Gender differences in time allocation to paid and unpaid work: Evidence from Urban Guatemala, 2000-2014

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23 May 2020

Gender differences in time allocation to paid and unpaid work: Evidence from Urban Guatemala 2000-2014*

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Abstract

This paper examines the effects of individual and household characteristics on time allocation decisions for both women and men, and how these effects have evolved in Urban Guatemala using data from the National Survey of Living Conditions (2000 and 2004). We built a multivariate Tobit to model the decision of individuals to allocate time, distinguishing between three different types of time uses: housework, childcare, and paid work. The results reveal that time allocation is strongly determined by gender. For both periods, on average, women devote more time to housework and childcare than men, while men spent more hours in paid work than their counterparts. Although offering fewer hours of paid work, women frequently accumulate both unpaid and paid work, while men specialize in market work. Moreover, women's time allocation is more responsive to individuals and household characteristics than men in both periods. Finally, we find that educational attainment plays a central role in shaping how individuals allocate their time between market and non-market activities, especially for women. For instance, while housework time is negatively associated with education level, time devoted to childcare increases with instruction.

Keywords: time use, gender, housework, childcare, paid work, Guatemala

JEL: D1, D13, J22, O54

* A previous version of this paper was part of Ilya Espino's doctoral dissertation at the Federal University of Minas Gerais (UFMG), 2020.

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1 Introduction

As a limited resource, an individual's time is allocated optimally between domestic work, market work, and leisure (Becker 1965; Gronau 1977). The time allocated to unpaid and paid work varies substantially across individuals, but the most notable disparities observed are gender-related. Women have increased their participation in the labor force considerably and reduced the amount of time spent on housework. In contrast, men have increased their hours in housework and childcare over the past several decades. Nevertheless, gender inequalities in unpaid and paid work have persisted over time (e.g., Sayer, Bianchi, and Robinson, 2004; Sullivan, 2011; Sayer 2016). In addition to being actively part of the labor force, women are also expected to comply with their family responsibilities regarding housework and childcare, which leads them to a "double-shift" of work (Sayer et al. 2009; Benería, Berik, and Floro, 2015). In this regard, gender differences in the time allocated to non-market and market work are substantial, with consequences in many areas of women's and men's lives.

In the last decades, examining the gender differences in time allocation has been under scholars' attention. Such studies have provided important insights to analyze the impact of the gender gap in time allocation on gender inequalities in the labor market, and they have also shed light on the invisibility of the unpaid work done mostly by women. Furthermore, time-use studies have provided evidence about the influence of individual characteristics and household attributes, among others, age, education, and economic situation on time allocation decisions between non-market and market-related activities. Therefore, findings in this line may help to implement public policies that improve the well-being of women and their families, especially in developing countries (see Campaña et al. 2017, 2018, 2020 for Latin countries). Notably, in Guatemala, female participation in the labor market is lower than in other Latin American countries. Guatemalan women continue to assume the largest share of unpaid work, as Guatemala reports one of the most unequal distributions of time-use across developing countries (Rubiano-Matulevich and Viollaz, 2019).

Personal characteristics and household composition can affect gender differences in time allocation to paid and unpaid work. Although gender patterns in time allocation vary over the life

cycle (Anxo et al. 2011; Kongar and Memiş, 2017), men spend longer hours in the market and devote less time to unpaid household tasks than women in all stages of the life cycle (Anxo et al. 2011). Several empirical studies have found that female education is positively associated with time allocated to market work (Kalenkoski et al. 2005; Lawson 2007; Bianchi et al., 2014) and childcare (Gracia, Ghysels, and Vercammen 2011; Pasqua and Mancini, 2012). However, highly educated women spent significantly less time on domestic chores than their peers with lower levels of educational attainment (Sullivan 2010). Meanwhile, highly educated men spend more time with childcare than lower educated individuals (Giménez and Molina, 2013; Gracia, 2014).

The household structure also affects the time spent in unpaid and paid work for each member of the household. Young singles living with their parents usually do the lowest share of unpaid work, but even in this case, women do more than men (Anxo et al., 2011). The number and age of children in the household affect the amount of time devoted to housework and childcare. For instance, Yeung et al. (2001) observe that on a typical weekday, infants and toddlers (aged 0-2) have their fathers accessible to them in all activities for a little more than 3 hours. However, as the child's age increases, this level of involvement decreases to 2 hours and 15 minutes for those aged 9-12.

