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WOMEN'S DECISIONS ON LABOR AND CARE-WORK ARRANGEMENT IN MEXICO

DECISIONES LABORALES Y DE CUIDADO PARENTAL DE LAS MUJERES EN MÉXICO

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Abstract:

This paper develops a discrete choice model to analyze the labor and childcare decisions of Mexican women with children under five years of age. A mixed logit model is used to simulate the potential effects of public policies on these decisions. Data from the National Survey on Time Use shows that disposable income, leisure, and the number of childcare options can explain women's labor and care decisions. In addition, it shows that the presence of children under two years old in the home decreases a woman's probability of entering the labor market. Alternatively, the presence of children between three and five years old or grandparents who are able to provide care increases it. Policy simulations suggest that the most effective policy to increase women's participation in the labor market is a reduction of the marginal rate of the personal income tax for women working in the formal sector who have children under five years old, compared to other options such as tax credits and conditional cash transfers for women in the formal sector. The simulated policies have limitations since the poorest women are employed in the informal sector.

Resumen:

Este artículo desarrolla un modelo de elección discreta para analizar las decisiones laborales y de cuidado parental de mujeres mexicanas que son madres de niños menores de cinco años. Se desarrolla un modelo probit mixto para simular los potenciales efectos de políticas públicas en estas decisiones. Utilizando datos de la Encuesta Nacional de Uso del Tiempo, el modelo muestra que el ingreso disponible, el ocio y el número de opciones de cuidado explican sus decisiones en el mercado laboral y de estrategias de cuidado parental. Además, la presencia de niños menores de dos años en el hogar reduce la probabilidad de entrar en el mercado laboral, mientras que la presencia de niños entre tres y cinco años y de abuelos la incrementa. Las simulaciones de política pública sugieren que la manera más efectiva de estimular la entrada al mercado laboral de las mujeres con niños menores es a través de la reducción de la tasa marginal del impuesto sobre la renta en el sector formal, en comparación con otras opciones como créditos fiscales a guarderías privadas o transferencias monetarias de efectivo para mujeres en el mercado laboral formal. Todas las políticas simuladas tienen limitaciones, ya que las mujeres más pobres están empleadas en el sector informal.

Clasificación JEL/JEL Classification: C25, H30, J08, J13

Palabras clave/keywords: discrete choice, care work, microsimulations, childcare

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1. Introduction

According to the International Labor Organization (ILO), care work is defined as all the activities conducted by households, government, and the private sector to provide services for domestic work and care for children, the elderly, or people with disabilities. It also includes professional services related to education and health. Cross-country comparisons made by ILO (2016) utilizing time-use surveys show that unpaid care work is mainly undertaken by women, which affects their ability to enter into the labor market and the quality of their jobs, further increasing gender inequality in the workspace (Addati *et al.*, 2019). In Mexico, according to 2021 estimations made by the National Institute of Statistics and Geography (*Instituto Nacional de Estadística y Geografía*, INEGI, 2022), almost three-quarters (73.9%) of the hours spent on unpaid care work hours are performed by women. According to Pacheco (2018) women devote on average more than twice as many hours per week (28 hours) than men (12 hours) caring for other household members and almost three times as many hours per week (29 hours) in domestic work than men (10 hours). In contrast, men spend an average of ten hours more per week in paid work (48 hours) compared to women (38 hours).

This paper develops a discrete choice model for mothers' labor and care strategies and simulates fiscal policies' effects on their labor and care decisions. The model focuses only on mothers with children under five years of age, modeling their labor and leisure decisions assuming that other household income sources are exogenous. Similar labor and discrete choice models have been developed by Kornstad and Thoresen (2007), Kalb and Thoresen (2010), Averet *et al.* (1997), and Gong and van Soest (2002).

The proposed model aims to contribute to the current literature by proposing that women choose the type of childcare based on the number of hours, the wage, and the labor market segmentation between formal and informal employment. This is relevant for most Latin American countries, particularly in Mexico, since labor status in Mexico determines access to social security. Workers with formal jobs have access to public childcare services financed by social security contributions, while workers in informal jobs can only access childcare services through private centers. The proposed utility function for working mothers depends on the household's disposable income, leisure, and care options. Using the National Survey on Time Use (*Encuesta Nacional sobre Uso del Tiempo*, ENUT) conducted in 2019 by INEGI, a mixed logit model is estimated using a proposed parametric form of the utility function, as well as relevant demographic

variables, such as the number of children in the household, geographic region, household size, and household assets.

The model uses a sample of 3,534 women to simulate the decision-making process of working mothers, who can choose different combinations (or states) of labor options and childcare arrangements. The estimated distributions of the simulations are compared with the observed distribution of the sample for the different states, with the best model showing similar results for eight of the ten possible states. Using the best-fitted model, three policies are simulated: 1) a reduction of the marginal rates of the personal income tax; 2) a tax credit to the cost of private care; and 3) a conditional cash transfer to mothers with children under five who work in the formal sector and live in poor households. Our findings suggest that a personal income tax reduction increases women's participation in the formal market, while the tax credit and the conditional cash transfers to women have more limited effects on increasing formal employment and reducing parental childcare.

2. Care work in Mexico and the labor market

As noted by UN Women and the Economic Commission for Latin America and the Caribbean (UN Women and ECLAC, 2020) the demographic transition in the region, along with the changes in family structure and migration, have increased women's participation in the Latin American labor markets during the last couple of decades. From 1990 to 2018, Latin America's average female labor force participation rate increased from 42% to 52% (UN Women and ECLAC, 2020). There have been gradual changes in the traditional breadwinner structure of families based on the sexual division of labor, in which the male partner was the sole provider and the women within the household took on exclusively the role of caregiver. However, even though the gender gap in the labor force has been closing during the first two decades of this century, male participation in the labor market remains, on average, 25 percentage points above female participation (UN Women and ECLAC, 2020).

In 2018, Mexico had the lowest female labor force participation rate (43.5%) in Latin America and the Caribbean after Guatemala (39.2%) (ECLAL and ILO, 2019). Despite many remaining challenges to include women in the workplace, the Mexican gender gap in the labor market decreased during the last ten years prior to the pandemic. From 2010 to the first quarter of 2020, the number of working women

for every 100 males increased from 60 to 65. However, the COVID-19 pandemic and its economic effects on the labor market were not gender-neutral, affecting women disproportionately during the recovery months after the pandemic. While general occupation, including men and women, fell 19% from the first to the second quarter of 2020, male occupation recovered to pre-pandemic levels during the first quarter of 2021, growing almost 20%, while female participation only grew 15% in the same period (INEGI, 2021b).

