

# Time Poverty Feminization and Gender Discrimination in a Developing Country

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## Abstract

In this study, time poverty is considered a form of gender-based discrimination. Our findings provide insight into whether gender-specific factors drive feminization of poverty or whether individual traits or geographic circumstances drive time poverty. Using data from the National Time Use Survey, ENUT (2016–2017), and time poverty estimation by the Colombia National Administrative Department of Statistics, DANE, we estimate a multivariate decomposition for nonlinear poverty between characteristics and coefficients (discrimination). Our findings show that there is approximately 0.023 difference between men and women. We also find that discrimination accounts for 42% (0.009 of 0.023) of the time poverty between men and women. The time poverty gap between men and women in Colombia can be explained by various factors, as age, marital status, employment status, and geographic location.

**Keywords:** Time poverty, Gender inequality, Logit models, Labor economics

**JEL Classification:** J16, J22, I3

## 1. Introduction

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Traditionally, women have been primarily responsible for household activities, which are largely unpaid and include producing goods and services for personal use and care. Time use measurement has allowed us to better understand how individuals divide their time between paid and unpaid tasks and the time they have for leisure and daytime rest. This measurement introduced a new aspect of poverty assessment: time poverty.

A person experiences time poverty when they lack sufficient time for rest and leisure activities due to a heavy workload, whether paid or unpaid ([Bardasi and Wodon, 2010](#)). Examining time scarcity helps us understand individual well-being. It also shows that income poverty and time scarcity can worsen each other ([Bardasi and Wodon, 2010](#); [Vickery, 1977](#); [Zacharias et al., 2012](#)).

In Colombia, estimates of time poverty for individuals and households are available for years 2012–2013 and 2016–2017. The study showed that time poverty affects nearly 19% of the population, with this figure changing by only half a percentage point between the two measurement periods ([National Administrative Department of Statistics DANE, 2019](#); [DANE, 2014](#)). Moreover, in Colombia, the feminization of poverty extends to time poverty, with women exceeding men by 1.2 percentage points. Specifically, 27.5% of women and 26.3% of men report experiencing time poverty. There is a 5-hour difference in the time deficit between genders: men and women face a deficit of 15.4 and 20.4 hours per week, respectively ([DANE, 2019](#)). The design, analysis, monitoring, and evaluation of public policies, as well as research, demonstrate the growing significance of considering time and its usage in poverty analysis ([Merz and Rathjen, 2014](#); [Diksha, 2015](#); [Beltrán et al., 2018](#)).

This study mainly contributes to our understanding of this phenomenon in Colombia by explaining the role of gender-related factors in the feminization of poverty and quantifying the extent to which time poverty is explained by individual characteristics or discrimination. Using

the data from the National Time Use Survey (2016–2017) and the DANE’s time poverty assessments, we estimate a multivariate decomposition model for nonlinear patterns. The findings showed that discrimination accounts for nearly 42% of Colombia’s time poverty gap.

This study is presented as follows. Section 2 outlines the literature on time poverty and well-being. Section 3 covers the methodology and decomposition of characteristics and coefficients (discrimination) in nonlinear models. Section 4 defines the data used in this study. Section 5 reports the findings of our econometric estimations. Finally, Section 6 presents the conclusions.

## **2. Review of Related Literature**

### ***2.1 Time Poverty as an Individual Measure of Well-being***

Collective measures of well-being, such as household income or per capita expenditure, do not consider unequal access to resources among household members, leading to intra-household inequities ([Lanau, 2021](#)). One limitation of using aggregated poverty measures is their exclusive focus on monetized activities, neglecting nonmonetized contributions to well-being. In indigenous communities with subsistence production or communal work, many crucial activities are not captured by the monetized economy ([Gammage, 2009, p. 6](#)).

Therefore, it is crucial to adopt a multidimensional and individualized approach to fully comprehend poverty.

While having sufficient income is crucial for meeting needs, having enough time to prepare goods for consumption is equally important. This includes tasks that require a minimum time commitment, such as food preparation, household chores, maintenance, and caregiving. Although these activities are not directly considered in poverty calculations, they are implicitly included because they are necessary to maintain a living within the poverty line ([DANE, 2019, p. 2](#)). Standard income poverty measures do not include unpaid domestic and caregiving work.

Households may, however, perform worse than the assumed level of well-being indicated by these measures if they lack this essential time (DANE, 2019, p. 3).