On the other hand, few studies have analyzed childcare and housework separately. In this regard, some studies have highlighted the importance of analyzing household and childcare tasks as specific activities (García et al., 2011; Sullivan, 2013), considering that their nature and predictors differ (Bianchi and Raley, 2005; Mannino and Deutsch 2007). Bloemen et al. (2010) modeled simultaneously three different time uses (paid work, childcare, and housework) for Italian couples. They conclude that partners' time allocation is sensitive to individual and household characteristics. In particular, educational level, the number of children, and the age of youngest child. Pasqua and Mancini (2012) also use a simultaneous approach to analyze how parents allocate their time between work, domestic tasks, "basic" childcare, and "quality" time with children in Italy. They find that women's time allocation is more responsive to family's and individual characteristics in comparison with men.

In this context, the contribution of this paper to the existing literature is twofold. It examines the effects of individual and household characteristics on the time allocation decision for both women and men, and how these effects have evolved in Urban Guatemala. Second, an important distinction of this paper is that unpaid work time is divided between housework and childcare. In this respect, we would expect that the time spent in household activities is not equally distributed across family members. Thus, three types of activities are distinguished: housework, childcare, and paid work. For this task, we model the decision for both men and women to allocate time to housework, childcare, and paid work simultaneously, using a multivariate Tobit Model. Here, household members decide what resources to devote to household production at the same time as they decide whether participating in the labor market. Therefore, the correlations might be explained by women accumulating both types of work, and specialization of men in the market work.

For the empirical analysis, we use the National Survey of Living Conditions (Encuesta Nacional de Condiciones de Vida-ENCOVI) from 2000 and 2014. The ENCOVI is not a Time-Use Survey, but it is representative of the Guatemalan population; its questionnaire contains sociodemographic information, and a module of time use as well. The time questionnaire is filled for all the members of the household aged 7 or over. The datasets allow us to compare time allocation decisions of the members of the household, and therefore examine discrepancies in the gender division of labor in all household types, using individual and household characteristics as control variables. We find that time allocation is largely determined by gender. For both periods, on average, women devote more time to housework and childcare than men, while men spent more hours in paid work than their counterparts. Our findings also show that women's time allocation is more responsive to individuals and household characteristics for both periods.

The paper is structured as follows. Section 2 reviews previous literature. Section 3 describes the data. Section 4 presents the empirical approach. Section 5 discusses the main results. Section 6 concludes.

2 Background

Three theoretical perspectives on the gender division of labor have dominated the literature (Bianchi et al., 2000). The first, the time availability perspective, argues that allocation time on domestic activities is related to the amount of time available for each family member and that hours spent on market work can constrain the capacity to respond to domestic demands (Coverman, 1985). The second, the relative resources perspective, suggests that the division of labor in a marriage depends on bargaining power between spouses. This power derives to some extent, from resources that reflect general socioeconomic status in society such as education, earnings, and occupational position (Becker, 1991). The third, the gender perspective, argues that the number of hours spent by women in household chores is higher than the undertaken by men because society automatically associates housework and gender (Greenstein, 2000). The three perspectives described above have been tested and predicted the unequal division of labor between men and women across countries. Nonetheless, the time availability and relative resource perspectives have received strong criticism by feminists, who argue that the division of labor is not a simple tradeoff between the time spent in market and non-market work (Hochschilds 1989). Moreover, men have increased their time in unpaid activities, but this has not compensated for the change in hours worked by women (Bianchi et al. 2000). Later, Goldscheider, Bernhardt, and Lappegard (2015) pointed out that female participation in labor markets has risen steadily. Nevertheless, there has been only a slight change in the division of unpaid invisible labor.[1]

Most studies have been applied to restrict samples of couples. However, each of the three perspectives can be adapted to apply to men and women in all household types (Shelton 1992). Previous empirical studies show how diverse factors such as age and education attainment, and household composition can affect the allocation of time. The gender gap exists at any stage of the life course, although it is usually smaller at the two ends of the age distribution and larger with parenthood. Particularly, men spend long hours in the market work in all stages of the life cycle (Anxo et al., 2011). Apps and Rees (2005) suggest that while domestic work excluding

[1] Goldscheider, Bernhardt, and Lappegard (2015) developed the framework of two halves of the "gender revolution." The first half refers to the dramatic rise in labor force participation among women and the second to the increased involvement of men in the private sphere of home and family.

childcare tends to rise with age for both females and males in Australia and the United Kingdom. In Italy, France, and Sweden an increase in the number of hours devoted to housework and care by men is positively associated with retirement (Anxo et al., 2011).