The pandemic increased the need for additional care work in the household, given the new health and educational challenges. This increase in care, paired with the structural barriers women face in the labor market, might hamper the modest progress made during the last decades. In Mexico, 75% of the total hours of unpaid care are done by women. Ninety percent of all the hours invested by women on care within the house are focused on caring for underage members of the household, including educational support. The pandemic dramatically increased this kind of care work. From 2020 to 2021, the monetary value of unpaid care done by households increased from 22.9% of gross domestic product (GDP) to 27.6% (INEGI, 2021a). Considering the current family structure of care within the households, this will likely undermine the recovery of female labor in the workplace.

According to the National Survey of Occupation and Employment (*Encuesta Nacional de Ocupación y Empleo*, ENOE), in the fourth quarter of 2021, 4.9 million women were outside the formal workforce but available for employment.[1] Of these, 63% of them (3.1 million) reported unpaid care within their household as the main barrier to entering the labor market. Moreover, 1.5 million women were completely unavailable for work, reporting as the main reason their sole responsibility was to care for the children, the elderly and/or the sick within the household (INEGI, 2021c).

Available care options are directly related to limited choices in the labor market. Almost 60% of the 22 million women currently employed (approximately 13.2 million) do not have direct access to social security in their jobs (INEGI, 2021c). In Mexico, public care options for women with children under five years old are directly linked with their formal status. Therefore, working mothers with children under five without social security must rely on private (i.e., paid) childcare or care provided by members of the household, most

[1] In Mexico, this definition is different from unemployment since this group is not looking actively for jobs but would be willing to take one if offered.

of the times with help from grandparents or other relatives, to be able to manage their time between work and care. Even women with working male partners with access to social security cannot take their children to public childcare since the current Mexican legislation and institutions assume a breadwinner structure.

In most countries in the world, women with children under five years old have a lower probability of entering the labor market. In almost every region, the labor participation of women with children under five years old is significantly lower than in the case of men, independent of their civil status, and even lower compared to women without children. According to UN Women and ECLAC (2020), in Latin America, the gap between women with children under five and women with a partner but without children is more than 10 percentage points and more than 30 percentage points, respectively, compared to single women. Early motherhood affects not only women's probability of entering the market but also the quality of the job they are able to secure. According to Addati *et al.* (2019), women with children under six tend to work less paid hours, have lower wages, and are more prone to work in the informal sector as self-employed, which increases their chances of falling into poverty and remaining in precarious conditions.

3. Previous studies

Kornstad and Thoresen (2007) present a discrete choice model for Norway, where they model the decision-making process by women with children under five in the labor market, choosing between public and parental options. Every option in the labor market has a fixed number of hours, and every care option comes with a number of observable attributes (including costs); the authors simulate the different states in order to model the effect of the reforms to the care system in Norway and their potential effects in women's choices. For the United States (US), Averet *et al.* (1997) present a structural model of labor supply where they took into consideration the cost of care options to estimate the impact of subsidies to care centers; similar to Kornstad and Thoresen (2007), the authors estimate the model only for women with children under five years old, taking the income of the partner as exogenous. The authors find that the supply of labor of this group is sensitive to changes in net wages rather than gross since the first takes into account the cost of care subsidies. Therefore, there is evidence that government subsidies increase the labor supply of women under these conditions.

Del Boca (2015) explores the relationship between different family structures in Europe and North America and the work arrangements made by working mothers. She finds an inverse relationship between the investment made by governments from different countries in care centers- through direct services or subsidies- and the involvement of grandparents raising children, which is the most traditional form of childcare. This last strategy is more prevalent in more traditional societies with bigger families and more social cohesion within the household. She also finds that the larger the number of children, the lower the participation rate of women in the market. The paper suggests that the use of public care options in almost every country has a positive effect on labor participation for women with children.

In the case of Mexico, Gong and van Soest (2002) develop a discrete structural model of labor supply to estimate the effect of wages, autonomous income, and family structure on the labor supply of working mothers with children under three years old. As in the case of Kornstad and Thoresen (2007), the authors estimate a discrete utility model using a multinomial logit, and their results suggest that: 1) the presence of older children and substitute mothers in the household increases the probability of women entering into the market; 2) as the number of total children increases, the supply of working hours decreases; and 3) similar to other developing countries, the traditional family structure in Mexico shapes the household's production function, thereby strongly influencing women's decisions, not only in terms of an economic rationale but also social and cultural norms.

Using data from the Mexican Census of Population (*Censo Nacional de Población*, CNPV) of 1990 and 2000, Arceo-Gómez and Campos-Vázquez (2010) estimate female labor supply elasticities for married women and find that married women with children under five years old are less engaged to the labor force than average married women. They hypothesize that these results might suggest a lack of attachment to the labor market caused by time constraints in caregiving responsibilities.

In terms of evaluating public care policies in Mexico, Calderón (2014) evaluates the policy "Estancias Infantiles" (childcare centers) carried out by the Mexican government from 2007 to 2018. This was a subsidy program for private care centers to help women with children under five years old without access to social security. The author uses a triple differences model to estimate the effect of the program on women's labor supply. Her findings suggest that the program increased women's insertion in the market, reduced their care burden, and even increased labor income for partners since the

new redistribution of care liberated time for all the carers within the household, women and men alike.

López-Rodríguez and Orozco (2019) explore the relationship between social capital, care work in the household, and financial inclusion in female labor force participation. Using data from Mexico's National Survey of Household Income and Expenditure (*Encuesta Nacional de Ingresos y Gastos de los Hogares*, ENIGH), the National Council for the Evaluation of Social Policy (*Consejo Nacional de Evaluación de la Política de Desarrollo Social*, CONEVAL), administrative registries from the Ministry of Social Development, and the National Survey on Financial Inclusion, the authors estimate a probit model with Heckman correction. According to their findings, 1) higher wages increase the probability of women working in full-time jobs, 2) the higher the number of children, the lower the probability of working, and 3) the presence of childcare facilities in the municipality increases the probability of working in a full-time job.

Talamas (2023) studies the role of grandmothers -who often play the role of a childcare provider in Mexican households- in mothers' employment rates. Using Mexico's ENOE, the author estimates a triple difference model using the death of a grandmother within a household with children as an exogenous variable to obtain causal effects and to control other effects that might influence the employment rate through other channels. The death of a co-inhabiting grandmother reduces the employment rate of mothers by 15 percentage points. In addition, this negative effect is smaller where public childcare or affordable private childcare is available.