In 1977, Clair Vickery's groundbreaking research introduced the concept of including time as a resource to assess household poverty situations. Time poverty refers to the lack of adequate time for sleep and rest (Gammage, 2009, p. 9). Every person has a finite amount of time throughout their lifetime. The more the time devoted to paid or unpaid work the less the time for activities such as rest and leisure. Thus, those who lack sufficient time for sleep, rest, and leisure activities are considered to be experiencing "time poverty" (Bardasi and Quentin, 2006). Time was explicitly included in Vickery's (1977) analysis to show that achieving a minimal consumption level requires both financial resources and specific household-produced activities or inputs. Consequently, traditional methods for measuring poverty are unable to accurately and completely capture household needs and conditions. Several methods have been developed since Vickery's study to measure time poverty, including the absolute (Vickery, 1977; Burchardt, 2008), relative (Blackden and Wodon, 2006; Bardasi and Wodon, 2006; Merz and Rathjen, 2014), and subjective methods (Hamermesh and Lee, 2007).

Time poverty significantly reduces individual capabilities. Time poverty not only hampers an individual's current abilities but also their future prospects by limiting their ability to rest, indulge in leisure activities, and allocate time for personal growth, including formal education. Furthermore, dealing with time poverty can result in a deterioration of human capital, compromised health, and reduced overall well-being (Blackden and Wodon, 2006; Gammage, 2009).

The roles and responsibilities of men and women are clearly differentiated, in both traditionally recognized productive spheres and the private domain, where work is often unpaid. In Colombia, too, women tend to focus on reproductive tasks, while men are more concerned with so-called productive work (DANE, 2021). However, compared to men, women often work

longer hours and have less time to rest (Milosavljevic, 2007). Women are therefore more likely to experience time deficits or shortages, which increases the levels of time poverty (Floro, 1995). This highlights the importance of measuring time poverty and examining its impact using a gender-specific approach.

There is a growing body of empirical research on time poverty and its varying impact on men and women (Bardasi and Wodon, 2010; Diksha, 2015; Qi and Dong, 2018; Najam-us-Saqib and Arif, 2012; Vega-Rapun et al., 2021). Diksha (2015) examined the time poverty experienced by men and women in rural households using data from a household survey conducted in Mozambique. The findings showed that although women allocate a similar amount of labor to economic activities as men, they bear almost exclusive responsibility for domestic chores and caregiving tasks. This situation contributes significantly to women experiencing greater time poverty than men, especially when are simultaneously responsible for caregiving.

Using a probit model, Bardasi and Wodon (2006) studied time poverty and its determinants in Guinea for the years 2002 and 2003 and found that women are more likely than men to experience time scarcity.

Qi and Dong (2018) analyzed data from the 2008 Time Use Survey and Household Income Survey of China to estimate time poverty rates and compare the conditions of time-deprived men and women workers in urban China. Using three-time poverty measures, they found that salaried and low-paid female workers were overrepresented among the time-poor. Regression analysis showed that, ceteris paribus, time poverty was more likely to occur among female workers with low wages, married status, and dependents (children or elderly) in places with high overtime and low minimum wages.

In Pakistan, Najam-us-Saqib and Arif (2012) examined time poverty using data from the 2007 Time Use Survey and found that women face greater time poverty than men, regardless of their

employment status, mainly due to domestic responsibilities typically assigned to women. Moreover, employed women suffer greater time poverty than unemployed women. Individuals working in fields with higher and frequent demands for overtime demands and low wages also struggle with time poverty, placing them in a scenario where they are simultaneously at risk of being both income and time-poor.

[Vega Domínguez and Gálvez \(2021\)](#) address time poverty, particularly in Spain. Using the 2009–2010 Time Use Survey and a probit model, their study highlights the pivotal role of family responsibilities in explaining the disparities in time poverty experienced by men and women.

## ***2.2 Measurement of time poverty in Latin America and time use surveys***

Time use surveys in Latin America have significantly advanced the measurement of time poverty. Studies by [Patiño \(2017\)](#), [Beltrán, Lavado, and Teruya \(2018\)](#), [Encalada García \(2015\)](#), and [Gammage \(2011\)](#) are notable examples. These works show that women are disproportionately affected by time poverty.

[Elizabeth Patiño's \(2017\)](#) research in Peru highlights the significant impact of gender-based division of labor on women's time management. Owing to their involvement in household duties and increased engagement in paid work over recent decades, women are more prone to time poverty. Using a logit model, Patiño found that women are 12.3% more likely to lack free time. In particular, indigenous women are at higher risk of poverty, although ethnicity is not significantly correlated with the likelihood of lack of free time. Similarly, in a study in Peru, [Beltrán, Lavado, and Teruya \(2018\)](#) used an Oaxaca-Blinder decomposition model to examine time poverty and found that women experience greater time scarcity than men, with a 23-percentage-point difference based only on gender. Moreover, women have a 12-hour time deficit more than men.