Education plays an important role in the allocation of time. Several empirical studies have found that female education is positively associated with the time allocated to market work (e.g., Kalenkoski et al., 2005; Bianchi et al., 2014). However, highly educated women tend to spend less time on domestic chores than women with lower levels of educational attainment (Sullivan, 2010). Educational attainment also affects time spent on childcare. Consistent with this argument, several researchers have found that parents with different education levels spend substantially different amounts of time on childcare in the United States--highly educated parents spend more time on care activities with their young sons (e.g., Guryan et al., 2008; Sullivan 2010). College-educated mothers devote more time to childcare than their lower educated counterparts in Flanders, Spain, and in the United Kingdom (Gracia, Ghysels, and Vercammen, 2011). For instance, mothers with a college education or greater spend roughly 4.5 hours more per week on childcare than mothers with a high school degree or less (Guryan et al., 2008). Meanwhile, the comparative study by Sullivan, Billari, and Altintas (2014) notes that most young educated men dedicate more time to childcare and household tasks in 13 European countries.

Futhermore, the presence of children in the household affects positively the time allocation to paid work by men (Connelly and Kimmel, 2010). While it reduces the time a mother spends in the labor market (Kalenkoski et al., 2005) and increases the average hours in domestic work (Craig and Bittman, 2008). The number and age of children also impact the time use of parents. For example, women increase by 3-6 hours per week, depending on whether or not they have their first child and the number of children they have, whereas men do not appear to adjust their housework hours except among fathers who have another child, among whom housework hours decrease by about one hour per week in Sweden (Boye, 2008).

Large households tend to demand more home production (Stratton, 2015). Furthermore, care activities demand time and are potentially costly, which may lead to a rearrangement of

employment schedules, unpaid leaves (Bianchi et al., 2006) or a reduction in working hours (Molina 2015). In other cases, childcare can also be provided informally within the family. As a result of the aging of the population, children are more likely to spend time in a three-generation family household, in which they co-reside with their parents and grandparents (Mare, 2011). Grandparents and siblings do play an important role in childcare (Hank and Buber, 2009). Thus, the presence of other family members in the household would likely affect the amount of time spent by parents with their children.

The empirical literature on this topic is limited for developing countries.[2] Nonetheless, this is consistent with the results from studies in the developed world. Although female participation in the labor market has increased in recent decades in almost all developing countries, women continue to assume the largest share of unpaid work. For instance, Milosavljevic and Tacla (2007) report that on average, men spend less than one hour in domestic activities, while they allocate one and half hours in childcare per day. In constrast, women spend their time mostly on housework (6.5 hours) and childcare (5 hours) in Guatemala. The recent study by Rubiano-Matulevich and Viollaz (2019) documented that Iraq, Guatemala, and Mexico have the most unequal distribution of time in a sample that included 19 countries. Furthermore, in these countries, the average gender gap considering four activities (unpaid domestic work, personal care, market work, and leisure) is 2.7 hours per day.[3]

In addition, Lawson (2007) finds that individuals who have university degrees undertake far more formal employment hours per day but spend less time cooking and cleaning and hardly ever gather firewood in Lesotho. In Turkey, men work longer hours in the marketplace and spend less time on unpaid domestic activities in all stages of the lifecycle (Dayıoğlu and Kırdar, 2010). Employed men work long hours in Turkey--the difference is the highest (3 hours) among parents of preschool children (Kongar and Memiş, 2017). Otherwise, Canelas and Salazar (2014)

[2] One of these reasons is that time-use surveys have carried out in developing countries by the end of the 1990s (Rubiano-Matulevich and Viollaz 2019). However, only a few Latin American countries have conducted these surveys. Generally, this basic module of time use is incorporated into the Continuous Household Survey (Milosavljevic and Tacla 2007).