Using data from the Mexico Social Mobility Survey 2017 and the National Statistical Directory of Economic Units (*Directorio Estadístico Nacional de Unidades Económicas*, DENUE), Orozco *et al.* (2022b) estimate through the rank-to-rank regressions the relationship between women's social mobility, and childcare facilities, female labor force participation and social security of parents. Women who have access to childcare facilities in their immediate surroundings have higher upward social mobility than those without access, and this effect is larger for women who have lower socioeconomic status.

Orozco *et al.* (2022a) estimate the effect of childcare services on female labor force participation at the municipal level in Mexico using a geospatial model with data for 2015 and 2020 from DENUE, CNPV, the Intercensal Survey, the Economic Census, and the Financial Inclusion Database. They find a negative relationship between the number of children under five years old and female labor participation and that the existence of childcare services in a municipality has an

effect of 10.3% on female labor participation. This effect is larger for municipalities with high output in tertiary sector activities.

Finally, Hoehn-Velasco *et al.* (2022) analyze the impact of the COVID-19 recession on childcare and employment. According to their findings, men spent more time engaged in domestic care work during the pandemic, although the total distribution remained unchanged, and the hours spent on childcare also remained unchanged by the pandemic, mostly due to the fact that before the pandemic women already spent significant hours outside of the labor market doing domestic care work.

International literature and previous studies about Mexico find evidence that: 1) women with children under five years old decrease the probability of working; 2) the existence of childcare services available for women with children increases their probability of working, and 3) government subsidies of childcare and social programs are likely to have a positive effect on female labor force participation. This paper builds on previous discrete choice models to simulate the labor and care work decisions of women in Mexico with children under five years old to study the potential outcomes of fiscal incentives, direct subsidies, and social programs. The model considers the structure of the Mexican labor market and its effects on workers' access to childcare.

Model

4.1 *Environment and assumptions*

This model takes as reference the labor market models that simulate women's decisions using micro simulation techniques with discrete choice models as done by Kornstad and Thoresen (2007) and Kalb and Thoresen (2010). These models analyze the decision-making process of women with children under five years old selecting their labor and childcare options. The model only considers women between 16 and 50 years old who are mothers of children under five.

Similar to the papers previously mentioned, this micro-simulation model centers only on the decisions of women. Therefore, the working decisions of men or other women without children within the household are taken as exogenous. Both labor and childcare decisions of each woman depend on income, leisure, and care options available, given the specific conditions and regulations of the current Mexican social protection system. In other words, market segmentation

between formal and informal workers' conditions access to social security, which affects not only labor but childcare options. It is also assumed that the amount of time a woman is not working for a wage is spent on leisure, including childcare, other types of domestic work, and other non-working activities. Women with non-paid jobs will be excluded from the analysis since wages are part of the disposable income used in the utility function mentioned in the next section of the paper.

Another assumption is that women can only choose one job, and childcare options are mutually exclusive. For the states with part-time jobs, it is more realistic to assume that women can also opt for a parental childcare option since working part-time might be consistent with this strategy- i.e., for part-time jobs, working does not limit parental care. For full-time jobs, parental childcare is discarded as an option. The model also assumes that the burden of childcare for children under five is done mainly by mothers, but partial co-care from other household members (particularly grandparents) is also considered and allowed in the model. This is supported by empirical evidence. According to INEGI, in 2020, almost 76% of weekly care hours for child support were done by women (INEGI, 2021a).

4.2 *Labor and childcare states*

Let B and S be the sets of labor and childcare options, respectively. Each woman with children under five years old will choose a state between a finite discrete choice of combinations of labor and childcare $(\mathrm{b_i}, \mathrm{s_j}) \forall \mathrm{b_i} \in \mathrm{B}; \mathrm{s_j} \in \mathrm{S}$. As previously mentioned, being a discrete model, there are five types of arrangements for women:

- b_1 = not employed.
- b_2 = part-time job without social security.
- b_3 = full-time job without social security.
- b_4 = part-time job with social security.
- b_5 = full-time job with social security.

The definition of "not employed" refers to women who are not participating in the labor force (i.e., do not have paid work, regardless of whether they are actively looking for a job or not). Part-time and full-time jobs are defined according to Chapter II of Mexico's Federal Labor Bill. Part-time jobs can be defined as all the paid occupations for women with weekly working hours of 30 or less from Monday to

Friday. Full-time jobs can be defined as all the paid occupations for women who work more than 30 hours a week, including day, night, and mixed shifts from Monday to Friday.

The social security criterion is also used to establish formal and informal jobs since, in the case of Mexico, childcare, health, and social protection benefits are restricted only for workers properly registered in the Internal Revenue Service, in the Mexican Institute of Social Security (IMSS) or in the Institute for Social Security and Services for State Workers (ISSSTE). All the workers registered in these institutions, as well as their employers, must pay monthly contributions from their wages. These divisions are important, considering that during the fourth quarter of 2021, 56% of Mexican working women were employed in the informal sector without access to social security (INEGI, 2021b).

There are three types of childcare arrangements:

- s_1 childcare provided by public centers.
- s_2 childcare provided by private centers.
- s_3 parental care, assumed to be provided by the mother.

The option s_1 contemplates public centers, defined by care institutions linked to the public social security systems previously mentioned (IMSS, ISSSTE), plus other specialized care centers provided by Mexican state-owned companies and the army. The option of s_2 refers to private centers that are paid institutions for women who either have public social security but decide to opt out of the system or women who do not have social security but have to pay. Finally, parental care (s_3) is defined as all the care provided by the mother for children who do not attend any care center (either public or private). While the role of care provided by other adults will not be contemplated within the states (defined by the role of mothers in the labor market), it will take into account the role of mothers in the final specification of the model as an independent variable.

From all the possible and feasible interactions between the elements of B and S, a matrix of 10 states is derived, each element a pair of labor and childcare options for women with children under five years old. Table 1 shows the matrix of possible combinations given the labor market structure in Mexico. There are some restrictions for possible combinations. Women who do not have a paid job cannot access public social security services, including childcare centers. Additionally, workers without social security cannot access public centers. As previously mentioned, in the case of working women who

have part-time jobs, parental care can be compatible with this option, given the working hours of private and public centers in Mexico as well as the flexible structure of Mexican families.

