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RESEARCH ARTICLE

# Intrahousehold Bargaining Power and Time Allocation for Multiple Activities

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**Abstract**

During the last decades, important policies have been implemented to incorporate women into the labor market, reduce persistent gender inequalities, and balance the time allocation between paid and unpaid work. We assess the Chilean case considering couples' time allocation with an explicit consideration of intrahousehold bargaining power (relative wages and education). The Chilean case is interesting because we use the first urban national survey of time use, which could help understand gender differences in labor participation. We estimate a demand model, specifically a Multiple Discrete-Continuous Extreme Value (MDCEV) model considering six time-consuming activities on weekdays and weekends. In addition, we assess two hypothetical scenarios, namely, a proxy to childcare availability policy and an increase in women's relative wages. We found that bargaining indicators are related to how individuals allocate their time, particularly the inverse relationship between the time allocated to housework and paid work. Moreover, we found that increasing women's bargaining power in terms of wages could produce stronger labor force participation increments. Finally, our simulations show that while women can bridge the gap between paid and unpaid work, they continue to spend more time on domestic activities than men.

**Keywords:** Time allocation, Intrahousehold bargaining power, Multiple discrete-continuous choice modeling, Gender equity, Chile.
*JEL codes:* J16, J22, D13.

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# 1. Introduction

In recent decades, substantial progress has been made regarding policies that favor gender equity, especially those that facilitate women's incorporation into the labor market (Rubiano-Matulevich, 2019; Sullivan, 2019). Some governments have implemented programs to reduce the amount of time women spend on childcare (or caring for relatives) to facilitate access to paid jobs (Altindag, 2017; Lefebvre, 2008; Manley, 2013; Martínez, 2017; Mateo-Diaz, 2013, 2016). These priorities are addressed by the sustainable development goals and include reducing women's unpaid work burden; meeting the care needs of children, the sick, and older adults; ensuring access to decent work; attaining healthy work–life balance; and improving well-being (Floro, 2021). Nevertheless, despite this progress, gender inequalities in time allocation persist, adversely affecting economic opportunities, career progression, and well-being (Rubiano-Matulevich, 2019; Sullivan, 2019). These inequalities deny women freedom and opportunities and have proven to be an obstacle to growth and human development prospects in the long term (Gaye, 2010).

Understanding gender inequalities requires evaluating the interactions in the time allocation between family members. Time allocated to different activities by one family member constrains the time allocation of other family members since this impacts individual and household income availability (Folbre, 2006; Hamermesh, 2016). Time allocation analyses may involve several time-use dimensions, including the simple binary work–leisure decision; paid versus unpaid work decision; or the multiple time allocation decisions among activities, such as education, leisure, personal care, or care of others (children, disabled people, or older adults) (CEPAL, 2015). The processes by which resources, including time, are allocated among family members and the outcomes of those processes are commonly referred to as intrahousehold resource allocation (Haddad, 1997; Quisumbing, 2003). At the household level, time allocation depends primarily on the opportunity cost each family member faces. The literature shows different time allocation patterns between genders, with men allocating more time to paid work than women (Bredtmann, 2014; Campaña, 2018; Datta Gupta, 2010; Stratton, 2012). Nonetheless, the observed differences in time allocation between men and women also depend on the social, economic, and cultural context and the juridical and institutional framework in which these decisions are made (Agarwal, 1997; Arceo Gómez, 2018; Baland, 2017). Furthermore, individuals make decisions in a particular family setting; therefore, it is advisable to evaluate these decisions considering an intrahousehold perspective, that is, the dynamics of the different household members (Hamermesh, 2016).

Modeling time allocation using an intrahousehold perspective instead of an individual perspective has been challenging (Bhat, 2005), mainly because the conceptualization of decision-making needs to incorporate power relations, which are sometimes obviated in the economic analysis (Kabeer, 1997). These power relations depend on each individual's bargaining power (Doss, 2013, p. 58). Bargaining power is an unobservable measure of the relative influence that a particular individual has, compared with other people within the same family (Doss, 2003). The bargaining power could be implicit or explicit in decision-making and may influence several family outcomes (Doss, 2003). Understanding how households allocate time could help policymakers to understand several human decisions and encourage or discourage some behaviors (Jara-Díaz, 2017b). It can help develop policies and programs to reduce gender inequalities.

This study assesses how time is allocated between women and men within the same family, explicitly considering power relationships. To this end, we use the first national-level Chilean survey of time use. The Chilean case is interesting to study because essential differences in access to the labor market exist between men and women, with a persistent difference between 20% and 27% –in global trends since the 1990s, women's labor force participation has slightly exceeded 50% (Kabeer, 2021; Bank, 2022)-, and a significant gender wage gap (22% approximately) (de Estadísticas, 2021; Sánchez, 2021). Part of this gap can be explained by cultural aspects, such as women's internalization of conservative cultural values (Contreras, 2010) and the unequal allocation of time to different activities (Barriga, 2021; Mujer, 2019).

Recent evidence for Chile shows that for men and women a discrepancy between how much would like and how much spend on time use. Both consider the amount of time allocated to unpaid work (care and housework) to be adequate, even if significant gaps exist between them. Furthermore, a strong preference exists for allocating time to childcare, which is greater for women than for men (Basaure, 2022). These subjective valuations for care have repercussions on lower labor market participation; hence, maternity, rather than marriage or pregnancy, is responsible for women exiting the labor force upon motherhood and causes differences in the labor market compared with non-mothers (Berniell, 2022; Casarico, 2023; Yopo Díaz, 2022). Moreover, it is not only labor informality that influences this unequal participation but also the time and costs associated with childcare and housework (Berniell, 2021; Domínguez-Amorós, 2021; Martínez, 2017). The distribution of activities is similar at the international level with women spending, on average, between three and six hours on unpaid care activities, while men spend between half an hour and six hours on unpaid care activities (Ferrant, 2014). Increasing women's participation in the labor market can positively affect gender norms and attitudes (Seguino, 2007), consequently attenuating these gaps in the future.

Using a developing country database, we examine the links between intrahousehold power relations and time allocation between women and men. We extend the existing literature in two ways. Previous literature focuses mainly on the dichotomy of paid versus unpaid work activities. On the contrary, we consider six different time-consuming activities (personal care, leisure, care of family members, housework, paid work, and education) and two-time allocation contexts (weekdays and weekends). Second, we extend the previous methodology using a multiple discrete-continuous extreme value (MDCEV) model that considers the simultaneous decision-making process associated with time allocation among several activities. In this model, based on the random utility maximization theory (Bhat, 2005), people could choose to allocate time to many but not necessarily all activities, subject to a budget (total available time). In this sense, the optimal decision fits a generalized corner solution instead of an interior solution for time allocation decisions. The literature on time allocation and intrahousehold relationships methodologically analyzes different types of activities and explanatory variables by linear regression. This study uses a time demand model to understand how individuals' marginal utility changes when simultaneously choosing various combinations of activities. However, this methodological innovation entails challenges. For example, it is complex to deal with endogeneity issues such as the likely simultaneous endogeneity between time allocation and bargaining power (Fang, 2008). Therefore, our results should not be seen as a causal estimate of the impact of bargaining power on time allocation but as an analysis of the correlations between these key variables.