[3] This study uses harmonized data from 14 stand-alone time use surveys and 5 household surveys with time use modules collected between 2006 and 2014. In particular, Guatemala data was retrieved from ENCOVI (2011). In addition, the difference between women and men is calculated as the absolute value of the average gender gap across activities (Rubiano-Matulevich and Viollaz, 2019).

find that women undertake most of the domestic activities of households. Particularly, the presence of children, one additional infant (0-5 years old) in the household increases the time spent by women on domestic activities by more than double the effective increase of their partners in Bolivia and Ecuador, while this does not an effect in the Guatemalan sample. Some scholars have supported the time poverty concept. For instance, Bardasi and Wodon (2010) show that working long hours is usually positively correlated with the poverty level of the household in Guinea. For Guatemala, Gammage (2010) f that an investment in small infrastructure and ownership of an electric or gas stove has the potential to alleviate women's time burdens and making their unpaid household work more efficient.

3 Data

Our analysis is conducted using data from the National Survey of Living Conditions (Encuesta Nacional de Condiciones de Vida, ENCOVI, for its acronym in Spanish) carried out by the National Institute of Statistics (Instituto Nacional de Estadísticas-INE) in 2000 and 2014. This is not a Time-Use Survey, but it includes a random sample with national coverage. Generally, ENCONVI collects sociodemographic information about the household respondents, including education, migration and social programs, expenditure, access to technology, sources of incomes (in cash and in-kind), employment and unemployment, and a module of time use. The time questionnaire is filled for all the members of the household aged 7 or over. Despite some minor divergence, both surveys should be compatible and comparisons over time can be derived using a set of harmonized variables. The original sample contains information of 37,771 individuals from 7,276 households for 2000 and 54,822 individuals from 11,536 households for 2014.

We restrict our analysis to the urban area because labor market characteristics in the rural area may differ in terms of productivity and remuneration in Guatemala.[4] The sample is restricted to individuals aged 15 and over who live in nuclear families either as a couple or alone. Borders, domestic workers, and individuals from which there is any missing value in the variables used in this study are excluded. The final sample for 2000 contains 5,233 women and 4,466 men, while

[4] While the urban population accounted for 38 percent of the total population in 2000, this ratio rises by 12 percent in 2014.

the 2014 sample comprises 8,219 women and 7,226 men.[5] In addition, sampling weights provided by the survey are applied.

The survey reports directly the time spent on paid work and childcare, while housework time is computed as the sum of the main activities (house cleaning, cooking, laundry washing, ironing, dishwashing, water collecting, and wood collecting) that are coded by respondents. Household members report data for a weekday in the case of paid work while unpaid work is provided in hours per week. Therefore, the data are standardized to a weekly frequency. Thus, to examine gender differences in unpaid and paid work, we construct three dependent variables: *housework, childcare*, and *paid work*.

The covariates are grouped into two categories, namely individual and household characteristics. The individual characteristics include a dummy variable to identify the indigenous population (in urban areas, the indigenous population comprised around 24.83 percent in 2000 and 29.01 percent in 2014). In order to map the life cycle, three age groups are distinguished: 15-24, 25-39, 40-59, and 60 and over. Educational attainment is presented for four main categories: no education, primary, secondary, and tertiary. The time allocated to housework, childcare, and paid work varies substantially across individuals and within the household where each person may have different responsibilities. Regarding living arrangements, a variable named "relation" is constructed and categorized into five groups: head household, spouse (partner), son (daughter), son-in-law (daughter-in-law), and other relatives (grandson/granddaughter, parents-in-law, among others).[6]

In terms of household attributes, we include the household size as a control variable. The average Guatemalan household consisted of 5.36 people in 2000, while in comprised about 5.21 people in 2014. Generally, adults face responsibilities for caring for both young children and elderly parents. The presence of children also increases the time spent on housework. In this regards, two continuous variables are added: the number of children under 5, and the number of persons aged 60 and over--when they typically become economically inactive. Market work is the most

[5] Dropped observations with missing values represent less than 1 percent of each year's survey.
[6] On average, 28 percent of the Guatemalan population lives in multigenerational family households. Meanwhile, the population living in couples with children aged 15 or older reaches 25 percent.

important source of income for most households, but labor income has not been considered because the model may suffer endogeneity problems. Nonetheless, it is possible to use a proxy for the economic situation of the household, a dichotomous variable is then constructed to identify whether the household is poor or not.[7] Finally, some families tend to understand domestic labor in terms of a hierarchy based on relations of class, rather than those of gender, employing others to take care of their children or work at home. However, this study does not control this possible effect because the survey reports only domestic workers who live in their employer's household.

