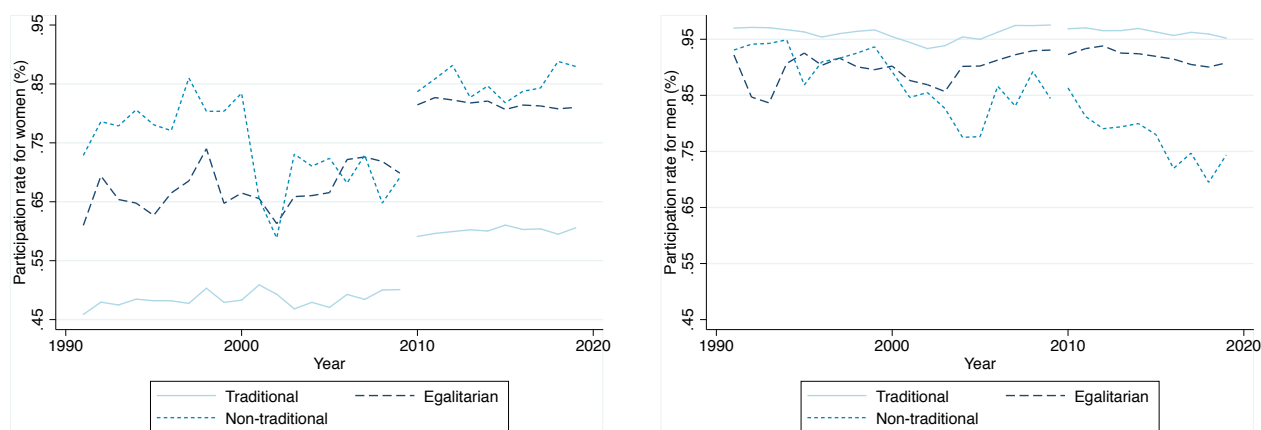
(a) Women   **(b)** Men

Figure 3: Labor force participation rates among women and men in Uruguay, 1991-2019.

Source: Author's calculations based on *Encuesta Continua de Hogares* from 1991 to 2019.
Note: Heterosexual couples between 23 and 64 years of age.

The Heckman correction is used to account for self-selection into employment and to compute fitted log wage. The wage equation is defined following a standard approach for human capital, which is common in collective models of labor supply (e.g.,Donni (2007), Oreffice (2011), and Donni and Matteazzi (2018)):

$$\log w_i = \mathbf{\Psi}'\mathbf{r^i} + u^i \tag{12}$$

where $i = f, m$, $\mathbf{r}$ includes each individual's education (measured in years), the square and cube of this variable, a second-order polynomial of the individual's age, a dummy for being white, dummies for the region of residence, a dummy variable if the individual have lived in the same administrative department of Uruguay since they were born, and a dummy if the household has a dishwasher. As noted by Donni (2007), the identification of the hourly wage requires that most of the variables included as controls in the market wage regression be excluded from the empirical model of the collective labor supply. The selection equation for each household member is given by:

$$d^i = \gamma_1 y + \gamma_2 s_1 + \gamma_3 s_2 + \gamma_4 child\_0to5 + \gamma_5 unempolyment + \mathbf{\Gamma}'\mathbf{x^i} + v^i \tag{13}$$

where d is an indicator variable that takes the value of one if the individual participates

in the labor market, and zero otherwise, y is non-labor income, s_1 is the difference in non-labor income between males and females, and s_2 is a dummy variable for married couples. The exclusion restrictions (i.e., variables that affect participation decision) are the number of children between 0 and 5 years in the household and the 2018 unemployment rate by department. The variables in **x** include dummies for age brackets and dummies for education levels. Selection into employment correction was estimated for all heterosexual couples in the sample between 23 and 64 years of age, and separately for traditional, egalitarian, and non-traditional couples.