In Santiago, Chile, [Encalada García \(2015\)](#) found that 10% of the population aged 18 to 65 suffers from time poverty. When transportation hours are considered, this percentage triples to 26%. Moreover, there are clear disparities when poverty rates are analyzed by age, socioeconomic status, and gender.

In Guatemala, [Gammage \(2011\)](#) examined the effects of conditional transfers on both income and time poverty and found a dual impact: although these transfers contributed to lowering income poverty, they also exacerbated it. This paradox resulted from the fact that meeting these programs' conditions demanded additional time investment from household members. Furthermore, Gammage observed a trend in which an increasing number of women reported working beyond the time poverty threshold.

In Colombia, there is clear evidence of disparities between men and women in terms of time poverty. This is supported by [Ramírez Soler \(2016\)](#) and [DANE](#) in 2017. Ramírez Soler used the 2012–2013 National Time Use Survey and logistic regression models to identify the key variables impacting the risk of time poverty. The findings indicate that individuals earning labor income are up to seven times more likely to experience time poverty than those without income. Moreover, women face a 50% higher risk of time poverty than men. Other risk factors include being 31–40 years old as an adult and living in a household with children.

[DANE \(2019\)](#) used the Levy Institute Measure of Time and Income Poverty (LIMTIP) methodology to assess poverty in Colombia. The LIMTIP methodology was developed by [Zacharias \(2011\)](#). [Zacharias et al. \(2012\)](#) stated that this method was previously used in Mexico, Chile, and Argentina. This approach includes two key components: first, the time spent on household work to process and maintain acquired goods, and second, the unpaid caregiving time necessary for household needs. Similar to the definition of income poverty based on a minimum income level, the LIMTIP methodology highlights deficiencies or time shortages in

households that do not perform the essential domestic activities to sustain themselves above the income poverty threshold (DANE, 2019, p. 3).

To include time poverty in the measurement of income poverty, the household's lack of time is quantified in monetary terms and included in the financial poverty threshold. This shortfall is calculated as the sum of each member's time deficit. We use the average hourly wage for domestic work for this computation. If the household's income is insufficient to meet the needs at the poverty line and to "buy" the time required for domestic tasks, the household is considered poor in terms of both time and income (DANE, 2019, p. 7).

### 3. Methodology

First, we examined time constraints in understanding and assessing poverty. Claire Vickery's 1977 model differs significantly as it explicitly considers time distribution inequalities within households. The basic principle of the model is time allocation, where the fixed total hours are divided into time spent on salaried or self-employed work ( $L_i$ ), household activities ( $U_i$ ), personal care ( $C_i$ ), and leisure or free time ( $V_i$ ). Assuming a weekly time unit, this breakdown is as follows:

$$168 = L_i + U_i + C_i + V_i \quad (1)$$

Equation (2) yields the deficit equation, which includes travel time, is derived by substituting the variables with threshold values for personal care and household production:

$$X_{ij} = 168 - M - \alpha_{ij}R_j - L_{ij} \quad (2)$$

The time deficit, denoted as  $X_{ij}$ , refers to the shortage of time experienced by an individual  $i$  of working age within household  $j$ . This concept corresponds to the idea of minimum consumption thresholds used in assessing income poverty. Here,  $M$  is the minimum time required for personal



care and nonsubstitutable household tasks, and  $R$  is the amount of replaceable family production time needed to meet income poverty standards. A household categorized as income-poor based on its specific characteristics must allocate a specific number of hours to productive household activities to move from income to consumption poverty. This method integrates low-income households' production requirements into the measurement of the nature and extent of poverty. Many studies using time use surveys have highlighted inequalities in the division of household tasks among members, particularly between genders. The parameter  $\alpha_{ij}$  represents these disparities, indicating the percentage of an individual's overall time that their household needs to household production to maintain subsistence at the income poverty threshold. The time available for income generation and leisure is the difference between the total hours in a week and the minimum time needed for personal care and household production. The individual's time deficit or surplus is determined by the excess or lack of hours spent on income-generating activities compared to the available time.