Finally, we forecast the implications of two hypothetical scenarios, namely, a scenario that simulates not having infants at home (which could be considered as an upper bound of the possible effect of a childcare policy) and another case, an increase in relative wages (RW). The time allocation patterns for women and men at the intrahousehold level have several economic implications, such as women's labor force participation. Thus, knowing the determinants of time allocation could inform the design of public policies to generate incentives—monetary (i.e., wage policies) or not (i.e., childcare programs)—to increase women's share in the labor force.

## 2. Bargaining power and time allocation

In many societies, women specialize in family care, while men are responsible for providing food and market income for the household. Furthermore, in some contexts, it is implicitly assumed that a woman should stay home whenever a relative is sick or perform specific domestic chores (Becerra, 2021; Castillo, 2022; Doss, 2003). Although it is a complementary division of tasks, it leaves women in a weak negotiating position in the family and society (Folbre, 2018, p.6). The time allocated to these activities imposes costs in the form of financial obligations, loss of opportunities, and foregone wages. However, it also generates intrinsic rewards, strong family and social ties, and high-quality services for

dependents (Folbre, 2006).

A consensus exists in the literature about the negative relationship between bargaining power and time spent on housework (Foster, 2018; Hersch, 1994; Kan, 2010, 2018, p.484). Housework is generally assumed to be a "necessary evil," or it is not considered of any social value (Amarante, 2018). Therefore, whoever has less power within the home, lower opportunity cost, or fewer resources will allocate more time to housework (Evertsson, 2014; Stratton, 2012; Sullivan, 2016, p. 606). Therefore, income levels and gender wage differences become essential in determining housework time (Stratton, 2015). As household chores are considered a necessary evil, an increase in leisure time can be associated as an indicator of power (Datta Gupta, 2010), as leisure is considered a normal good. Besides, evidence exists of the complementarity of leisure time between partners within the same household (Connelly, 2009). Even when earnings are comparable among partners, women spend, on average, more time on housework than men (Stratton, 2015). This is important because if individuals allocate more time and energy to housework, they will have less time and energy to allocate to the labor market and, consequently, earn less money (Stratton, 2015).

Data from Australia and the United States show that a woman reduces her time allocated to domestic chores as her income increases. In contrast, the man in the same household increases his time allocated to these activities, but only to the point when there is equality in the co-contribution to household earnings; subsequently, the man decreases his time allocated to domestic chores, while the woman does the opposite (Bittman, 2003). Studies in Australia, Denmark, and the United States (Baxter, 2013; Datta Gupta, 2010) show that a relative contribution to family income is more critical than an absolute contribution to family income for the allocation of domestic chores and that the higher the market wage rate is, the lower the time allocated to domestic chores by women will be (MacPhail, 2007). In addition, greater bargaining power (i.e., potential income) implies less time allocated to housework activities for men and women (Kan, 2010). Furthermore, Malathy (Malathy, 1994) found a negative impact of women's educational level on allocating time to domestic production activities. In China, husbands with more bargaining power (difference in year of schooling with respect to their partner) spend less time on housework and more time in the labor market. Paradoxically, this educational gap does not influence the time women allocate to domestic work. Likewise, having children increases domestic work time for both partners; however, women significantly increase their time allocated to it (Fengdan, 2016). Recent evidence indicates that more educated men are more willing to allocate time to housework (Hamplová, 2019).

Different economic models have tried to understand the underlying household decision process regarding time allocation. The simplest and pioneer model in this area is the unitary model. In this model, household decisions are driven by the "altruistic preferences" of a single decision-maker with enough power to impose a behavior on all family members according to their preferences (Becker, 1965; Samuelson, 1956). Some alternative models are those based on game theory (Manser, 1980; McElroy, 1981), and collective models (Chiappori, 1988, 1991, 1992). For the game theory models, time allocation is achieved through a Nash solution of a two-person non-zero-sum game. In contrast, for collective models, a household is a group of individuals, each with their preferences, and among whom a collective decision process occurs (Bourguignon, 1992). These models assume that family members have different bargaining power (Alderman, 1995). Thus, agreements in the family will be reached through the so-called "sharing rule" (for more details about collective models, review (Browning, 2014)). In these models, bargaining power is represented by the different preferences and options the couple can resort to if the relationship does not work out. The level of negotiation will then be determined by the force that these options present, such as having a well-paid job, divorce laws, effective control of assets, or the absence of dependents to support or care for (Benería, 2016).

We found eight studies explicitly covering the role of bargaining power in intrahousehold time allocation (Table 1); most of them were conducted in developed countries. They mainly analyze time allocation on weekdays and/or weekends. A particular case analyzes time allocation throughout the life

cycle using panel data (Kan, 2010). The most analyzed case is the dichotomy between the time spent on paid and unpaid work. In these instances, unpaid work includes housework, leisure, study, and personal care time (Baxter, 2013; Bittman, 2003; Fengdan, 2016; Foster, 2018). A few studies include other categories, such as leisure time, study time (Chang, 2016; Datta Gupta, 2010; Kan, 2010), and paid work (Bittman, 2003). For example, Kan & He (Kan, 2018) split unpaid work into housework, routine housework, nonroutine housework, and care time. All studies used ordinary least squares (OLS)-type regressions (OLS, 2SLS, and GMM), and the bargaining measures were related to relative income and relative education (RE).

Table 1: *Studies covering bargaining power and time use*

| Study | Country | Reference period | Activities | Estimation Method | Bargaining Measure |
|---|---|---|---|---|---|
| Bittman et al. (2003) | Australia & USA | weekly, a dummy for weekend | Housework and paid work | OLS | wife´s relative income |
| Datta Gupta & Stratton (2010) | USA & Denmark | workdays/non-workdays | Housework, leisure | OLS | relative earnings and relative education |
| Kan & Gershuny (2010) | UK | life cycle data | Consumption and leisure, sleep and rest, care and other domestic works, routine housework, paid word | OLS | relative potential income |
| Baxter & Hewitt (2013) | Australia | week | Paid work, housework | OLS (Panel) | relative and absolute earnings |
| Fengdan et al. (2016) | China | week | Housework-care/market work | SUR/OLS | education gap-squared between spouses/age gap-squared between spouses/relative income |
| Foster & Stratton (2018) | Australia | week | Paid time, housework time | OLS/2SLS | significant labor market events |
| Kan & He (2018) | China | workdays | Total housework, routine housework, nonroutine housework & care work | OLS | relative income and working time |
| Lise & Yamada | Japan | week | Market hours, home hours, leisure hours | GMM | relative private consumption, leisure time, home hours, market hours, public expenditure, and relative wages |

## 3. Measuring intrahousehold bargaining power

There is no consensus in the literature regarding how to measure intrahousehold bargaining power (IBP) nor which indicators best approximate the relationship between IBP and the decision-making process (Conference of European Statisticians, Vilnius, Lithuania). This is explained by the methodological ambiguity existing in the literature on how to represent intrahousehold decision-making (Roy Chowdhury, 2018) and the diffuse nature of the concept (Laszlo, 2020).