The two-equation model presented in (12) and (13) is estimated by maximum likelihood (estimations available upon request). The estimation results suggest that selection into employment is a relevant issue only among women, as the estimation of the correlation coefficient of the error terms of both equations is negative and statistically significant for women but not for men (ρ) in traditional and egalitarian homes, whereas it is significant and positive for women in non-traditional households. A negative (positive) correlation between the selection and wage equations implies that unobservable factors that increase the likelihood of employment, also decrease (increase) the wage rates.

Estimation of the system of labor supply equations (equations (7) and (8)) with selectivity-corrected log hourly wage for males and females is presented in Table **??** of the Appendix. The number of observations in the sample of couples with a traditional division of domestic work almost doubles, while in egalitarian and non-traditional homes it increased by approximately 50%. In traditional households, 87% of the increase in the sample is explained by women being out of the labor force, while this percentage declines to 66% in egalitarian and 32% in non-traditional homes. Therefore, the specialization pattern is more important among households with traditional gender roles. It should be noted that the distribution factors included in the participation equation have significant effects on the probability of employment, in the same direction as they do in the labor supply estimations. An increase in the non-labor income of men will reduce their likelihood of being employed and increase their partners', while being married decreases the probability of employment for women and increases that of men.

The estimation results of the unrestricted collective model of labor supply shows no significant differences are observed in the correlation between women's and men's labor supply and non-labor income, nor the distribution factors. However, there are changes in the signs and significance of own and cross-wage rates. Once selection into employment is taken into account, own-wage has a significant positive impact on men's labor supply

for those living in traditional and egalitarian households. Furthermore, the cross-wage effect is negative and significant for both household members in traditional homes and only for females in egalitarian and non-traditional homes. The model does not reject collective rationality or any proportionality test in any household type. Therefore, the sharing rule is well defined, and it can be recovered up to an additive constant for all couples, traditional, egalitarian, and non-traditional households.

Table 7 presents the results of the estimated parameters and marginal effects of the sharing rule after correcting for selection. Given the differences in the estimation of the unrestricted model of labor supply after correcting wages for selection, it is reasonable to observe changes in the sharing rule in these variables. Due to the fact that there may be additional endogeneity problems, the following comments are related to the non-labor income and distribution factors.

The selection correction reduces the magnitude of an increase of $1 on non-labor income, but signs and significance remained the same. This result may be related to the fact that women who are out of the labor force may have less bargaining power than those who are working. As before, women living in households with traditional gender norms have less bargaining power. Differences in non-labor income between males and females are significant in the whole sample, and among household types. Again, women living in households more attached to traditional gender roles lose relatively more of their intrahousehold bargaining when this difference increases. Lastly, being married significantly increases the intra-household bargaining of women in egalitarian households and the overall magnitudes are similar to those obtained without the selection correction.

Table 7: Sharing rule coefficients and marginal effects for total, egalitarian and traditional couples with Heckman's MLE correction.

	All couples		Traditional		Egalitarian		Non-traditional	
	Coeff.	$\partial\phi/\partial$Variable[a]	Coeff.	$\partial\phi/\partial$Variable[a]	Coeff.	$\partial\phi/\partial$Variable[a]	Coeff.	$\partial\phi/\partial$Variable[a]
Log of wage	-0.605***	-0.109***	-0.643**	-0.121**	-0.161	-0.027	0.613	0.100
of female	(0.233)	(0.0417)	(0.292)	(0.055)	(0.339)	(0.0575)	(1.048)	(0.1716)
Log of wage	1.883***	0.303***	1.607**	0.266**	1.706***	0.265***	1.65*	0.257*
of male	(0.478)	(0.0768)	(0.797)	(0.1321)	(0.626)	(0.0973)	(0.908)	(0.1414)
Non-labor income	0.408***		0.306***		0.475***		0.528***	
/1,000[b]	(0.05)		(0.101)		(0.065)		(0.149)	
Non-labor income	-0.990***		-1.150***		-0.860***		-0.859***	
difference/1,000[b]	(0.087)		(0.176)		(0.106)		(0.235)	
Married[b]	0.144***		0.083		0.111*		0.226	
	(0.04)		(0.055)		(0.057)		(0.2)	
Observations	7,377		4,086		2,958		333	

Notes: ***; **; * significant at 1%, 5% and 10%. Robust standard errors in parenthesis.