4 Empirical Method

We first explore the data by reporting time use in the three activities: housework, childcare, and paid work for women and men by individuals and household characteristics, as well as changes in the time devoted to these tasks over time. Second, we study simultaneously the time uses using a multivariate Tobit Model.

The model

The decision to allocate time by men and women on paid and unpaid work is modeled distinguishing three types of activities: housework, childcare, and paid work. The main problem that one faces when dealing with data is the presence of zero observations on dependent variables. Such excess weight of extreme values causes biases when the usual linear regression models are used. In order to resolve this, the literature proposes the use of the Tobit Model (Tobit 1958). The structural equation in this model is the following:

$$y_i^* = X_i\beta + \varepsilon_i \quad (1)$$

where; $\varepsilon_i \sim N\ (0, \sigma^2)$, the model expresses the observed level of the dependent variable (y) in terms of an underlying latent variable (y^*).

[7] Poverty status is a variable that indicates if the household is poor or non-poor and is reported directly by the ENCOVI. Poverty is measured using household consumption. For more details about calculations, see INE (2000, p. 3-7). The incidence of poverty in Guatemala is still high. According to the World Bank, the incidence of poverty was 56.19 percent in 2000 and 59.3 percent in 2014 (see the report of these indicators in the Socioeconomic Database for Latin America and the Caribbean, SEDLAC, at Universidad de La Plata and World Bank 2019).

$$y_i = \begin{cases} y^* if \ \ y^* > 0 \\ 0 \ \ \ if \ y^* \leq 0 \end{cases} \quad (2)$$

According to Amemiya (1985), the likelihood function for this model takes the form:

$$L = \prod_0 [1 - \phi(X_i')] \ \prod_1 \sigma^{-1} \phi \left[\frac{y_i}{\sigma} X_i' \alpha\right] \quad (3)$$

Household members decide what resources to devote to household production at the same time as they decide whether participating in the labor market. In this sense, a system of equations with multiple censored variables is presented. Here, it is necessary to consider both censoring and simultaneity. Extensions to the original Tobit Model have been proposed to analyze multivariate censored data in the literature (Nelson and Olson 1978).

These variables are functions of a set of exogenous variables and are simultaneously determined. Then, the equation for each activity can be represented by:

$$Y_{hw}^* = f(X_{hw}) + \varepsilon_{hw} \quad (4)$$

$$Y_{ch}^* = f(X_{ch}) + \varepsilon_{ch} \quad (5)$$

$$Y_{pw}^* = f(X_{pw}) + \varepsilon_{pw} \quad (6)$$

where; $[\varepsilon_{hw}, \varepsilon_{ch}, \varepsilon_{pw} \ ] \sim N\ (0, \sum)$, Y_{hw}^*, Y_{ch}^*, Y_{pw}^* are latent variables associated with housework, childcare, and paid work respectively, and $X_{hw}, X_{ch},$ and X_{pw} represent the common attributes that influence the dependent variables.

The likelihood function of the system of equations in the case in which all activities are censored is given by:

$$L = f(\varepsilon_{hw}, \varepsilon_{ch}, \varepsilon_{pw}) \quad (7)$$

where, f is the probability density function of a multivariate normal function with mean zero and variance $\sum$.

5 Results

4.1 Time use and gender differentials over time (2000-2014)

Table 1 reports the distribution of the time allocated by gender in the three activities. Looking at different groups, various patterns in gender gaps are observed, which seem to be stable over time. As expected, for both periods, on average, women devoted more time to housework and childcare and continued to spend less time in paid work, which leads to women accumulating both types of work while men show specialization in the market work. For instance, spouses and daughters-in-law allocate more time in housework and childcare than the rest of the family members. It is also remarkable that the gender gap in the three activities exists at all stages of the life course, but important differentials are observed at the extreme phases of the life cycle (among the very young and the older individuals): while very young individuals devote less than 22 hours per week to housework, individuals over sixty spend less than 24 hours. As expected, a decrease in working time for older household members is reported.

We also observe differences between educational attainment and the time devoted to unpaid and paid work. For both men and women, the time devoted to housework is associated negatively with the level of education, while childcare time tends to increase with educational level. For instance, in 2000, educated women spent, on average, 4 hours more per week on childcare than women with less education. However, highly educated women decreased their childcare time supply in 2014. Moreover, men with higher education spent, on average, more time in childcare compared to those less educated (2.56 hours in 2000 and 0.6 hours in 2014).