However, it is possible to distinguish three proxy categories of bargaining power, namely, income and employment, assets, and human capital (Doss, 2013). The outcomes related to income and employment, such as salaries and relative salaries, are the most used. Proxies related to assets, including land and houses, have been found relevant within subsistence economies (Agarwal, 1997; Udry, 1996). Concerning human capital as a proxy of bargaining power, a partner's education is usually the most used. This proxy is more exogenous than monetary measures because many people complete their education before entering a relationship (Datta Gupta, 2010; Thomas, 1994, p. 329). It is also possible to identify other processes within the home as proxies of bargaining power, such as the ability to decide on the sale of properties or the household budget (Doss, 2013; Duflo, 2003; Schaner, 2017; Thomas, 1990, p. 65). Although these measures attempt to capture intrahousehold relationships, some factors that play important roles are not considered, such as cultural roles or psychosocial factors (Laszlo, 2020).

# 4. Material and methods

## 4.1. Data

We used data from the first wave of the national survey of time use (ENUT by its Spanish acronym), which is a cross-sectional national survey for 2015. The objective of this survey is to characterize how people aged 12 years or older spend time on different activities focusing on work and personal activities. The sampling involves the urban area of the country regions, considering those municipalities that account for 85% of the total national population. The survey was designed with a reference period corresponding to two days assigned to the dwelling from the sample design, one labor day (weekday, Monday to Friday), and one weekend day (random) to measure household members' activities. The unit of measurement of time corresponds to the hours dedicated to a particular activity (de Estadísticas, 2016).

The categories of time use considered are *working time* (including time spent on paid work and commuting time), *care time for members of the household* (including caring for persons that need permanent healthcare, i.e., children between 0 and 14 years old, and older adults), *housework time* (including meal preparation, house cleaning, cleaning and caring of clothes and footwear, home maintenance, administration, household supply, and pet care), *education time and learning activities* (including assistance to the educational establishment and other learning activities), *time for leisure and social life* (including social life activities; attendance at events, games, sports; and use of communication media), and *time in personal care*. This last category includes two types of largely unavoidable activities: first, physiological needs, such as sleeping, eating (breakfast, lunch, and dinner), showering, dressing, and grooming; and second, other activities, such as going to medical or dentist appointments, attending therapy, undergoing medical tests, and traveling to medical centers. Finally, the sample of 7,978 individuals considers heterosexual couples living together, as declared in the survey.

We cleaned the data by eliminating inconsistent observations, for example, cases where the sum of time used during a day exceeded 24 hours, mainly due to the self-reporting of the respondents; to do this, we applied a proportional adjustment to the daily times declared, following (Jara-Díaz, 2017a). We also dropped around the upper 1% of the sample in each time use category. Those who did not provide information on their time use and those who showed income imputation were omitted. Furthermore, our analysis did not consider activities that could be conducted in a nonexclusive manner, such as "listening to the radio" or "using the computer to consult information and surf the Internet."

### 4.1.1 Dependent variables

Figure 1 shows the average time allocation for different activities, split by gender. Time allocation differs in certain activities by gender and type of day, that is, weekdays versus weekends.

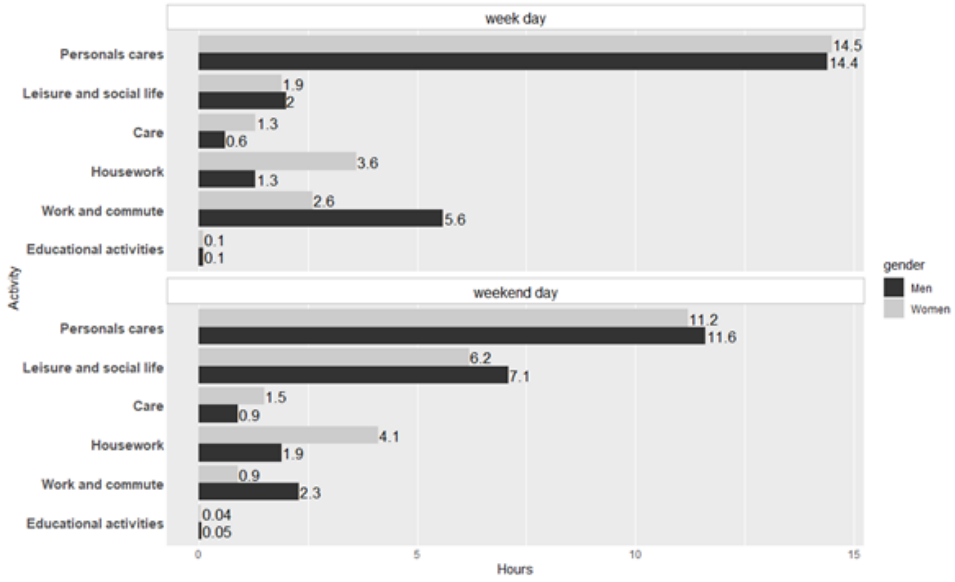


Figure 1: *Average time allocation by categories of time use, gender, and time context.*

The average time allocated to men's and women's daily activities suggests similar personal care, leisure, and education behavior. The main difference is the tradeoff between housework (and care) and paid work. On average, the highest amount of time is dedicated to personal care. This result is expected as this category includes physiological needs (such as sleep). The least amount of time is allocated to education. The most relevant difference between weekdays and weekends is the increased time allocated to leisure activities and decreased paid work time.

### 4.1.2 Explanatory variables

We used two types of explanatory variables: 1) IBP variables and 2) individual and household characteristics (Table 2).

**IBP variables:** We used two continuous bargaining power measures: 1) *Relative Education:* $RE = \frac{E_w}{E_w+E_m}$, where $E_w$ and $E_m$ represent the education level of women and men, respectively, measured in years; and 2) *Relative Wages:* $RW = \frac{W_w}{W_w+W_m}$, where $W_w$ and $W_m$ represent the wages of women and men, respectively. These measures of power are considered relative measures of women's empowerment at home.

**Individual and household characteristics:** We included individuals' age, the number of children by age range, the number of people living in the household who are not direct relatives (i.e., not a partner, son, or daughter), and the income quintile to which the individual's home is associated. See Table 2 for a definition of the explanatory variables.