[a] The marginal effects are computed with respect to w_f and w_m, not with respect to $\log w_f$ and $\log w_m$.

[b] The sharing rule is linear on non-labor income and distribution factors, which leads to the equality between estimated coefficients and marginal effects.

To sum up, the correction of the estimates with selection into employment changes magnitudes but no signs in the intra-household bargaining power of non-labor income and distribution factors. It remains true that the bargaining power of women is higher in those households less attached to traditional gender roles, even though the differences among household types are not statistically significant.

5 Conclusions

This paper has analyzed differences in the labor supply responses and intra-household bargaining of heterosexual couples in households with different gender role attitudes regarding the division of domestic work. Households were classified as traditional, egalitarian, and non-traditional using data from Uruguay and information on who mainly does household chores in couples where both members earn. More educated, younger, and richer individuals tend to have more egalitarian gender role attitudes, as they self-reported that both members do domestic work.

The collective model of labor supply with distribution factors was used to analyze the labor supply of couples. Results show that the labor supply of males and females is responsive to bargaining power shifts measured by differences in the non-labor income between partners and in the condition of being married, or not. Results indicate that a relatively richer individual (whether male of female) reduces their labor supply in traditional homes,

while in egalitarian households being married significantly reduces the labor supply of women and increases that of men. Additionally, in traditional and egalitarian households, the data does not suggest the rejection of the collective rationality hypothesis for any household type nor the proportionality constraints for at least one distribution factor. On the contrary, the income-pooling hypothesis is rejected by the data.

The derivatives of the sharing rule show that an increase in non-labor income translates to a higher transfer to the female partner regardless of the distribution of domestic work, and it is higher among those households less attached to traditional gender role attitudes. However, these differences are not statistically different from zero among household types. The bargaining power of women living in traditional homes is reduced when the non-labor income difference increases in favor of males, while being married increases her bargaining power in egalitarian households. The latter result suggests that insurance against divorce is a relevant booster of women's intra-household bargaining while reinforcing the specialization pattern. These results are robust to the selection into employment correction.

Social norms regarding the division of domestic work are not the only relevant variable to explain differences in intra-household bargaining, but it was shown that they can booster the distribution of power within households. Future research may combine time-use data and information on attitudes towards social norms regarding the distribution of domestic work to disentangle the influence of these variables in the collective labor market choices and intra-household bargaining.

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Appendix

Table A.1: Estimation of the restricted collective model of labor supply.