Table 1. Hours per week spent on housework, childcare, and paid work by gender, and various sub groups (2000-2004)

Mean hours per week spent on	Women					
	2000			2014		
	Housework	Childcare	Paid work	Housework	Childcare	Paid work
Whole	22.84	16	19.01	25.37	7.51	16.82
Indigenous population	26.47	16.08	17.04	26.15	7.64	16.17
Relation to head household						
Head	22.88	12.69	25.34	23.32	4.83	24.51
Spouse/Partner	28.72	21.3	17.17	31.72	10.05	13.96
Son/daughter	14.95	9.81	21.04	18.67	4.91	18.44
Son/Daughter in law	27.58	30.19	10.18	29.66	17.65	11.88
Other relatives	15.39	8.86	14.82	18.27	4.64	13.26
Age group						
15-24	17.72	15.76	16.46	21.84	9.12	12.64
25-39	25.81	25.03	22	26.49	11.57	21.65
40-59	26.44	9.6	22.2	28.47	3.39	20.05
60 and over	20.66	5.87	10.48	24.62	2.29	8.34
Table 1 continued						
Educational attainment						
No Education	25.36	14.68	16.05	28.04	5.79	12.72
Primary	25.26	16.63	19.69	27.97	7.98	17.22
Secondary	20.01	15.50	18.93	23.01	8.24	17.29
Tertiary	15.23	19.40	25.79	16.93	5.94	24.22
Household Characteristics						
Poor	26.15	17.7	15.7	24.04	6.12	18.46
Non-poor	21.61	15.36	20.24	27.33	9.54	14.4
Mean hours spent on	**Men**					
	2000			2014		
	Housework	Childcare	Paid work	Housework	Childcare	Paid work
Whole	2.67	3.08	40.14	3.1	2.1	38.4
Indigenous population	3.55	2.64	42.26	2.97	1.88	40.44
Relation to head household						
Head	2.84	3.88	46.33	2.83	2.45	44.02
Spouse/Partner	4.86	4.28	35.92	5.07	1.75	42.01
Son/daughter	2.38	1.70	30.06	3.07	0.93	30.83
Son/Daughter in law	1.71	5.45	49.84	2.29	5.51	48.21
Other relatives	2.55	1.81	31.00	3.32	0.94	27.41
Age group						
15-24	2.45	2.21	31.39	3.05	1.48	30.13
25-39	2.13	5.31	48.15	2.46	3.17	47.21

Table 1. Continued						
40-59	3.00	2.29	46.38	2.82	1.31	45.01
60 and over	4.05	1.46	30.18	4.33	0.78	25.70
Educational attainment						
No Education	3.64	2.14	42.52	3.70	1.13	35.20
Primary	2.72	2.58	44.82	2.93	1.86	42.00
Secondary	2.48	3.45	35.08	2.84	2.13	36.65
Tertiary	1.96	4.70	37.08	2.78	1.69	35.26
Household Characteristics						
Poor	2.96	2.56	43.27	2.92	1.77	37.97
Non-poor	2.56	3.28	38.95	3.04	2.04	39.06

Notes: The table reports the unconditional mean. The ratio of individuals with non-zero values in each time category and the means conditioned on declaring a positive value (percentage of zeros).

Source: Authors' calculation based on ENCOVI 2000 and 2014.

4.2 Multivariate Tobit Model

The multivariate Tobit model allows the simultaneous analysis of the effect of individuals and household characteristics on time allocation for the three activities. In Table 2, we present the results concerning observable individual and household characteristics. In general terms, our findings show that women's time allocation is more responsive to individuals and household characteristics than men's for both periods analyzed. The relationship to the head of the household is only relevant to the time devoted by women. Spouses tend to spend more time on housework and childcare than the rest of the family members. As expected, the time allocated on unpaid and paid work varies across the life cycle. Age has a strong effect on hours allocated to childcare and paid work for both women and men at all stages of life for both periods. However, this is not relevant for the time devoted to housework, except for women aged 40-59.

We find that educational attainment plays an important role in how individuals allocate their time between market and non-market activities. For instance, housework time tends to decrease with education level. Higher-educated individuals spend less time in this activity than their lower-educated counterparts. However, the difference becomes more significant for women at the university level (5 hours in 2000 and 10 hours in 2014) when compared to men at the same level (between 1-4 hours), which becomes notable only in 2014. Important differences in childcare time across educational groups are also observed among men. Higher-educated men spend significantly more time in childcare in relation to those who completed primary school for both

periods. Women's education has a positive impact on their working hours, although this varies according to their education level. Female educated tend to devote more hours to market work compared to those who studied up to primary level. On the other hand, Guatemala comprised an important proportion of the indigenous population. Nevertheless, this variable is only statically significant for women in childcare. In both periods, indigenous women significantly decreased their time devoted to childcare while men tended to spend more time on housework.