The time deficits of all individuals in the household are combined to calculate the household time deficit (Equation 3):

$$X_{ij} = \sum_{i=1}^n \min(0, X_{ij}) \quad (3)$$

If a household has a time deficit, i.e.,  $X_{ij} < 0$ , it is reasonable to interpret this as a shortage of time relative to  $R_j$ , indicating that the household has little time to complete the substitutable household production<sup>1</sup>. The earlier equations reveal a fundamental fairness issue with poverty thresholds if the deficits in required household production are not considered. For example, consider two identical households with the same monetary income. However, one of them lacks the time for essential household production activities while the other has enough time. In such a scenario, considering both households as equally impoverished in terms of income would be unfair, particularly toward the household experiencing a time deficit.

Second, addressing inequality can involve reevaluating income thresholds. If we consider that the time deficit can be offset by market substitutes, the logical step is to assess the cost of replacement. This cost can then be incorporated into the income poverty threshold, resulting in a new threshold that reflects the time deficit:

$$y_i^0 = \bar{y} - \min(0, X_j) p \quad (4)$$

where  $y_i^0$  denotes the adjustment threshold,  $\bar{y}$  represents the standard threshold, and  $p$  is the unit replacement cost of household production. The standard and modified thresholds would align if the household had no time deficit.

The thresholds for time allocation and modified income threshold together form a two-dimensional measure of time and income poverty, known as the LIMTIP. A household is income-poor if its income  $y_j$ , falls below its adjusted threshold (Equation 5). It is considered time-poor if any of its members experience a time deficit:

$$y_i < y_i^0 \Rightarrow \text{Income poor household}; x_j < 0 \Rightarrow \text{Household is time poor.} \quad (5)$$

An is considered income-poor if their household income falls below the adjusted threshold. Similarly, an individual is considered time-poor if they experience a time deficit (Equation 6):

$$y_i < y_i^0 \Rightarrow \text{Income poor individual}; x_{ij} < 0 \Rightarrow \text{Individual is time poor.} \quad (6)$$

Following this method, the DANE estimates the number of individuals experiencing time poverty, income poverty adjusted for time, and extreme poverty. This study estimates time poverty to show disparities in time management between men and women, especially how these differences contribute to the feminization of time poverty.

We identify individuals experiencing time poverty. If the individual experiences time poverty the variable takes the value one and zero otherwise. As the dependent variable is dichotomous,

we applied a multivariate decomposition model for nonlinear models, following the approach proposed by Power et. al (2011).

The model starts with the standard problem of decomposing a difference in the first moment, where the dependent variable is a function of predictors and regression coefficients:

$$Y = F(X\beta) \quad (7)$$

where  $Y$  represents an  $N \times 1$  vector of dependent variables,  $X$  is an  $N \times K$  matrix of independent variables, and  $\beta$  is a  $K \times 1$  vector of coefficients. The function  $F(\cdot)$  represents a distribution function, specifically the logit function.<sup>2</sup>This helps decompose the mean difference in  $Y$  between groups A and B:

$$\begin{aligned} \bar{Y}_A - \bar{Y}_B &= \overline{F(X_A\beta_A)} - \overline{F(X_B\beta_B)} \\ &= \underbrace{\{ \overline{F(X_A\beta_A)} \} - \{ \overline{F(X_B\beta_A)} \}}_E + \underbrace{\{ \overline{F(X_B\beta_A)} \} - \{ \overline{F(X_B\beta_B)} \}}_C \quad (8) \end{aligned}$$

where  $E$  is the part of the difference resulting from the variations in endowments or characteristics, often called the explained component or characteristic effects. In contrast,  $C$  relates to the part of the difference resulting from variations in coefficients or effects, called the unexplained component or coefficient effects (Powers et al., 2011).

We compared the average likelihood of experiencing time poverty women (as the reference group) and men (as the control group) using a logit decomposition model. The model calculates the differences between groups A and B in the average likelihood of poverty ( $\bar{P}_A - \bar{P}_B$ ), where A represents women and B represents men. This difference can be decomposed into two components: the effect of characteristics and the effect of coefficients. In an asymptotic sense, this is expressed as

$$\begin{aligned}
\text{logit}(Y_A) - \text{logit}(Y_B) &= F(X_A\beta_A) - F(X_B\beta_B) \\
&= \underbrace{F(X_A\beta_A) - F(X_B\beta_A)}_E + \underbrace{F(X_B\beta_A) - F(X_B\beta_B)}_C \quad (9)
\end{aligned}$$

where  $\beta_A$  and  $\beta_B$  are the sets of coefficients estimated for each group, and  $X_A$  and  $X_B$  are the various explanatory variables used in the logit equations. These variables include household composition (such as the number of individuals, children, and adults), marital status, engagement in paid activities, and age. The model also includes controls for regions and urban–rural areas.