Table 1
Possible states of labor and childcare

	Child care options (S)		
Labor options (B)	*Public centers*	*Private centers*	*Parental care*
Not employed	-	(b_1,s_2)	(b_1,s_3)
Part time job without social security (informal)	-	(b_2,s_2)	(b_2,s_3)
Full time job without social security (informal)	-	(b_3,s_2)	-
Part time job with social security (formal)	(b_4,s_1)	(b_4,s_2)	(b_4,s_3)
Full time job with social security (formal)	(b_5,s_1)	(b_5,s_2)	-

Source: Author's elaboration.

The utility function contemplated in the model is similar to the ones proposed by Kornstad and Thoresen (2009), first derived by McFadden (1974). It is divided into two parts: the first term is a function of observable variables -a representative utility function- and the second is a stochastic term that captures non-observable characteristics of the service or individual-level preferences not captured in the data. So, for any individual from the sample, the utility can be expressed as:

$$U_{n,s,b} = V\left(y_{s,b}, L\left(H_b\right), O_b\right) + \varepsilon_{n,s,b} \; for \; any \; b \in B; s \in S \quad (1)$$

It is worth noting that the income from wages from other members of the family and other sources is considered disposable income for the women but treated as exogenous; the utility function will also be dependent on the childcare options for women since available options are valuable themselves, as they provide more variety and different quality and location. Let $y_{s,b}$ be the monthly household disposable income per capita, $L(H_b)$ the monthly available leisure time of the woman as a function of working hours from the labor option

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selected, and O_b the available care options for working women given a specific selection of labor options.

In this model, income estimations are made at the individual level rather than at the household level, even when disposable income takes into account other sources from the households, since consumption and overall well-being levels of a person do not depend only on their personal income given that income tends to normally be shared among members. Also, there can be several women with children under five years old in a household. Compared to other models in previous studies, this model takes into account the difference between formal and informal status, which determines the costs of childcare and, therefore, the disposable income. Household disposable income per capita can be defined as:

$$y_{s,b} = \frac{w_b + A + TR - G_s - TX_b\left(w_b\right)}{HH} \tag{2}$$

where w_b is the monthly wage observed or estimated for a woman given a labor option; A is other sources of income from the household that are independent from the labor situation of women; TR is direct monetary transfers received by the household, either public-social programs -or private- remittances or allowances; G_s is the monthly spending on childcare given the specific option taken; $TX_b(w_b)$ are the women's monthly income taxes paid; and HH is the size of the household adjusted by an equivalence scale.

Additionally, leisure is just the percentage of total hours a month available (729) minus the hours spent by the women working:

$$L\left(H_b\right) = \left(1 - \frac{H_b}{729}\right) * 100 \tag{3}$$

Since the observable variables of hours worked in the sample is a continuous variable but the estimated hours worked in each state will take only three values, a modification of (3) as a categorical variable is proposed as a range where:

$$LH_b = \begin{cases} 100\% \text{ if } b = b_1 \\ 99\% \text{ - } 75\% \text{ if } b = b_2 \text{ or } b = b_4 \text{ (Part-time job)} \\ \text{less than } 75\% \text{ if } b = b_3 \text{ or } b = b_5 \text{ (Full-time job)} \end{cases} \tag{4}$$

Finally, O_b are the childcare options available that women have given any selected labor option. Since private options are always available for any state (subject to budgetary constraints already contemplated in $y_{s,b}$), including it is trivial. Therefore, the variable is built as a categorical variable to account for the existence of public and parental options, defined as follows:

$$O_b = \begin{cases} \text{no options if } b = b_3 \\ \text{public or parental if } b = b_1, \text{ or } b = b_2, \text{ or } b = b_5 \\ \text{public and parental if } b = b_4 \end{cases} \tag{5}$$

4.3 *Women's choice problem*

Women with children under five years old can select from ten possible states from the matrix $B \times S$ that maximizes their utility. Following Train (2009), the election problem can be stated for any woman n from the sample will choose a pair of options (b_i,s_i) if and only if $U_{n,(bi,si)} > U_{n,(bj,sj)} \forall (b_i, s_i) \neq b_j, s_j$.

Since we can only observe the deterministic part of the function, the problem can be stated as the probability of a woman n choosing alternative (b_i, s_i) as:

$$\begin{aligned} &P_{n,(b_i,s_i)} = \\ &\quad P\left(U_{n,(b_i,s_i)} > U_{n,(b_j,s_j)} \forall\, (b_i, s_i) \neq b_j, s_j\right) \\ &P_{n,(b_i,s_i)} = \\ &\quad P\left(V_{n,(b_i,s_i)} + \varepsilon_{n,(b_i,s_i)} > V_{n,(b_j,s_j)} + \varepsilon_{n,(b_j,s_j)} \forall\, (b_i, s_i) \neq b_j, s_j\right) \\ &P_{n,(b_i,s_i)} = \\ &\quad P\left(\varepsilon_{n,(b_j,s_j)} - \varepsilon_{n,(b_i,s_i)} < V_{n,(b_i,s_i)} - V_{n,(b_j,s_j)} \forall\, (b_i, s_i) \neq b_j, s_j\right) \end{aligned} \tag{6}$$

So, the problem can also be stated as follows: Woman n will choose option (b_i,s_i) only if the difference between the errors- the random part of the distribution- is smaller than the difference between the observed deterministic part of the utility function. Since

this can be expressed as a cumulative distribution of the errors ε_n, some assumptions on the errors should be made in order to derive a statistical model. Following Kornstad and Thoresen (2007) and Gong and van Soest (2002), we will assume that the errors are i.i.d. and distributed as the standard type I extreme value distribution.

$$F\left(\varepsilon_{n,(b_j,s_j)} - \varepsilon_{n,(b_i,s_i)}\right) = F\left(\varepsilon_{n,j,i}\right) = \frac{\exp\left(\varepsilon_{n,j,i}\right)}{1+\exp\left(\varepsilon_{n,j,i}\right)} \tag{7}$$

As a result, assuming independence of irrelevant alternatives (Train 2009),[2] the model can be expressed as a multinomial logit- which is consistent with utility maximization according to Marschak (1960)- with the form:

$$P_{n,(b_i,s_i)} = \frac{\exp\left(V_{n,(b_i,s_i)}\right)}{\sum_b \sum_s \exp\left(V_{n,(b_j,s_j)}\right)} \tag{8}$$

The proposed model is consistent with women choosing the option amongst the ten different states from the matrix $B \times S$ that maximize their utility assuming a specific distribution of the unobserved part of utility so long that irrelevant alternatives are independent. A representative lineal utility function is proposed, taking into account the proposed form $V\left(y_{s,b}, L\left(H_b\right), O_b\right)$ plus a vector m of relevant individual and household socioeconomic variables that will be explained in the next section. The purpose of adding more variables is to ensure that the errors are not correlated amongst options or shared socioeconomic characteristics of individuals. The criteria to include household-level variables considers the findings of previous literature to reduce the risk of obtaining biased estimations such as the number of children, the size of the household, the presence of children under two years old and the presence of grandparents. Variables of physical assets in the house were also taken into account in the socioeconomic level of the household.