Household characteristics also affect time allocation across individuals, as is shown in Table 2. The size household is only statically significant for women in childcare. An additional member in the household decreases the time allocated to childcare by 1.4 hours per week in 2000, and 1.12 hours per week in 2014. The effect of the size household is strongly significant and negative on time devoted to household chores by men. An additional member in the household decreases the time allocated to these chores by 1.6 hours per week in 2000, and almost one hour per week in 2014. Household size has a positive impact on paid work by men, although it is only highly significant in 2000.

In terms of household composition, the number and the age of children in the household affect significantly the time devoted to childcare and paid work by women in both years. Women's time allocation on childcare is associated positively with the number of children under 5. Meanwhile, an additional child (under 5) in the household decreases women's hours of market work by 6 in 2000 and by 3 in 2014. The number of adults aged sixty or over also seems to affect negatively the time allocated by women on childcare in 2014. Given the age structure of the Guatemalan population, childcare supply may be compensated by the demand for adult care in multi-family households, where women and girls are usually the predominant providers of informal care for family members (Addati et al., 2018).

Table 2. Results of Multivariate Tobit Model

Dependent variable	Housework				Childcare				Paid Work			
	Female		Male		Female		Male		Female		Male	
	2000	2014	2000	2014	2000	2014	2000	2014	2000	2014	2000	2014
Individual Characteristics												
Relation to household												
Spouse/Partner	6.81***	10.95***	3.88	11.83***	11.08***	3.95**	2.77	3.16	-22.64***	-28.14***	-12.36**	-5.46*
Son/Daughter	-12.41***	-4.37***	1.17	2.56*	-16.90***	-11.0***	-24.18***	-16.34***	-6.26*	-16.12***	-21.68***	-17.15***
Son/Daughter in law	-1.27	9.23***	-4.74	2.49	13.07**	5.60*	-9.08	6.88**	-24.39***	-37.55***	0.90	-1.52
Other relatives	-10.76***	-5.01***	4.12	0.86	-11.74**	-1.59	-22.08***	-10.12***	-16.30***	-20.94***	-19.65***	-16.59***
Age Group												
25-39	4.90***	-0.6	-2.69	-0.33	8.46***	2.68**	4.11	1.02	14.00***	26.41***	7.34***	12.62***
40-59	5.19***	1.87*	3.07	-0.33	-14.17***	-14.84***	-8.33	-7.81***	10.04***	19.59***	1.06	6.04***
60 and older	1.16	0.7	6.64	4.7**	-23.08***	-18.96***	-23.07***	-8.37**	-17.15***	-18.51**	-17.04***	-18.22***
Educational attainment												
Primary	3.57***	1.41	0.40	4.1 **	-6.45*	0.33	2.01	1.08	6.63**	5.90**	1.26	3.84**
Secondary	3.28**	-1.81*	3.27	-2.73	-2.44	2.89*	11.69**	6.08**	1.23	6.08**	-4.91**	-0.47
Tertiary	-4.90**	-10.06***	-0.92	-3.63	1.79	-1.39	14.05***	5.07**	11.79***	15.90**	-3.30*	-2.72
Ethnicity	5.72***	0.02	9.57***	2.00*	-10.43***	-2.25*	-2.58	-0.27	-1.00	2.52*	1.83	1.15
Household Characteristics												
Household size	0.20	0.21	-1.60**	-0.91***	-1.43***	-1.12***	-1.17*	-8.46**	0.53**	-0.17	1.06***	0.10
Number of children aged under 5 years	0.57	1.42**	1.42	-0.77	27.08***	20.94***	15.84***	12.79***	-5.88***	-3.00**	1.30	1.82**
Number of persons aged 60 and older	1.64*	-1.1*	0.71	-0.21	-1.12	-3.2***	6.92***	-2.87*	-4.69**	5.22***	-2.52**	-0.001
Poor	1.62*	1.87**	-3.51	1.56	-8.55***	4.8***	-11.78***	1.06	-0.67	-4.34**	1.53	-1.32
Constant	10.44***	17.51***	-20.57***	-17.02***	-7.55*	-12.89***	-39.00***	-27.48***	7.27*	-4.96	40.48***	36.4***

* p<0.10; **p<0.05; ***p<0.01

Note: The reference categories are: head, aged 15-24, no education, and non-poor.