Numerous studies have examined the concept of feminization of time poverty, mainly attributing it to caregiving responsibilities traditionally associated with women due to societal gender norms ([Castillo Mayén and Montes Berges, 2014](#)). Understanding time poverty depends on variables that influence caregiving tasks. For example, a larger household size means more caregiving duties ([Diksha, 2015, p. 17](#)). However, the presence of both adults and children in the household is likely to have a nonlinear impact on caregiving tasks ([Gang et al., 2008, p. 57](#)), indicating that tasks can be shared, are typically done by women, or older children may play help with or help take care of younger ones. Studies, for example, [Bardasi and Wodon \(2010\)](#), include variables such as number of children and number of children squared to understand this dynamic.

To further explain the feminization of poverty, the age factor, including its squared representation, is also frequently used ([Bardasi and Wodon, 2006](#)). Individuals in households typically have more caregiving responsibilities within households as they grow older. Marital status similarly influences time poverty ([Qi and Dong, 2018; Bardasi and Wodon, 2010](#)), where this variable explains time poverty.

Diksha (2015) and Najam-us-Saqib and Arif (2012) showed the impact of regions or rural–urban settings on time poverty, which indicates in inclusion of such variables in this model. Furthermore, involvement in paid activities affects the likelihood of experiencing time poverty (Qi and Dong, 2018; Vega-Rapun et al., 2021; Najam-us-Saqib and Arif, 2012).

#### 4. Data

These data are obtained from the ENUT survey for 2016–2017 by DANE. This survey on time use included 146,190 individuals aged 10 years and above. The findings show that 19% of Colombia’s population experienced time poverty and a higher prevalence among women than men. Moreover, the time poverty rate decreased by 1.3 percentage points for men. Unlike men, Colombian women have a 5-hour time deficit (DANE, 2019). Rural regions experience greater time poverty than urban regions; specifically, there was a 1.9 percentage point increase in the incidence of time poverty in rural areas between measurements.

**Table 1. Incidence of time poverty (Percentages)**

	<i>2012–2013</i>	<i>2016–2017</i>
<b>Men</b>	18.9	17.6
<b>Women</b>	19.1	19.4
<b>Urban</b>	18.9	17.7
<b>Rural</b>	19.5	21.4
<b>Employed</b>	42.4	41.1
<b>Unemployed</b>	1.9	1.2
<b>Men, urban</b>	18.5	15.9
<b>Women, urban</b>	19.2	19.3
<b>Men, rural</b>	20.3	22.9

<b>Women, rural</b>	18.6	19.7
<b>Men, employed</b>	35.5	32.9
<b>Women, employed</b>	53.7	53.8
<b>Men, unemployed</b>	0.1	0.1
<b>Women, unemployed</b>	3	2

Source: DANE. National Time Use Survey. ENUT 2018. Own calculations.

The incidence of time poverty is particularly higher among employed than unemployed individuals, as expected, exceeding 40% during both periods (Table 1). However, when analyzing the difference between employed men and women, the incidence is consistently higher in women, approximately 53.7% in both periods, compared with 35.5% in men in 2013 and 32.9% in 2017. This corresponds to a difference of 18.2 percentage points in 2013 and 20.9 percentage points in 2017. These statistics highlight that employed women predominantly experience more time poverty than men. This disparity is explained by the unequal distribution of unpaid household activities, indicating that Colombian women continue to face a double workload (DANE, 2019).

In the rural category, the poverty rate among men was higher in both periods, with 20.3% of rural men experiencing time poverty in 2013, increasing to 22.9% in 2019. In contrast, the poverty rate among rural women was 18.6% in 2013 and 19.7% in 2017.

**Table 2. Incidence rates of time poverty by region and gender**

<b>Region</b>	<i>Incidence of time poverty</i>		<i>Incidence of extreme time poverty</i>		<i>Incidence of combined time and income poverty</i>	
	<i>Men</i>	<i>Women</i>	<i>Men</i>	<i>Women</i>	<i>Men</i>	<i>Women</i>
<b>Atlantic</b>	13.9%	14.4%	16.6%	16.5%	43.2%	43.0%
<b>Center</b>	18.0%	18.9%	11.2%	11.4%	28.2%	29.3%

<b>Orinoquía</b>	17.7%	20.8%	12.7%	12.4%	31.5%	32.1%
<b>Pacific</b>	15.3%	19.2%	16.0%	16.1%	34.3%	35.5%
<b>Bogotá</b>	20.1%	23.6%	6.7%	7.2%	19.7%	20.4%
<b>San Andrés</b>	20.2%	29.9%	20.3%	16.3%	32.8%	30.3%

Source: DANE. National Time Use Survey. ENUT 2018. Own calculations.