While the socioeconomic variables are case-specific (i.e., they do not change over different states), wages (and therefore disposable income), leisure, and options are alternative-specific. Since the model

[2] After estimating the model presented in the results section with all the possible states, the model was re-estimated with all the different states (except the baseline) being dropped one at a time to see if the alternative specific coefficients changed. All of them remain statistically significant, with the same sign and minimal variation in their value. If this assumption were not true, the exclusion of an option would likely bias the results of the regression.

aims to create counterfactual to run simulations, a mixed logit form will be estimated, combining a multinomial specification with alternative conditional regressors. This will allow the calculation of, for any individual, the probability of being in each state under different policy scenarios. Following Cameron and Trivedi (2005), the mixed and multinomial logit are essentially equivalent, with the only difference being that the first uses both alternative and case-specific regressors.

It is worth noting that the coefficients α_1, α_2, and α_3 estimate the effect of the variables within the utility function across options, while case-specific regressors (i.e. sociodemographic variables) change across states, which means that the likelihood of a woman to choose a particular state is conditioned by certain household characteristics.

In order to evaluate the model's results in terms of predicting the probabilities of new states given a policy change, the model is estimated without any case-specific intercepts to allow variability due to changes in alternative specific regressors done in the policy simulations. In this case, disposable income, labor hours, and options will vary across states, while a vector of case-specific variables will be estimated as shown in equation (9).

$$P_{n,(b,s)_i} \frac{exp(\alpha_1 y_{n,(b,s)_i} + \alpha_2 L\left(H_{n,(b,s)_i} + \alpha_3 O_{n,(b,s)_i} + \sum_{k=1}^{m} \beta_{k,(b,s)_i} X_{k,n}\right)}{1 + \sum_{j=2}^{9} exp\left(\alpha_1 y_{n,(b,s)_j} + \alpha_2 L\left(H_{n,(b,s)_j}\right) + \alpha_3 O_{n,(b,s)_j} + \sum_{k=1}^{m} \beta_{k,(b,s)_j} X_{k,n}\right)} \tag{9}$$

5. Data

As said earlier, most data come from ENUT 2019. The sample for that survey is representative at the national level and measures different characteristics at the individual and household level, such as the time spent on different activities- including care, labor conditions, access to social security, income sources, assets of the household, and whether people take their children to childcare centers. Only women with children under five years old but still not in elementary school will be considered in the model. The total sample of women in ENUT with these characteristics is 3,536 women.

For the consideration of labor options in B, the definition of an employed worker is any woman from the sample who declared on the

survey that they worked during the week and received a wage or other type of payment (tips or commissions). For the selection of the non-employed, the sample only considered women that explicitly declared care as the main reason for not having a paid job. Other working women excluded from the model were the boss/employer of the business, as well as self-employed women since the working decision for the latter would require other specifications and assumptions. For example, the model could work better in a continuous environment if women had the flexibility to allocate as much time as they wanted if they were to own the business or have direct control of their work. Finally, the model also excludes women who received some form of permanent injury pension or who have some disease or permanent disability that precludes them from entering the labor market.

As previously mentioned, all women who reported working 30 hours a week or less would be considered to work part-time, and all women with more than 30 hours full-time. Additionally, a variable of access to public social security was created. All working women who received medical insurance as part of their job benefits job were considered to be registered in IMSS or ISSSTE. All women who did not receive this benefit were considered without access to social security.

For the care options in S, ENUT reports whether a child attends a care center or kindergarten and identifies if the mother of that child has access to any public healthcare system. The model considers users of public care centers as children that attend a care center, and the mother has direct access to social security through her job, which provides the benefit of care services. On the other hand, the option for private care centers applies to all women with children who enter into one of three cases: 1) attend a care center but the mother does not have direct access to social security; 2) attend a care center and the mother has basic access to social security but not explicitly access to public care; this can happen for independent workers paying in a special regime in IMSS; or 3) children who have paid private care at home (like tutors or nannies).

It should be noted that in Mexico, male workers in a household-father, brothers, or grandparents- can grant access to social security to the rest of the family, but only in very few cases to care centers. This happens only if the male worker can prove that he is a widower or divorced, given the original design of social protection that assumes a breadwinner structure with very clear gender roles.

Parental care can be defined as women who declare that they do the majority of the hours designated to childcare, and their children do not attend any care center nor have any paid private care

at home. Following previous studies on childcare, in order to consider the effect of having other adults take care of children in the labor market, a dummy variable for grandparents in the household was created. While exploring the data, cases were found in which the male head of the household and working women both had full-time jobs and still reported not taking their children to a care center. In order to avoid inconsistencies, those cases were excluded, assuming that another member of the family does the full care of those cases; therefore, the structure of the incentives was different from the model proposed in this paper.

To calculate disposable income, there is information on the individual level of labor income, plus other sources of income at the household level, such as cash transfers from social programs, rent from property, rent from physical assets, rent from interests, family transfers, pensions, etc. To use only current income, the following items were considered and adjusted to monthly quantities: 1) labor income from women considered in the model, 2) labor income from the rest of the members of the household, 3) per capita current non-labor income at household level from pensions, cash transfers from social programs, private transfers- including remittances, rents from financial and physical assets.

To calculate the amount of taxes paid, the Mexican income tax (*Impuesto Sobre la Renta*, ISR) is considered labor income, and social security contributions are also considered in the case of having direct access to social security. Other sources of income were taken out from the tax scheme since 1) the model assumes that this source is exogenous and, therefore, will not be considered in the policy simulations, and 2) there is no detailed data at the individual level to calculate the effective tax rate. In order to derive the tax rate from disposable income reported in ENUT, the model uses the procedure followed by Absalón and Urzúa (2012) to recover the tax base from ISR and social security contributions for the labor income of women. It is assumed that women with no social security do not pay social security contributions nor ISR, and they are considered to be informal since there is no available data to consider if those individuals actually pay any taxes.