Table 2: *Explanatory variables considered in the estimates of the time-use*

| **Explanatory variables** | **Description** |
|---|---|
| **Bargaining Power measures** | |
| Relative education (women) | A ratio of two continuous variables, which indicate the women's education with respect to the education level of her couple |
| Relative Wages (women) | A ratio of two continuous variables, which indicate the women's wage with respect to the wage of her couple. |
| **Individual and household characteristics** | |
| Age | Continuous variable: years of education |
| Not direct family | Continuous variable: indicates the number of people living in the household who are not direct family members. |
| Quintile | Categorical variable: Indicates the quintile associated with the household's individual. One corresponds to the poorest quintile, and five is the wealthiest quintile. |
| Children 0-6 | Continuous variable: number of children between 0 and 6 years old |
| Children 7-15 | Continuous variable: number of children between 7 and 15 years old |
| Children $>$ 15 | Continuous variable: number of children greater than 15 years old |

Author´s elaboration

The descriptive statistics of our bargaining variables show that the educational level between men and women is very similar (mean $RE$ is 0.49); however, $RW$ indicates a gender wage gap, with a mean value of 0.21, which implies that women, on average, receive lower wages than men. The average age of the sample is 48.91 years, which can be disaggregated into a mean of 50 and 47 years for women and men, respectively. The third quintile (middle socioeconomic level) is the average in the sample. The average number of indirect family members per household is 0.43. On average, the number of children between 7 and 15 years old is higher than those below 6 years old and 15 years and older. These statistics are shown in Table 3

Table 3: *Descriptive statistics of explanatory variables*

| **Variables** | **Weekdays** | | **Weekend days** | |
|---|---|---|---|---|
| | **Mean** | | **Mean** | |
| Relative Education | 0.49 (0.12) | | 0.49 (0.12) | |
| Relative Wages | 0.21 (0.29) | | 0.21 (0.29) | |
| Quintile | 2.96 (1.33) | | 2.96 (1.32) | |
| Not direct family | 0.44 (0.96) | | 0.44 (0.97) | |
| Child 0-6 years | 0.29 (0.57) | | 0.29 (0.57) | |
| Child 7-15 years | 0.39 (0.67) | | 0.39 (0.67) | |
| Child over 15 years old | 0.14 (0.36) | | 0.13 (0.36) | |
| Age | 48.91 (15.17) | | 48.96 (15.19) | |
| | **Men** | **Women** | **Men** | **Women** |
| Age | 47.49 (14.99) | 50.32 (15.23) | 47.55 (15.01) | 50.37 (15.24) |
| Observations | 3974 | 3962 | 3996 | 3982 |

Note: Standard deviation in parenthesis.

## 4.2. Econometric Approach

This study used a simultaneous multivariate approach, or generalized corner solution approach, also known as the Kuhn Tucker (KT) model or the multiple discrete-continuous extreme value (MDCEV) model (Bhat, 2005, 2008; Vasquez-Lavin, 2008). This approach considers that people allocate a continuous amount of time (the continuous component of the model) to several, but not necessarily all, activities (corner solution component) in a simultaneous decision process subject to a time constraint (Bhat, 2005, 2008).

This model is a tool to investigate choice behavior under multiple discrete and continuous alternatives and provides an ideal platform for modeling time use decisions (Bhat, 2010). A review of the applications of this model and an analysis of activity time use is found in (Bhat, 2010). When an activity is performed, the model could consider an "outside good" (LaMondia, 2008). In this study, we incorporate *personal care* as an outside good.

The model starts with the definition of an additively separable utility function with an argument $t_k$ (the time allocation for each activity), which could also be zero. The functional form is

$$U(t) = \frac{1}{\alpha_1}\varphi_1 t_1^{\alpha_1} + \sum_{k=2}^{K} \frac{\gamma_k}{\alpha_k}\varphi_k \left\{ \left( \frac{t_k}{\gamma_k} + 1 \right)^{\alpha_k} - 1 \right\}, \tag{1}$$

where $\varphi$ corresponds with the baseline utility and is defined as positive, that is $\varphi_k = exp(\beta' z_k + \epsilon_k)$, where $\beta' z_k$ indicates the alternative's baseline utility and $\epsilon_k$ is the i.i.d. random disturbance, following a Gumbel $(0, \sigma)$ distribution. The first component of the equation points to the outside good. The marginal substitution rate between the two alternatives can be expressed by the ratio of their respective baseline utilities. $\alpha_k$ is a satiation parameter representing the diminishing marginal utility and $\gamma_k$ is a translation parameter (also involved in the level of satiation). It captures possible corner solutions, and $t_k$ is the consumption quantity of alternative $k$, in this case, the $k$ activity of time use. Moreover, $\varphi > 0, \gamma_k > 0$, and $\alpha \leq 1$. The individual maximizes this utility subject to time constraint:

$$\sum_{k=1}^{k} t_k = T,$$

where $T$ is the total amount of time available (24 hours), which must equal to the sum of the time allocated to each activity (Bhat, 2008). Bhat (2008) argues that as $\gamma_k$ and $\alpha_k$ influence satiation in different ways, it is difficult to disentangle their effects. He proposed to normalize $\alpha_k = 0$ for all alternatives to estimate a $\gamma_k$ -profile or normalize $\gamma_k = 1$ for all alternatives to estimate an $\alpha_k$ -profile. Furthermore, Bhat (2018) demonstrates that it is feasible to estimate $\sigma$ scale parameter when $\gamma_k$ -profile is used. Therefore, the utility form in Equation (1) is is modified as follows:

$$U(t) = \varphi_1 ln(t_1) + \sum_{k=2}^{K} \gamma_k \varphi_k ln\left( \frac{t_k}{\gamma_k} + 1 \right), \tag{2}$$

In the first stage, we estimated the MDCEV model with a fixed scale parameter, but the model in Equation (2) outperformed it. Bhat (2008) and Vasquez-Lavin & Hanemann (2008) show that this maximization problem can be solved using the Lagrangian multiplier technique and that the KT conditions (first-order conditions) can be used to build a likelihood function that can be estimated using conventional or simulated maximum likelihood approaches (Train, 2009). The Lagrangian can be expressed as follows:

$$\mathcal{L} = \varphi_1 ln(t_1) + \sum_{k=2}^{K} \gamma_k \varphi_k ln\left(\frac{t_k}{\gamma_k} + 1\right) - \lambda \left[\sum_{k=1}^{K} t_k - T\right], \tag{3}$$

where $\lambda$ is the Lagrangian multiplier associated with the time constraint. Subsequently, the KT first-order condition for the optimal time allocation ($t_k^*$ values) is given by

$$\frac{\epsilon_k - \epsilon_1}{\sigma} = V_1^* - V_k^* \qquad if \quad t_k^* > 0, k = 1, 2, 3, ..., K$$

$$\frac{\epsilon_k - \epsilon_1}{\sigma} < V_1^* - V_k^* \qquad if \quad t_k^* = 0, k = 1, 2, 3, ..., K$$

where $V_k^* = (\beta^*)' z_k - \frac{1}{\sigma} ln\left(\frac{t_k^*}{\gamma_k} + 1\right)$ and $V_1^* = (\beta^*)' z_1 - \frac{1}{\sigma} ln(t_1^*)$ with $\beta^* = \frac{\beta}{\sigma}\beta$ is the parameter vector for the utility specification in Equation (1), and $\beta^*$ is for the utility form in Equation (2) ($\gamma_k$ - profile). Bhat 2008 and Bhat 2018 present a detailed explanation of the econometric estimation process.