In all geographical regions covered by the ENUT, women experience a higher incidence of time poverty than men, with a significant impact observed in the Orinoquía, Bogotá, and San Andrés. Women in San Andrés are most affected, with a time poverty incidence reaching nearly 30%. The patterns of extreme time poverty for men and women are similar across geographical regions except in San Andrés, where men (20.3%) are more affected than women (16.3%). Time and income poverty are similar between men and women across all geographical regions except San Andrés.

Other significant variables contributing to time poverty are shown in Table 3, which outlines various measures of central tendency. For dichotomous variables, the sample average corresponds to the cases in which the characteristic is present.

**Table 3. Descriptive statistics of the variables**

	<i>Women</i>				<i>Men</i>			
	<i>No Obs: 76799</i>				<i>No Obs: 69391</i>			
<b>Variable</b>	<i>Mean</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
<b>Time-poor</b>	0.192802	0.3945015	0	1	0.1693591	0.3750715	0	1
<b>Unemployed</b>	0.0426308	0.2020245	0	1	0.0482051	0.2142009	0	1
<b>Age</b>	34.88933	21.81288	0	103	32.6589	21.55208	0	103
<b>Age squared</b>	1693.061	1769.899	0	10609	1531.089	1689.437	0	10609

<b>Number of children in the household</b>	1.353195	1.306006	0	18	1.320301	1.317333	0	18
<b>Number of children squared</b>	3.536765	7.603761	0	324	3.478535	7.325411	0	324
<b>Number of adults in the household</b>	2.750166	1.282275	0	13	2.806949	1.301179	0	13
<b>Number of adults squared</b>	9.20762	9.643075	0	169	9.572005	9.986412	0	169
<b>Head of the household</b>	0.2279066	0.4194848	0	1	0.3962474	0.4891205	0	1
<b>Marital status: married</b>	0.1767601	0.381468	0	1	0.1913361	0.3933558	0	1

Source: DANE. National Time Use Survey. ENUT 2018. Own calculations.

From 2016 to 2017, 19.2% of women and 17% of men experienced time poverty. The unemployment rates were 4.2% and 4.8% for women and men, respectively. The average age of women and men was 35 and 33 years, respectively. This analysis includes the total number of children and the total number of household members, including their squared values, to identify decreasing trends in these variables. The national average for children per household is 1.3, while the average number of adults per household is approximately 2.8. Household heads consist of 22% women and 40% men. Additionally, 18% of women were married, compared to 19% of men.

## 5. Results

We estimate logit model to assess the likelihood of experiencing time poverty and the resulting marginal effects are outlined in Table 4. The results show that women are a 1.1 percentage point more likely to experience time poverty. Based on the number of children in the household, each



additional child is associated with a 1.2 percentage point decrease in the likelihood of time poverty. Notably, the squared term of this variable has a negative sign, implying a concave effect on time poverty in terms of the number of children in the household.

**Table 4. Probability of experiencing time poverty (marginal effects)**

<i>Time poverty</i>	<i>Coefficients</i>	<i>Std. err.</i>	<i>dy/dx</i>	<i>std. err.</i>
<b>Sex</b>	0.0928227***	0.015355	0.0111231***	0.0018386
<b>Number of children in the household</b>	0.1019921***	0.0188438	0.0122219***	0.0022551
<b>number of children squared</b>	-0.0188831***	0.0049517	-0.0022628***	0.000593
<b>Number of adults in the household</b>	-0.577606***	0.0183022	-0.0692158***	0.0021485
<b>Number of adults squared</b>	0.0459932***	0.0023696	0.0055115***	0.0002817
<b>Unemployed adult</b>	-3.794938***	0.1415594	-0.4547557***	0.0169059
<b>Age</b>	0.2952572***	0.0024409	0.0353813***	0.0002628
<b>Age squared</b>	-0.0034024***	0.0000322	-0.0004077***	3.50E-06
<b>Area/urban</b>	-0.3970926***	0.0205164	-0.0475845***	0.0024507
<b>Married</b>	-0.1054181***	0.0187441	-0.0126325***	0.0022456
<b>Atlantic</b>	-0.6398225***	0.0471083	-0.0766713***	0.0056277
<b>Center</b>	-0.4324617***	0.0464656	-0.0518228***	0.0055603
<b>East</b>	-0.3304356***	0.0476498	-0.0395968***	0.0057051
<b>Pacific</b>	-0.5073022***	0.0479909	-0.0607911***	0.0057409
<b>Bogotá</b>	-0.0641146	0.0468224	-0.007683***	0.0056107
<b>_cons</b>	-5.002444***	0.0743364	0.0111231	0.0018386

N = 146,190	* p<0.05; ** p<0.01; *** p<0.001
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Source: DANE. National Time Use Survey. ENUT 2018. Own calculations.