|	All couples		Traditional		Egalitarian		Non-traditional	
	Female	Male	Female	Male	Female	Male	Female	Male
Log of wage of female	-5.241***	0.206	-5.775***	0.656	-5.273***	-0.161	-2.354	2.29
	(0.437)	(0.37)	(0.641)	(0.504)	(0.621)	(0.545)	(1.767)	(2.23)
Log of wage of male	0.571	-5.32***	1.77***	-5.542***	-0.1	-5.122***	-1.787	-6.46***
	(0.41)	(0.351)	(0.631)	(0.5)	(0.558)	(0.492)	(1.598)	(2.037)
Non-labor income/1000	-1.741***	-1.335***	-1.686***	-2.091***	-1.609***	-0.555	-1.173	-5.65***
	(0.418)	(0.353)	(0.64)	(0.502)	(0.605)	(0.518)	(1.321)	(1.836)
Non-labor income	1.861***	-1.514***	2.183*	-3.55***	1.373*	-0.721	0.409	1.951
difference/1,000	(0.603)	(0.504)	(1.161)	(0.935)	(0.802)	(0.516)	(0.913)	(3.176)
Married (1=Yes)	-1.186***	0.965***	-0.36	0.586	-1.623***	0.852*	1.09	5.204**
	(0.367)	(0.305)	(0.316)	(0.436)	(0.548)	(0.453)	(1.741)	(2.232)
Age	0.291*	0.584***	0.291	0.721***	0.373	0.468**	0.353	0.573
	(0.169)	(0.144)	(0.252)	(0.205)	(0.238)	(0.205)	(0.65)	(0.819)
Age squared	-0.004*	-0.007***	-0.003	-0.008***	-0.005	-0.006**	-0.005	-0.006
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.008)	(0.009)
Race (1=White)	0.309	0.082	-0.279	-0.389	1.082	0.628	-1.554	-2.471
	(0.534)	(0.467)	(0.815)	(0.688)	(0.722)	(0.637)	(2.349)	(2.533)
Education of female	0.709***	-0.123**	0.742***	-0.145*	0.583***	-0.023	0.687***	-0.444
	(0.068)	(0.058)	(0.104)	(0.082)	(0.092)	(0.081)	(0.252)	(0.319)
Education of male	-0.019	0.227***	-0.04	0.323***	0.00002	0.068	-0.269	1.022***
	(0.065)	(0.056)	(0.099)	(0.078)	(0.09)	(0.079)	(0.255)	(0.322)
N. children both	-1.043***	-0.187	-1.302***	0.255	-0.916***	-0.702**	-0.169	0.187
	(0.238)	(0.199)	(0.357)	(0.278)	(0.335)	(0.288)	(0.797)	(1.008)
N. children female	-0.205	-0.319	-0.552	0.329	0.135	-1.174**	-0.312	0.611
	(0.441)	(0.37)	(0.665)	(0.521)	(0.599)	(0.517)	(2.228)	(2.829)
N. children male	-1.2	0.831	0.008	1.284	-2.79**	1.025	-1.332	-2.676
	(0.967)	(0.824)	(1.415)	(1.122)	(1.342)	(1.182)	(5.371)	(6.742)
House Owner (1=Yes)	1.027	-0.065	0.404	-1.141	1.297	0.324	2.087	3.715
	(0.678)	(0.637)	(1.041)	(0.895)	(0.924)	(0.902)	(2.403)	(3.792)
Number of rooms	0.816***	1.124***	0.758***	0.905***	0.966***	1.307***	-0.018	1.508*
	(0.188)	(0.16)	(0.284)	(0.225)	(0.264)	(0.232)	(0.671)	(0.875)
North	-3.35***	-2.105***	-2.828***	-2.802***	-2.422***	-1.901**	-1.284	-4.889*
	(0.548)	(0.466)	(0.749)	(0.591)	(0.897)	(0.787)	(2.369)	(2.938)
South	-1.323***	-0.106	-0.408	-0.563	-1.865***	0.136	0.582	-5.029*
	(0.448)	(0.38)	(0.676)	(0.531)	(0.606)	(0.534)	(2.295)	(3.005)
Female respondent	-1.413***	1.003***	-1.374**	0.965*	-0.488	0.465	-2.811*	-0.526
(1=Yes)	(0.394)	(0.336)	(0.632)	(0.498)	(0.523)	(0.462)	(1.498)	(2.004)
Constant	30.295***	36.378***	27.425***	34.708***	30.798***	38.754***	38.373***	27.161
	(3.414)	(3.04)	(5.23)	(4.426)	(4.657)	(4.222)	(13.088)	(17.189)
Observations	4,276		2,087		1,996		193	