Finally, to forecast the implications of different hypothetical scenarios, we use an efficient and computationally fast forecasting algorithm for the model proposed by (Pinjari, 2010). The model starts by predicting the average hours individuals will devote to each activity in the baseline situation (without a hypothetical scenario). Once the model parameters are estimated, scenario analysis solves the utility maximization problem for each decision-maker's optimal consumption quantities. (Pinjari, 2011, p.29) suggest using these predicted values to analyze the model's sensitivity to changes in explanatory variables, or profiles of them, that represent various scenarios. We estimate the proposed MDCEV model using Apollo software (Hess, 2019).

# 5. Results

As the model comprises many components, we present our results analysis in steps. First, we analyze the constant parameters, bargaining power implications, and sociodemographic variables in relation to the time allocation. Second, we briefly explain the translation parameters (satiation) results. Finally, we forecast the time allocation under two hypothetical interventions: 1) not having children between 0 and 6 years old and 2) the increase in women's RW. The bulk of the estimation results are presented in Tables 5 and 6.

## 5.1. Constant Parameters and the Effect of Bargaining Power on Baseline Utilities

The constant parameters (baseline utility) capture the tendency to allocate time to each alternative compared to the base alternative (outside good) (Calastri, 2017; LaMondia, 2008). Each parameter is statistically significant and negative; this implies that most time is allocated, on average, toward *personal care* (outside good). This result is not surprising as our outside good incorporates daily activities such as sleep and personal care.

However, under the MDCEV model, if the coefficient associated with the explanatory variable is positive, the higher the coefficient, the greater the time allocated to the activity. In our specification, two groups of variables influence the time allocation decision: 1) the IBP variables (*RE* and *RW*) and 2) the individual and household characteristics.

For men, a relatively high women's education level only affects their time allocated to work (weekdays and weekends) and leisure (only weekends). In contrast, the impact on their time allocated to other activities is statistically insignificant. For women, a large RE will positively affect their time allocated to leisure activities on weekdays, whereas the effect on the time allocated to other activities is statistically insignificant. Regarding RW, men will allocate more time to housework and less time to work—on both types of days—to increase the time dedicated to care on weekdays and decrease their leisure time on the weekend despite the high relative wage of women. The opposite result is found for women in terms of work time. Moreover, for women, higher RW does not influence housework or leisure time; instead, it increases the time allocated to care and educational activities.

Regarding individual and household characteristics, age is essential to determine whether the time allocation varies throughout the life cycle. This variable is statistically significant in almost every time use category, except for leisure and housework for women. Older individuals allocate less time to each of these activities. Furthermore, the household socioeconomic status will influence the time allocated to different activities. Thus, men who belong to a high-income quintile have a positive effect on the utility of time allocation to each activity, excluding paid work on the weekend. The latter situation is similar for women. Belonging to a wealthy household positively impacts the utility for time allocation of all activities, except for care and housework on the weekend.

Moreover, the number of people in the household who are not direct family members' influence on time use is statistically significant and positive for care and paid work for men and women throughout the entire week. Time allocated to leisure also increases with the number of not direct family members in the house. However, these additional members do not influence the time allocated to housework. Finally, the number of children under 15 years old increases the time dedicated to care, housework, and paid work for both partners during the entire week. Interestingly, children over 15 years old have less impact on their parents' time allocation decisions (few categories are statistically significant). Time allocated to leisure is not consistently significant. However, it has a positive impact when it is significant. Giving time to education is statistically insignificant in almost every category; therefore, we did not discuss them.

Table 4: *Influence of utility parameters of bargaining variables on time use on weekdays by gender*

| | | Men | | Women | |
|---|---|---|---|---|---|
| | Activity | Estimate | Rob. SE. | Estimate | Rob. SE. |
| Baseline utility constants | Leisure | -2.2999 | (0.0363)*** | -2.4462 | (0.0400)*** |
| | Care | -2.5288 | (0.0426)*** | -2.5613 | (0.0459)*** |
| | Housework | -2.4545 | (0.0357)*** | -2.3419 | (0.0413)*** |
| | Work | -2.4534 | (0.0377)*** | -2.9838 | (0.0508)*** |
| | Education | -2.8988 | (0.0985)*** | -2.8676 | (0.1120)*** |
| Leisure | RE | 0.0017 | (0.0439) | 0.1226 | (0.0522)** |
| | RW | 0.0010 | (0.0179) | 0.0305 | (0.0188) |
| | Age | -0.0015 | (0.0004)*** | 0.0002 | (0.0004) |
| | Quintile | 0.0286 | (0.0037)*** | 0.0225 | (0.0040)*** |
| | Non direct family | 0.0066 | (0.0051) | 0.0202 | (0.0057)*** |
| | Children 0-6 | 0.0056 | (0.0095) | 0.0373 | (0.0102)*** |
| | Children 7-15 | 0.0154 | (0.0073)** | 0.0207 | (0.0081)** |
| | Children $>$ 15 | 0.0005 | (0.0130) | -0.0070 | (0.0140) |
| Care | RE | -0.0288 | (0.0521) | 0.0795 | (0.0592) |
| | RW | 0.0698 | (0.0222)*** | 0.1197 | (0.0222)*** |
| | Age | -0.0075 | (0.0005)*** | -0.0073 | (0.0005)*** |
| | Quintile | 0.0337 | (0.0048)*** | 0.0203 | (0.0048)*** |
| | Non direct family | 0.0640 | (0.0065)*** | 0.0885 | (0.0076)*** |
| | Children 0-6 | 0.2025 | (0.0127)*** | 0.3372 | (0.0145)*** |
| | Children 7-15 | 0.1150 | (0.0092)*** | 0.1574 | (0.0098)*** |
| | Children $>$ 15 | 0.0342 | (0.0170)** | 0.0334 | (0.0165)** |
| Housework | RE | -0.0265 | (0.0435) | 0.0808 | (0.0513)*** |
| | RW | 0.1151 | (0.0201)*** | -0.0068 | (0.0192) |
| | Age | -0.0024 | (0.0004)*** | -0.0004 | (0.0005) |
| | Quintile | 0.0269 | (0.0039)*** | 0.0082 | (0.0043)* |
| | Non direct family | -0.0048 | (0.0056) | -0.0011 | (0.0064) |
| | Children 0-6 | 0.0345 | (0.0101)*** | 0.0683 | (0.0108)*** |
| | Children 7-15 | 0.0232 | (0.0075)*** | 0.0565 | (0.0087)*** |
| | Children $>$ 15 | 0.0014 | (0.0133) | 0.0438 | (0.0154)*** |
| Work | RE | 0.0860 | (0.0494)* | 0.1080 | (0.0679) |
| | RW | -0.0749 | (0.0192)*** | 0.6670 | (0.0244)*** |
| | Age | -0.0079 | (0.0004)*** | -0.0059 | (0.0006)*** |
| | Quintile | 0.0547 | (0.0038)*** | 0.0839 | (0.0051)*** |
| | Non direct family | 0.0195 | (0.0055)*** | 0.0231 | (0.0082)*** |
| | Children 0-6 | 0.0362 | (0.0092)*** | 0.0615 | (0.0130)*** |
| | Children 7-15 | 0.0587 | (0.0068)*** | 0.0799 | (0.0096)*** |
| | Children $>$ 15 | 0.0709 | (0.0124)*** | 0.0514 | (0.0183)*** |
| Education | RE | 0.0530 | (0.1174) | 0.0760 | (0.1359) |
| | RW | 0.0440 | (0.0469) | 0.2367 | (0.0538)*** |
| | Age | -0.0123 | (0.0012)*** | -0.0143 | (0.0014)*** |
| | Quintile | 0.0888 | (0.0113)*** | 0.0826 | (0.0120)*** |
| | Non direct family | 0.0238 | (0.0169) | 0.0021 | (0.0161) |
| | Children 0-6 | 0.0175 | (0.0258) | -0.0101 | (0.0307) |
| | Children 7-15 | 0.0741 | (0.0190)*** | 0.0343 | (0.0235) |
| | Children $>$ 15 | 0.0263 | (0.0437) | 0.0016 | (0.0393) |
| LL | | -27050.6 | | -26749.56 | |
| AIC | | 54203.21 | | 53601.13 | |
| BIC | | 54523.72 | | 53921.79 | |
| Obs | | 3962 | | 3974 | |