The likelihood of experiencing time poverty is decreased by 45 percentage points in households with an unemployed adult. Although slightly, marital status or living in urban areas also decreases this likelihood by 1.2 and 4.7 percentage points, respectively. Age contributes to an increased likelihood of time poverty, although with a diminishing effect over time. Each year of age increases the likelihood of experiencing time poverty by 3.5 percentage points.

Regarding regional differences, especially in Bogotá, the likelihood of experiencing time poverty in these areas is lower than in our reference region, San Andrés.

However, this estimation does not distinguish between those aspects of the probability of experiencing time poverty arising from personal or contextual factors and those influenced by gender. We used a multivariate decomposition model for nonlinear logit-type models to address this issue. This helps in identifying the differences in the probability of experiencing time poverty that are linked to personal backgrounds and those associated with gender disparities. This study showed that gender accounts for 42% of the observed difference (0.00987 of 0.02344). Conversely, 58% of the probability of experiencing time poverty is associated with individual and environmental factors (0.01358 of 0.02344). In particular, most variables showed significance and had the expected directional impact.

**Table 5. Multivariate decomposition.**

<i>Reference Group (A): woman = 1</i>		<i>Comparison Group (B): Men = 0</i>		
<i>Time-poor</i>		<i>Coeff.</i>	<i>Std. Err.</i>	<i>Pct.</i>
	E	0.01358***	0.00024	58.13
	C	0.00987***	0.00176	41.87

R	0.02344***	0.0018
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*Due to Difference in Characteristics (E)*

<i>Time-poor</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>Pct.</i>
<b>Number of children in the household</b>	0.00054***	0.00007	2.29
<b>Number of children squared</b>	-0.00016***	0.00003	-0.67
<b>Number of adults in the household</b>	0.00239***	0.00016	10.21
<b>Number of adults squared</b>	-0.00101***	0.00014	-4.31
<b>Unemployed adult</b>	0.00159***	0.00006	6.8
<b>Age</b>	0.07076***	0.00091	301.84
<b>Age squared</b>	-0.06057***	0.00085	-258.35
<b>Area/urban</b>	-0.00036***	0.00007	-1.54
<b>Married</b>	0.00022***	0.00004	0.95
<b>Atlantic</b>	0.00065***	0.00005	2.76
<b>Center</b>	-0.00026***	0.00002	-1.1
<b>East</b>	0.00026***	0.00004	1.12
<b>Pacific</b>	-0.00041***	0.00004	-1.75
<b>Bogotá</b>	-0.00008***	0.00002	-0.32

*Due to Difference in Coefficients (C)*

<i>Time-poor</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>Pct.</i>
<b>Number of children in the household</b>	0.03174*	0.01895	135.38
<b>Number of children squared</b>	-0.01064	0.00726	-45.38
<b>Number of adults in the</b>	0.1418*	0.08099	604.87

<b>household</b>			
<b>Number of adults squared</b>	-0.05598*	0.03243	-238.79
<b>Unemployed adult</b>	0.01648**	0.00699	70.31
<b>Age</b>	0.26292	0.16927	1121.54
<b>Age squared</b>	-0.18594	0.11618	-793.15
<b>Area/urban</b>	0.06626*	0.03756	282.66
<b>Married</b>	-0.00271	0.00198	-11.56
<b>Atlantic</b>	-0.02198*	0.01311	-93.77
<b>Center</b>	-0.01998*	0.01194	-85.21
<b>East</b>	-0.0086	0.0056	-36.7
<b>Pacific</b>	-0.00552	0.00408	-23.54
<b>Bogotá</b>	-0.01275*	0.00768	-54.4
<b>_cons</b>	-0.18524	0.11728	-790.17
<i>Number of observations: 146190</i>			
<i>Significance: * <math>p &lt; 0.05</math>; ** <math>p &lt; 0.01</math>; *** <math>p &lt; 0.001</math></i>			

Source: DANE. National Time Use Survey. ENUT 2018. Own calculations.