Notes: ***; **; * significant at 1%, 5% and 10%. Estimated coefficient and robust standard errors in parenthesis.
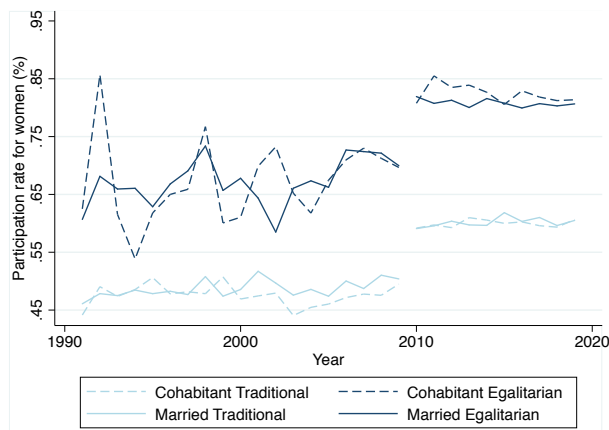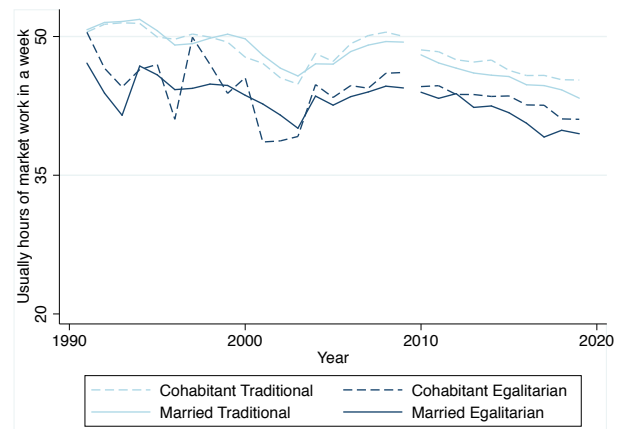
(a) Labor force participation of females
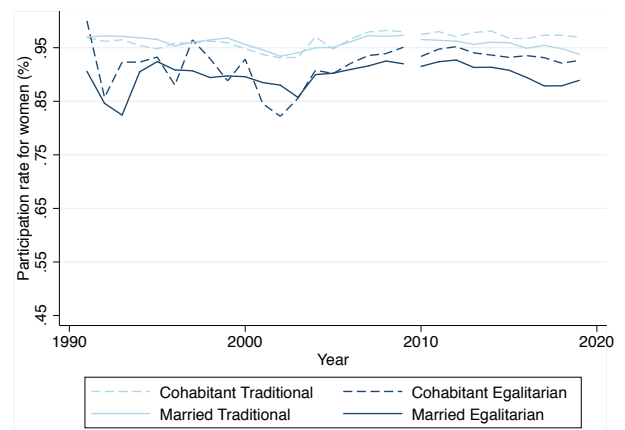
(b) Labor force participation of males
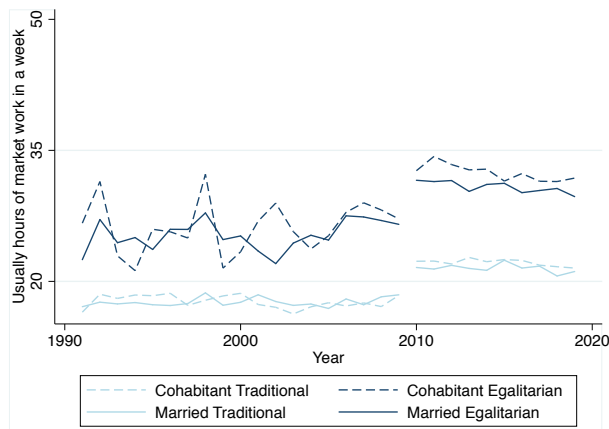
(c) Hours of market work female partner (not conditional on working)

(d) Hours of market work male partner (not conditional on working)

Figure A.1: Hours of work in the labor market and participation rates in Uruguay, 1991-2019.

Source: Author's calculations based on *Encuesta Continua de Hogares* from 1991 to 2019. *Note:* Heterosexual couples between 23 and 64 years of age. The graphs do not include non-traditional households to avoid the variability of this group due to the small sample size.