Source: Author's elaboration. Statistical significance at: 0.01***, 0.05**, 0.1*. Robust standard errors in parentheses.

Table 5: *Influence of utility parameters of bargaining variables on time use on weekend days by gender*

| | | Men | | Women | |
|---|---|---|---|---|---|
| | Activity | Estimate | Rob. SE. | Estimate | Rob. SE. |
| Baseline utility constants | Leisure | -1.5402 | (0.0708)*** | -1.8533 | (0.0563)*** |
| | Care | -2.2706 | (0.0798)*** | -2.2447 | (0.0678)*** |
| | Housework | -1.9877 | (0.0643)*** | -1.8423 | (0.0543)*** |
| | Work | -2.4865 | (0.0839)*** | -2.9713 | (0.1091)*** |
| | Education | -3.3295 | (0.2033)*** | -3.1632 | (0.2521)*** |
| Leisure | RE | 0.1386 | (0.0744)* | 0.0896 | (0.0695) |
| | RW | -0.0596 | (0.0301)** | 0.0121 | (0.0274) |
| | Age | -0.0039 | (0.0007)*** | -0.0026 | (0.0006)*** |
| | Quintile | 0.0362 | (0.0068)*** | 0.0338 | (0.0058)*** |
| | Non direct family | 0.0186 | (0.0092)** | 0.0211 | (0.0083)** |
| | Children 0-6 | 0.0192 | (0.0174) | 0.0545 | (0.0153)*** |
| | Children 7-15 | -0.0038 | (0.0141) | 0.0163 | (0.0123) |
| | Children $>$ 15 | -0.0188 | (0.0241) | -0.0228 | (0.0201) |
| Care | RE | 0.0929 | (0.1077) | 0.1433 | (0.0898) |
| | RW | -0.0133 | (0.0413) | 0.0492 | (0.0355) |
| | Age | -0.0127 | (0.0010)*** | -0.0100 | (0.0008)*** |
| | Quintile | 0.0325 | (0.0093)*** | 0.0076 | (0.0075) |
| | Non direct family | 0.1254 | (0.0131)*** | 0.1224 | (0.0110)*** |
| | Children 0-6 | 0.4220 | (0.0277)*** | 0.4972 | (0.0222)*** |
| | Children 7-15 | 0.1835 | (0.0193)*** | 0.1860 | (0.0152)*** |
| | Children $>$ 15 | 0.0306 | (0.0312) | 0.0057 | (0.0234) |
| Housework | RE | -0.0289 | (0.0803) | 0.1016 | (0.0679) |
| | RW | 0.1012 | (0.0322)*** | -0.0310 | (0.0276) |
| | Age | -0.0036 | (0.0007)*** | -0.0004 | (0.0006) |
| | Quintile | 0.0448 | (0.0073)*** | 0.0037 | (0.0058) |
| | Non direct family | -0.0146 | (0.0108) | -0.0047 | (0.0088) |
| | Children 0-6 | 0.0671 | (0.0187)*** | 0.1003 | (0.0156)*** |
| | Children 7-15 | 0.0330 | (0.0148)** | 0.0632 | (0.0123)*** |
| | Children $>$ 15 | 0.0107 | (0.0268) | 0.0704 | (0.0202)*** |
| Work | RE | 0.3103 | (0.1128)*** | 0.2304 | (0.1431) |
| | RW | -0.1152 | (0.0411)*** | 0.5753 | (0.0402)*** |
| | Age | -0.0093 | (0.0009)*** | -0.0063 | (0.0012)*** |
| | Quintile | 0.0142 | (0.0089) | 0.0253 | (0.0105)** |
| | Non direct family | 0.0310 | (0.0127)*** | 0.0321 | (0.0164)** |
| | Children 0-6 | 0.0332 | (0.0246) | 0.0702 | (0.0293)** |
| | Children 7-15 | 0.0303 | (0.0184)* | 0.0698 | (0.0241)*** |
| | Children $>$ 15 | 0.1015 | (0.0295)*** | 0.0206 | (0.0382) |
| Education | RE | 0.1749 | (0.2136) | 0.2614 | (0.3188) |
| | RW | 0.0317 | (0.1277) | 0.1535 | (0.1149) |
| | Age | -0.0171 | (0.0030)*** | -0.0178 | (0.0030)*** |
| | Quintile | 0.1366 | (0.0272)*** | 0.1188 | (0.0248)*** |
| | Non direct family | 0.0446 | (0.0432) | 0.0547 | (0.0298)* |
| | Children 0-6 | 0.0791 | (0.0673) | 0.0790 | (0.0565) |
| | Children 7-15 | 0.1134 | (0.0433)*** | 0.0369 | (0.0458) |
| | Children $>$ 15 | -0.0229 | (0.1040) | -0.0593 | (0.0986) |
| LL | | -28189.72 | | -27456.98 | |
| AIC | | 56481.43 | | 55015.95 | |
| BIC | | 56802.2 | | 55336.9 | |
| Obs | | 3982 | | 3996 | |

Source: Author's elaboration. Statistical significance at: 0.01***, 0.05**, 0.1*. Robust standard errors in parentheses.