Finally, some imputations were made to account for the cost of private care since ENUT does not have any data on expenditures. For all women in the state $S=2$ who have children that attend private care centers, the cost of private care is taken into account in the disposable income equation, assigning the average monthly cost per child under five years old by geographic regions obtained from the 2017 National

Employment and Social Security Survey (*Encuesta Nacional de Empleo y Seguridad Social*, ENESS) (INEGI, 2023).

The disposable income is then divided by the number of members in the household adjusted by the equivalence scale used in the methodology of the official poverty measures by CONEVAL (2023).

The resulting sample for the model was 3,534 women with children under five years old, which represents roughly 4.8 million women at the national level. To improve the accuracy of the model, demographic variables from the household have been included as case-specific: household size, access to health, assets of the family, and the number of children within the household using age ranges, following the approximation made by Conelly (1992), who shows that the age of other children within the household influences the decisions of women in the labor market and their care decisions. Table 2 shows the descriptive statistics used in the model.

Since we can only see the women's wages of the selected state, a fundamental challenge is to estimate wages for women who are not employed and their expected wages if they change from the formal to the informal sector, or from part to full-time jobs. In order to derive the alternative-specific wages, a wage estimation for part-time and full-time jobs is made from an ordinary least square (OLS) model for the log of wages following Kornstad and Thoresen (2007), using as regressors the level of education, education squared, experience, experience squared, a dummy variable to calculate if women are in the formal or informal sector, another dummy variable for being in a part-time or full-time job, and four dummies for the region of the country.[3] These estimates are used to create an alternative-specific disposable income function. Finally, the leisure and childcare options are set as categorical variables dependent on state B, as mentioned in the previous section.

[3] Taking the Center-South region as a baseline.

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Table 2
Descriptive statistics of the variables used in the model

	Mean	*Standard Deviation*
Employment status (Set B)		
% of women not employed	0.6582	0.4743
% of women with part time job without social security	0.0945	0.2925
% of women with full time job without social security	0.0686	0.2529
% of women with part time job with social security	0.0374	0.1898
Childcare status (set S)		
% of women using public childcare centers	0.0984	0.2979
% of women using private childcare	0.41	0.4987
% of women using parental care	0.4987	0.5
Independent variables		
Monthly labor income per women (Mexican pesos)*	2,236.57	4624.14
Monthly household disposable income per capita (Mexican pesos) *	3,098.75	2645.63
Age	28.5	6.77
Years of education	13.5	4.1
Years of experience	12.0	7.5
% of employed women who work between one and 30 hours a week	0.1319	0.3384
% of employed women who work more than 30 hours a week	0.2098	0.4072
% of women who live in the North region	0.2071	0.4052
% of women who live in the North-Central region	0.1979	0.3984
% of women who live in the Central region	0.1963	0.3972
% of women who live in the South-Central region	0.1829	0.3866

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Table 2
(Continued)

	Mean	*Standard Deviation*
Independent variables		
% of women who live in the South-Southeast region	0.2156	0.4113
% of women with children under 2 yo in their household	0.5887	0.4921
% of women with children between 3 and 5 yo in their household	0.6269	0.4836
% of women with children between 6 and 9 yo in their household	0.3857	0.4868
% of women with children between 10 and 12 yo in their household	0.2224	0.4350
% of women with grandparents in their household	0.3890	0.4876

Note: *The labor income and working hours calculations include women who are not employed.

Source: Author's elaboration using ENUT 2019.

6. Results

To estimate the different wages for any given state, an OLS model is estimated using only data for working women with positive wages reported. The wage for women outside the market for the estimated states where women are not employed is zero since women who report not working in ENUT 2019 do not answer questions about wages. The estimation adjusts the dummy variables for informal and part-time jobs for the different states. Table 3 shows the results of that regression.

Table 3
Monthly wage estimation

	Using original wages	*Using log wages*	*Using log wages*	*Using log wages*
Constant	7326.73**	7.1033***	8.2143***	8.2034***
	(3170.38)	(0.3218)	(0.2979)	(0.299)
Education years	-676.69	0.0463	0.0026	-0.0002
	(452.16)	(0.0358)	(0.0316)	(0.0321)
Education years	37.96**	0.0016	0.0020**	0.0021**
squared	(15.26)	(0.001)	(0.0009)	(0.0009)
Experience	167.27*	0.0360**	0.0159	0.0149
	(94.3)	(0.0153)	(0.0146)	(0.0145)
Experience	-2.74	-0.0008	-0.0002	-0.0002
squared	(3.75)	(0.0006)	(0.0006)	(0.0005)
Informal status	-2222.72***		-0.5294***	-0.5053***
	(391)		(0.0539)	(0.0531)
Part time job	-1692.77***		-0.3961***	-0.3916***
	(320.52)		(0.0513)	(0.0508)
Region (North)	373.04			0.0602
	(517.08)			(0.0568)
Region (North-	376.72			0.0794
Central)	(378.43)			(0.0578)
Region (Central)	828.67			0.059
	(620.32)			(0.0895)
Region (South-)	-801.22**			-0.1703**
Southeast	(386)			(0.0667)
Adj R^2	0.3107	0.2822	0.4708	0.4794
RMSE	4704.28	5065.22	5074.11	5077.09
N	1229	1229	1229	1229

Note: Robust standard errors in parenthesis. ***p<0.01, **p<0.05, *p<0.1.
Source: Author's elaboration.

All the models except one in Table 3 show that three variables -education years squared, being in the informal sector, and having a part-time job- are statistically significant. Adjusted R squared, and the root of the mean squared error were estimated to select the best model for estimated wages. For the models that used the log of wages, the root of the mean squared error was estimated after transforming to wages the predicted results. The selected model to estimate wages for different states was the first model, which uses the level of wages rather than the logs and includes dummies for all the regions of the country. Even when the first model with levels has a smaller adjusted R squared (which is expected considering that the log of wages reduces variability), it has the highest root squared mean error amongst all the models. Wages for the tenth states are estimated using these coefficients, replacing the observed wages for all the cases to use as much observed data as possible. The mixed logit model will take as a baseline the scenario of women not employed with parental care since it is the most prevalent scenario. For the purposes of policy-making, it is relevant to analyze the factors that would increase the probability of a woman in that state becoming employed. Table A2 shows the model results for all the states, and Table 4 shows the predicted wages by employment status.

Table 4
Estimates net wages by employment status.
Set B (Mexican pesos)

	Mean	*Standard Deviation*
% of women not employed	0	-
% of women with part time job without social security	3296.31	2025.91
% of women with full time job without social security	4989.08	2025.91
% of women with part time job with social security	5376.68	1965.22
% of women with full time job with social security	7022.22	1961.66

Source: Author's elaboration using ENUT 2019.