In general, the impact of characteristics is not attributed to discrimination, and the coefficient effect reflects the consequence of unequal treatment within society (discrimination). A positive coefficient  $E_k$  (Characteristic) indicates the anticipated decrease in the gap, implying that the coefficient effect shows the effectiveness of characteristics in reducing the time poverty disparity among comparison groups (Powers et al., 2011, p. 567; Gang et al., 2008, p. 61).

Household composition helps narrow the time poverty gap between men and women in the observed characteristic effects. In particular, having more children and adults in the household increases the likelihood of sharing domestic tasks, thus reducing time poverty. Gang et al.

(2008) and Bardasi and Wodon (2010) confirmed this concave effect of household composition on domestic responsibilities and, thus, on time poverty among household members. Furthermore, living in regions such as Atlantic and East is associated with a narrower gap. Conversely, living in central, Pacific, or Bogotá regions worsens time poverty differences. This trend is consistent with urban areas, where living in such zones tends to widen the time poverty gap between men and women. These findings align with those of Diksha (2015), who highlighted regional disparities in time poverty in Mozambique.

Marital status substantially narrows the gap, although not as much as having more number of adults in the household because it might also imply the presence of other women who can share and manage a greater portion of domestic responsibilities. Studies such as Martín Palomo (2008, p. 36) show how support from grandmothers, aunts, or other women within or outside the household helps reduce caregiving duties among women, on average, especially relative to men in similar households.

The age variable shows a positive trend, suggesting that as individuals age, there are few differences in time poverty between men and women. Similarly, the presence of an unemployed adult in the household has a positive impact and contributes to narrowing the time poverty gap between men and women. Studies such as Qi and Dong (2018) examine employment status to understand how occupation affects time poverty in China.

## **6. Conclusions**

The National Time Use Survey offers insights into the feminization of poverty based on time and shows how women's predominant role in household caregiving tasks results in a distinct form of inequality compared to men within households. The limited time available for relaxation and leisure further worsens this disparity. Furthermore, the survey in Colombia

showed that time and income poverty are correlated. People must allocate more time to paid work to meet basic needs owing to very low wages.

Time poverty in Colombia shows gender-based disparities, with women's insufficient time for leisure and rest affecting their opportunities for personal development, human capital, and overall well-being. The government should focus on affirmative measures to promote a fairer distribution of caregiving responsibilities and bridge the gap between men and women.

The assessment of an individual's time poverty in Colombia has highlighted its significance as an indicator of individual well-being, shifting from traditional household-centric analysis. This approach highlights the disproportionate impact of time poverty on women than on men in Colombia and the urgent need for a fair distribution of caregiving responsibilities within households to bridge the time poverty gap. This aligns with the International Labour Organization's framework, called the 5 "Rs" of care: recognizing, reducing, and redistributing unpaid caregiving, valuing paid caregiving, and ensuring representation and collective bargaining ([International Labour Organization, ILO, 2023](#)).

Fair distribution of household tasks among adults in households would help alleviate time poverty. However, failure to do so could lead to increased time poverty for women. This issue is particularly important, given the demographic shift toward smaller and even single-person households. Failure to address the social distribution of caregiving responsibilities may increase the risk of time poverty for women due to these changes in household structures.

Unemployed people may appear to have a lower likelihood of experiencing time poverty. However, factors such as employment status, industry of employment, or hourly wage rates can offer deeper insights into how paid work affects leisure time and rest. Future studies should include these variables to further enrich our understanding of this relationship.

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<sup>1</sup> A key aspect to note in this statement is that it does not presume that a shortfall in time for one individual within a household is offset by another individual's surplus time in the same household. This differs significantly from the typical assumption of a "unitary" household often found in traditional literature. To illustrate the significance of this difference, let us consider a hypothetical scenario with a husband and wife both working. Let us assume the wife experiences a time shortage because of her full-time job and handling most of the household chores. Meanwhile, the husband has surplus time due to minimal involvement in household tasks after returning from work. If we were to combine the husband's surplus time and the wife's deficit to calculate the total household time deficit, it would imply an assumption that the husband automatically adjusts his behavior to compensate for the wife's time shortage. However, in reality, such automatic adjustments are not assumed to occur within the household.

<sup>2</sup> For linear regression, logit, and Poisson models, the Multivariate Decomposition for Nonlinear Response Models (MVDCMP) will accurately break down the difference in observed average outcomes ([Greene, 2008](#)).