## 5.2. Translation Parameters

From the estimation of the MDCEV model, it is possible to obtain the $\gamma_k$ translation parameters for each category except for the outside good (personal care). The $\gamma_k$ parameters are linked to the corner solutions, as an increase in the value of $\gamma_k$ implies a stronger preference (or lower satiation) for the $k$ good (Bhat, 2008). In the case of time allocation, a high $\gamma_k$ means that it is less likely that a person will choose to assign no time to that activity (Pinjari, 2010). These parameters show how the marginal utilities associated with each alternative decrease. Lower values of these parameters imply faster satiety.

The most likely order of preferences is the same for men and women during the weekend. Work takes the longest time to be satiated, followed by education, leisure, care, and housework activities. The first and second places remain the same for men and women during weekdays. However, for men, the third place is care followed by housework. This order is inverse for women. Finally, leisure time has the fastest satiation for women and men during weekdays (Table 4). These results are linked to the essentiality of activities. (Pinjari, 2010) pointed out that people are less likely to allocate zero time to essential activities. In this sense, reducing the time allocation for work and education is challenging; it is much easier for leisure. Noteworthy, the scale parameters are statistically significant with a value below 1, which means that estimating this model by fixing the scale parameter would produce a worse statistical fit (Bhat, 2018).

Table 6: *Translation parameters of MDCEV model by type day and gender.*

| | Weekdays | | | | Weekend | | | |
|---|---|---|---|---|---|---|---|---|
| | Men | | Women | | Men | | Women | |
| Activity | Parameter | Rob S.E. | Parameter | Rob S.E. | Parameter | Rob S.E. | Parameter | Rob S.E. |
| Leisure | 4.091 | (0.125)*** | 3.969 | (0.124)*** | 5.100 | (0.415)*** | 7.479 | (0.322)*** |
| Care | 5.046 | (0.180)*** | 5.898 | (0.212)*** | 3.997 | (0.254)*** | 5.094 | (0.210)*** |
| Housework | 4.970 | (0.155)*** | 7.085 | (0.228)*** | 2.779 | (0.174)*** | 4.399 | (0.166)*** |
| Work | 93.931 | (6.808)*** | 42.844 | (2.273)*** | 544.920 | (244.740)* | 145.697 | (19.785)*** |
| Education | 15.068 | (1.265)*** | 19.671 | (1.742)*** | 7.874 | (0.926)*** | 9.522 | (1.077)*** |
| Scale parameter | 0.1669 | (0.003)*** | 0.181 | (0.003)*** | 0.311 | (0.012)*** | 0.264 | (0.005)*** |

Source: Author's elaboration. Statistical significance at: 0.01***, 0.05**, 0.1*. Robust standard errors in parentheses.

## 5.3. Forecasting and Hypothetical Scenarios

In this subsection, we evaluate the following scenarios. 1) A household without children from 0 to 6 years old as a proxy for a policy where childcare is available to reduce the time allocated to care. Women typically do not participate in the labor market because they spend significant time on domestic and care activities. Thus, we evaluate how individuals would redistribute their time when their household does not have young children as a proxy to assess free daycare availability. This applies to all individuals with children between 0 and 6 years old, making the equivalent of not having to spend that time 2) increasing *RW* by 50%, 100%, and the percentage necessary to achieve parity. We chose these scenarios because the mean *RW* in the baseline is 0.21; this implies a significant wage difference between men and women. An increase of 50% and 100% increases this mean to 0.32 and 0.42, respectively. These scenarios are meaningful because our objective is to evaluate potential reductions in the gender wage gap. In addition, it is relevant to assess the effect of parity wages; this is reached by moving the average *RW* to 0.5. These policy exercises are performed using the method proposed by Pinjari & Bhat 2010 that evaluates the model's sensitivity to changes in independent variables (Children 0–6 and RW), keeping the rest of the variables constant. Thus, we cannot explicitly capture general equilibrium effects that could occur in a more realistic setting. The time allocation observed and predicted (without a hypothetical scenario) and the predictions in each scenario are presented in Table 7.

The model predicts an average time allocation to *personal care* of 14.39 hours on weekdays for men and women and 11.61 and 11.15 hours on weekends for men and women, respectively. For *leisure activities*, men's average time allocation predictions go from 2.03 hours on weekdays to 7.26 hours on weekends; a similar growth of predicted hours is shown for women (from 1.98 to 6.17 hours). The remaining patterns can be observed in Table 5. The most significant difference in the predicted time

Table 7: *Predicted time allocation for each scenario by gender and type of day*

| | | Observed average time allocation (hours) | Predicted average time allocation (hours) | No Child from 0 to 6 years old | Increase RW 50% | Increase RW 100% | Parity in RW |
|---|---|---|---|---|---|---|---|
| | | | | Weekdays | | | |
| Men | Personal care | 14.44 | 14.39 | 14.52 | 14.43 | 14.46 | 14.51 |
| | Leisure | 1.95 | 2.03 | 2.08 | 2.05 | 2.07 | 2.08 |
| | Care | 0.64 | 0.63 | 0.45 | 0.67 | 0.70 | 0.72 |
| | Housework | 1.31 | 1.31 | 1.31 | 1.39 | 1.48 | 1.53 |
| | Work | 5.55 | 5.53 | 5.52 | 5.36 | 5.18 | 5.05 |
| | Education | 0.11 | 0.11 | 0.11 | 0.12 | 0.12 | 0.12 |
| Women | Personal care | 14.48 | 14.39 | 14.69 | 13.93 | 13.46 | 13.74 |
| | Leisure | 1.89 | 1.98 | 2.05 | 1.84 | 1.71 | 1.77 |
| | Care | 1.32 | 1.29 | 0.80 | 1.21 | 1.13 | 1.22 |
| | Housework | 3.59 | 3.74 | 3.77 | 3.45 | 3.22 | 3.23 |
| | Work | 2.59 | 2.46 | 2.52 | 3.44 | 4.36 | 3.88 |
| | Education | 0.14 | 0.14 | 0.17 | 0.13 | 0.12 | 0.15 |
| | | | | Weekend | | | |
| Men | Personal care | 11.63 | 11.61 | 11.80 | 11.65 | 11.68 | 11.72 |
| | Leisure | 7.14 | 7.26 | 7.40 | 7.23 | 7.19 | 7.17 |
| | Care | 0.97 | 0.99 | 0.61 | 1.00 | 1.00 | 1.01 |
| | Housework | 1.88 | 1.87 | 1.87 | 1.93 | 1.99 | 2.03 |
| | Work | 2.32 | 2.20 | 2.27 | 2.14 | 2.08 | 2.02 |
| | Education | 0.05 | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 |
| Women | Personal care | 11.25 | 11.15 | 11.49 | 11.00 | 10.79 | 11.03 |
| | Leisure | 6.15 | 6.17 | 6.39 | 6.01 | 5.80 | 6.07 |
| | Care | 1.55 | 1.51 | 0.86 | 1.48 | 1.44 | 1.52 |
| | Housework | 4.10 | 4.23 | 4.28 | 4.10 | 3.94 | 4.06 |
| | Work | 0.91 | 0.88 | 0.93 | 1.35 | 1.98 | 1.28 |
| | Education | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |

Source: Author's elaboration. The number of the column is in parenthesis.

allocation between men and women is between housework and paid work. Generally, the predicted and observed time allocations are close and maintain the same magnitude and structure order. Nevertheless, this hypothetical scenario evaluation focuses on changes in the predicted values.