The selected model shows all the alternative-specific variables as statistically significant at the 99% confidence level. There is significant variation of case-specific alternatives depending on the specific states and the sub-sample for each state: states of part-time formal workers have very few observations, so standard errors tend to be

comparatively large: state (b_4,s_1) has 51 observations, state (b_4,s_2) has 11, and state (b_4,s_3) only 36. However, some general insights can be drawn from Tables A1 and A2 in Appendix A. As one could expect, having children aged two or younger reduces the probability of a woman transitioning from being not employed and using parental care to almost any other option, even part-time jobs. This could be because the burden of care is more intense during a child's first two years of life. On the contrary, having children aged three to five increases the probability of being employed in almost any other state. This could be due to the availability of private and public centers for this age group in preschool. In addition, having grandparents in the household increases the probability of being employed in several states since other members of the household can contribute to childcare.

Table 5
Observed vs predicted probabilities of the model

	Observed			*Predicted*		
State	*Mean*	*SD*	*95%CI*	*Mean*	*SD*	*95%CI*
(b_1, s_2)	0.2288	0.0102	(0.2087,0.2489)	0.2316	0.0043	(0.2231,0.2402)
(b_1, s_3)	0.4294	0.012	(0.4058,0.4530)	0.4137	0.0062	(0.4014,0.4260)
(b_2, s_2)	0.041	0.0045	(0.0321,0.0500)	0.0435	0.0009	(0.0417,0.0454)
$(b_2, s_3))$	0.0534	0.0055	(0.0424,0.0644)	0.0529	0.0008	(0.0510,0.0547)
(b_3, s_2)	0.0686	0.0059	(0.0570,0.0802)	0.0692	0.0014	(0.0664,0.0720)
(b_4, s_1)	0.0142	0.0023	(0.0097,0.0187)	0.016	0.0008	(0.0144,0.0176)
(b_4, s_2)	0.0072	0.0022	(0.0027,0.0117)	0.0066	0.0002	(0.0060,0.0071)
(b_4, s_3)	0.0158	0.0029	(0.0100,0.0217)	0.0141	0.0008	(0.0125,0.0157)
(b_5, s_1)	0.0841	0.0062	(0.0719,0.0963)	0.1006	0.0044	(0.0919,0.1092)
(b_2, s_2)	0.0569	0.0065	(0.0441,0.0698)	0.0513	0.0018	(0.0477,0.0549)

Note: Both observed data and model estimates presented use ENUT 2019 sampling weights.

Source: Author's elaboration.

This model is used in the next section to simulate changes in disposable income due to changes in different policies. In addition to McFadden's pseudo R squared, in order to evaluate the fitness of the model, Table 5 compares the mean of observed state probabilities with the mean of the simulated probabilities and their 95%

level confidence intervals. Considering the fact that the model was estimated without a constant (i.e., probabilities are only considered using the observable variables), the model fits relatively well for almost all states. It slightly overestimates public care for full-time job mothers in the formal sector.

7. Policy simulations

There is a wide array of public policies to reduce and redistribute unpaid childcare that disproportionately affects women- maternity and paternity leave, increasing school hours, more flexible working schemes for mothers, fiscal incentives for early child education (ECE), universal provision of public childcare, care-friendly social protection systems, among others (Addati *et al.*, 2019). Considering the available survey data for Mexico and the environment and assumptions of the model proposed in early sections, this paper focuses on fiscal and social policies that directly affect childcare costs through an increase in the disposable income of the household.

Countries like the United States, which rely on private ECE, have adopted direct subsidies like portable vouchers for low-income families to incentivize the use of childcare centers. Some of them, like the Child Care Development and Block Grant, require parental employment, while others, like the Early Head Start, do not require parental employment since the policy priority is focused on the positive effects of ECE on young children and toddlers and not on increasing employment (Morrisey, 2017).

Morrisey (2017) presents the main research findings for several countries with policies to reduce ECE costs (either public or private). Countries like the United Kingdom use instruments like the Working Families Tax Credits for low-income families, which can cover up to 70% of childcare costs up to £70 per week and show an increase of five percentage points in female labor participation amongst single mothers with children under five years old. In the case of Finland, a voucher program was introduced in several municipalities in 1994, showing an increase in the use of private childcare but not showing effects on female labor participation.

Using the estimates from the model, three policy simulations are conducted to evaluate whether changes in fiscal and social policy increase female labor participation for women with children under five years old and, therefore, change the choices of women with regards to their selected labor and care options.

The three options are 1) a reduction of marginal rates in Mexico's income tax (ISR), 2) a tax credit for working women who choose private sector childcare, 3) a conditional cash transfer for working women living in households with a per capita income below the poverty line. Table 6 shows the change from the baseline predicted by the model to a specific simulation, and Table A3 in the Appendix shows changes through aggregate categories of labor status and childcare options.

Table 6
Results of the simulations by states

	Baseline		*S1: income tax reduction*		*S2: tax credit*		*S3: cash transfer*	
State	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
(b_1, s_2)	0.2317	0.0043	0.2199*	0.0044	0.2291	0.0043	0.2267	0.0043
(b_1, s_3)	0.4138	0.0063	0.3979*	0.0066	0.4116	0.0063	0.4082	0.0063
(b_2, s_2)	0.0436	0.0009	0.0405*	0.0009	0.0434	0.0009	0.0425	0.0009
(b_2, s_3)	0.0529	0.0009	0.0506*	0.0009	0.0526	0.0009	0.0521	0.0009
(b_3, s_2)	0.0693	0.0014	0.0648*	0.0014	0.0695	0.0015	0.0677	0.0014
(b_4, s_1)	0.016	0.0008	0.0189*	0.0009	0.0157	0.0008	0.0177	0.0008
(b_4, s_2)	0.0066	0.0003	0.0077*	0.0003	0.0080*	0.0003	0.0074*	0.0003
(b_4, s_3)	0.0142	0.0008	0.0170*	0.0008	0.0141	0.0008	0.0158	0.0008
$((b_5, s_1)$	0.1006	0.0044	0.1195*	0.0054	0.0987	0.0043	0.1064	0.0045
(b_2, s_2)	0.0513	0.0019	0.0631*	0.0022	0.0578*	0.0021	0.0555	0.0019

Note: Model estimates and simulated data presented use ENUT 2019 sampling weights. Estimates with * are statistically significant than the baseline with a 95% confidence interval and a one-tail hypothesis test.