Source: Authors' calculation based on ENCOVI 2000 and 2014.

Finally, in both years, poverty status is only statistically significant for the time devoted to housework and childcare by women. Women living in poor families spend more hours on domestic activities as compared to non-poor females. Results are mixed for their childcare time. In 2000, this variable had a negative effect on the time devoted to childcare. In contrast, this effect becomes positive in 2014. Poverty status only seems to affect negatively the time devoted to childcare by men in 2000.

6 Conclusion

This paper contributes to the existing literature by examining the effects of individual and household characteristics on the time allocation decision for both women and men, and how they have evolved over time in Urban Guatemala. We study simultaneously the decision of individuals to allocate time between unpaid and paid work, distinguishing three time uses: housework, childcare, and paid work. The findings provide evidence that time allocation is largely determined by gender. For both periods, on average, women devoted more time to housework and childcare while men spent more hours on paid work than their counterparts, which leads women to accumulate both unpaid and paid work and men to show specialization in the market work.

We also show that women's time allocation is more responsive to individuals and household characteristics for both periods. For instance, spouses tend to spend more time on housework and childcare than the rest of the family members. Gender differences also emerged over the life cycle of women and men. Age has a strong effect on hours allocated to child care and paid work for both women and men at all stages of life for both periods, but this is not relevant for the time devoted to housework, except for women aged 40-59.

Educational attainment plays an important role in the time allocation of individuals between market and non-market activities. Generally, housework time tends to decrease with education level. Higher-educated individuals spend less time in this activity than their lower-educated counterparts. However, the difference becomes higher for women at the university level (5 hours in 2000 and 10 hours in 2014) when compared to men at the same level (between 1-4 hours), which becomes significant only in 2014. Another interesting result is that higher-educated men

spend significantly more time on childcare in relation to those who completed primary school in both years. Educational attainment is strongly more significant for women on paid work for both years. Women's education has a positive impact on their working hours, although this varies according to the education level. Female educated tend to devote more hours to market work compared to those who studied up to primary level. These results clearly point to the strong influence of education on the decision of time allocation, further analysis could discuss the possible implications of these effects. First, gender differentials in time devoted to market work and non-market work reduce with the education level, but they persist even for highly educated individuals. Second, education may be an active instrument of policy-makers, as a potential agent of change in the reduction of inequalities in time use. However, Guatemala still reports low levels of educational attainment in relation to other Latin American countries (UNDP 2015).

Some relevant indications also emerge from the analysis of the household variables in the model. The number of children under 5 in the household affects positively the time devoted to childcare. Meanwhile, an additional child (under 5) in the household decreases women's hours of market work in both years. Besides, the number of adults over sixty seems to affect negatively the time allocated by women on childcare in both periods. Other factors explaining the gender gap are household size and poverty status. An additional member in the household decreases the time allocated to housework by men. Meanwhile, women living in poor families spend more hours on domestic activities as compared to non-poor females.

The results highlight the persistent gender gap in time allocation over time. Despite the female participation in labor markets has risen steadily in recent decades (INE 2014), women continue being primarily responsible for housework and childcare in Guatemala. Similar results have been reported for both developed and developing countries (e.g., Sullivan 2011; Canelas and Salazar 2014; Sayer 2016; Rubiano-Matulevich and Viollaz 2019). Thus, studies focused on time use can contribute to recognizing the invisibility of the unpaid work of women. Generally, women face care responsibilities for both young children and elderly members of households (Ferrant et al. 2014; Addati et al. 2018). Moreover, unpaid care activities demand time, and these are potentially costly, which may lead to a rearrangement of employment schedules. Future research

might address the burden of unpaid care activities, especially, caring for elderly members of family according to family and work patterns.

In summary, the findings presented in this paper indicate that gender differences in time allocation to housework, childcare, and paid work are substantial. Consequently, these gender differences limit access to productive activities and affect negatively the well-being, especially of women, who spend most of their time on unpaid work. Then, our findings may have a large implication on economic policies if time use is incorporated into the labor market analysis and the design of employment policies.

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