The analysis of a household's hypothetical scenario without children aged 0 to 6 years compared to the initial prediction shows that the predicted hours for men and women increased slightly or did not change in each time use category, except for care. Time allocated to care activities was reduced by 29% and 38% on weekdays and weekends for men, respectively, and by 38% and 43% on weekdays and weekends for women, respectively. These time reductions are significant and more critical for women than for men. Notably, although the impact is similar for men and women in all activities (e.g., paid work time remains constant for men and increases by 2% for women on weekdays, while on the weekend, the increase was 3% for men and 6% for women), the allocation of time to household-related activities is still greater for women, and the time allocated to paid work is greater for men on weekdays and weekends.

The second hypothetical scenario evaluates changes in *RW*. Here, the time allocated to personal care, leisure, care, and education is virtually equal to the baseline predicted values for men. The notable changes for men are expressed by a slight increase in housework time and a decrease in the time allocated to paid work. These results are similar for weekdays and weekends. For the scenario of a 100% increase in *RW*, there is a decrease in the hours allocated to personal care, leisure, care, and housework for women, with a substantial increase in the time dedicated to paid work, an increase of 77% on weekdays and 125% on the weekend. Time allocated to education, as with men, remains relatively constant.

In the scenario of parity in *RW*, men increase their time in care activities by 14% on weekdays. However, no relevant change occurs on weekends; housework activities increase by 17% on weekdays and 9% on weekends. In comparison, the time spent at paid work decreases by 9% on weekdays and 8% on weekends. However, women decrease time allocated to care activities by 5% on weekdays, and there

is no change on weekends; housework activities decrease by 14% on weekdays and 4% on weekends, while paid work time increases by 57% on weekdays and 46% on weekends. These simulated results show that the scenario associated with increasing women's wages is more effective than reducing the time spent on childcare in increasing women's labor force participation and leisure. However, even with an *RW* of 0.5 (parity), which we use as a proxy of wage equity, women allocate more time to domestic activities (care and housework) than men.

## 6. Discussion and conclusions

We analyzed the relationship between the time allocation of men and women and the IBP during weekdays and weekends, using the MDCEV model proposed by Bhat 2005; 2008; 2018 with data from a national urban survey in Chile in 2015. This model allows us to incorporate, using a demand model, the continuous dimension of time allocation to different daily activities.

We found a relationship between bargaining power indicators (mainly RW) and their time allocation on weekdays and weekends. Our results align with the literature, particularly the inverse relationship between the time allocated to housework and paid work, subject to gender and relative wage (Bayudan, 2013; Bittman, 2003; Foster, 2018; Kan, 2010, 2018; MacPhail, 2007; Stratton, 2012, 2015).

Age, income quintile, the number of indirect relatives living in the household, and the number of children in different age groups affect an individual's time allocation. Some key findings are as follows. 1) As an individual gets older, they allocate less time to each time activity compared to the time allocated to personal care. This aligns with the findings of Bredtmann 2014 and Kan & Gershuny 2010. 2) Women in wealthier households get more utility when dedicated to paid work (Bredtmann, 2014), leisure, care, housework, and education during weekdays. Their preferences for allocating time to care or housework are inconclusive on the weekend. 3) The number of indirect relatives in the household increases the time allocated to care, work, and leisure for men and women throughout the week. 4) The number of children in a family mainly increases the time allocated to care, housework, and paid work for both genders, and the latter aligns with Bredtmann 2014 and Fengdan et al. 2016.

The hypothetical scenarios tell us two things. First, although the scenario that simulates not having infants at home reduces home care time and implies a redistribution of time to other activities, it does not necessarily mean that women will spend more time working. This could indicate that cultural factors limit women's labor force participation (Contreras, 2010). This scenario simulation probably does not entirely capture a childcare availability policy because not having children at home eliminates the total hours spent caring for them. However, this scenario can be considered an upper bound of the possible effect of that policy. The simulation shows that not having to spend time caring for children will unevenly impact women and men. Recent evidence indicates that the first child's birth strongly increases working mothers' informality and decreases employment, hours worked, and work earnings (Berniell, 2021). Our results could capture a slight transition from informality to formal employment due to the increased hours of paid work.

The second implication of the hypothetical scenario analysis is associated with changes in time allocation by gender as women's RWs increase. By increasing women's RWs, they allocate their time to paid work activities and decrease unpaid work, including leisure time. This indicates that to the extent that significant financial compensation concerning the household exists, participation in paid work activities will be increased. Even though women have bridged the gap between paid and unpaid work, they continue to spend more hours on domestic activities than men. An important finding is that even in a household wage parity scenario, women spend more time on domestic activities than men. These findings are similar to those of Bittman et al. 2003 and Lise & Yamada 2019. A parity situation in the contribution to household income does not imply that women will find themselves in an improved scenario in which they reduce their time assigned to housework activities.

In summary, our hypothetical scenarios show that a policy linked to reducing the time dedicated to caring for children could enhance the time allocated to women's paid work. Nevertheless, increasing women's bargaining power in wage terms improves their potential labor force participation. Moreover, we show that time allocation also depends on household and individual characteristics, such as age, household wealth, the number of indirect relatives living in the household, and the number of children.

We show that using a demand model, such as the MDCEV model, allows us to simultaneously consider several activities, improving our understanding of individual behavior, which differs substantively in methodological terms from the existing literature presented in our work. This can help design policies to encourage or discourage the time allocated to specific activities. The results, in general terms, agree with the mainstream literature and add to it by showing that the effect of the relative power level in time allocation depends on the type of day and gender (Bayudan, 2013; Datta Gupta, 2010; Fengdan, 2016; Kan, 2018).

As a limitation of our work, we recognize that the relative measures of bargaining power used here could be weak indicators of power relationships (Hamplová, 2019). This issue requires further research to investigate the complexity of the concept (Laszlo, 2020). Therefore, it is essential to consider more robust measures to quantify these intrahousehold relationships in future analyses. Exploring different bargaining measures could help the decision-making process related to women's labor force participation. Another limitation is that we are not dealing with a potential simultaneous endogeneity between time allocation and bargaining power. The literature on discrete and continuous decision-making has yet to develop or adapt techniques to address endogeneity in these models. Therefore, it would be inaccurate to establish causal links between IBP and time allocation. Instead, our findings refer to the correlation between these (and other) variables. Furthermore, it would be interesting to analyze the correlation between activities in an MDCEV context; this may give us an even more complete view of time allocation decisions and bargaining power. Finally, evaluating hypothetical scenarios relies on a forecasting method that does not account for complex relationships between variables; therefore, it should be considered a mere approximation of what could occur.

**Compliance with ethical standards**

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