Source: Author's elaboration.

7.1 *Policy simulation 1: Income tax reduction for women*

This proposal simulates the effect of reducing the marginal rate of the income tax (ISR) targeted only toward women with children under five years old, keeping the brackets for each segment of the tax constant. The measure is temporary and lasts only for the amount of time in which the child is under five years old. It would affect only the formal jobs registered in IMSS or ISSSTE. Reducing this rate should increase the disposable income for many women and provide incentives for entry into the labor market, increasing the opportunity cost of leisure

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by increasing the expected net wage in five states. Table 7 presents the adjustment details, taking as reference annual income for 2019, the same year as ENUT. The proposal contemplates a one percentage point reduction in the marginal rate for all wages above 6,942 Mexican pesos (MXN) a year and an additional reduction of another one percentage point in the first four brackets since 73.7% of the observed sample of women working in the formal sector (i.e., with access to direct social security) falls under these brackets.

Table 7
Income tax proposal for women with children under five years old

Income brackets		*Original*		*Proposal*	
Lower bound	*Upper bound*	*Fixed quota*	*Marginal tax*	*Fixed quota*	*Marginal tax*
0.01	6,942.20	0	1.92%	0	1.92%
6,942.21	58,922.16	133.28	6.40%	133.28	4.40%
58,922.17	103,550.44	3,460.01	10.88%	2,418.20	8.88%
103,550.45	120,372.83	8,315.57	16%	6,379.41	14%
120,372.84	144,119.23	11,007.14	17.92%	8,735.55	16.92%
144,119.24	290,667.75	15,262.49	21.36%	12,754.45	20.36%
290,667.76	458,132.00	46,565.26	23.52%	42,591.74	22.52%
458,132.01	874,650.00	85,952.92	30%	80,304.76	29%
874,650.01	1,166,200.00	210,908.23	32%	201,095.74	31%
1,166,200.01	3,498,600.00	304,204.21	34%	291,475.64	33%
3,498,600.01	or more	1,097,220.21	35%	1,061,167.63	34%

Note: The brackets are set in terms of a person's annual gross income.

Source: Author's elaboration using information from the Mexican Revenue Service.

As shown in Table 8, the reduction in the marginal tax rate increased the reported monthly wage of women, therefore increasing their household disposable income per capita. Both part-time and full-time workers increased their monthly net wages by 15% and 10.8%, respectively, and their average tax burden reduced by 38% and 27%, respectively. Although this could create incentives to formalize some women, the measure could be regressive since women living in poverty tend to be in the informal economy with precarious jobs. The

space for tax reductions is also very limited, since taxes are already relatively low in absolute terms.

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Table 8
Changes in monthly net wages before and after taxes (Mexican pesos)

	Baseline	*After tax reduction*
Part time workers	$5,376.68	$6,099.11
Full time workers	$7,222.81	$8,002.58

Source: Author's elaboration using estimated wages for women working in the formal sector.

The policy shows positive results in terms of both increasing formal employment amongst women of the group and reducing parental care. Considering the sampling weights from ENUT 2019, the number of women not employed was reduced from 64.5% to 61.7%, almost 2.8 percentage points. Regarding employment status, the number of women who choose formal full-time jobs increases, especially for women who would choose private and public childcare. The percentage of women working in full time jobs in the formal sector increases from 15.2% to 18.3%, almost three percentage points. In contrast, there is a slight reduction in informal employment since expected relative wages between sectors change due to an increase in expected net wages. Regarding childcare, the percentage of women who would choose public childcare increases from 11.7% to 13.8%, and other options have a slight decrease. Overall, the number of women with better jobs in the formal sector (with access not only to public childcare but other benefits, such as maternity leave and paid sick leave) increases, which could be positive in improving working conditions and reducing precarious jobs.

In terms of the first-order effects on tax collection, before the implementation of the policy, the total monthly estimated income tax revenues from women with children under five years old who worked in the formal sector accounted for 12.2 billion pesos in the base scenario. The measure would reduce the estimated amount collected by these taxes by 1.8 billion pesos each month, with a total of 21 billion pesos per year. The results of the potential loss in tax revenue should be taken only as a comprehensive estimate for comparative purposes amongst different policy simulations since household surveys tend to under-report income and are not directly comparable with national accounts.

It is important to consider that the model presented in this article does not account for market equilibrium and second-order effects. For example, the total cost could be lower than expected since there could be positive effects from the measure in terms of tax collection due to more women entering the formal sector and, therefore, paying taxes and social security contributions. In contrast, wages can decrease in the long term if more women enter into the formal sector. Finally, since it is a temporary measure, demographic changes might reduce in the long term the number of women who decide to have children.

7.2 *Policy simulation 2: A tax credit for private childcare*

In this policy simulation, a 70% subsidy of the average cost of private childcare is implemented with a similar tax to the one provided in the United Kingdom for all employed women who pay for private childcare. Since the mechanism to provide the tax credit is through the tax system, women are required to have a paid job in the formal sector. The credit has a cap of MXN 1,500 a month, slightly lower than the average total childcare for all the geographic regions (MXN 1,571).

As a result, the total cost of private childcare in the different regions decreases. In the Central region, which has the highest costs, private childcare costs decreased from MXN 2,370 to MXN 870. In contrast, the region with the lowest costs (North-Central) decreases from MXN 1,453 to MXN 436. The change in childcare costs only apply to all households in their observed or estimated states where women are employed in the formal sector and choose private childcare.

In contrast to the previous simulation, the model does not show significant changes in most states. The percentage of women not employed decreases from 64.5% to 64.1%, less than half a percentage point, while formal employment (both considering part-time and full-time states) only increases from 18.9% to 19.4%. Private childcare

increased from 40.25% to 40.73%, and parental care from 48.1% to 47.8%. The states that show a statistically significant increase are where women have part-time or full-time jobs and private childcare.

According to the estimated model, the number of women who could potentially benefit from the measure reaches 310 thousand. Considering regional variations in private childcare costs mentioned above, the annual cost of the policy is close to 4.5 billion pesos, which is only a fifth of the reduction in the marginal rates of ISR. One of the limitations of this specific policy is that women might not enter the formal labor market if the reduction in the subsidy is offset by the amount of new costs that women face (social security contributions and ISR).

7.3 *Policy simulation 3: A conditional cash transfer for poor households*

Under this policy, a conditional cash transfer of MXN 3,400 (the poverty line for one person, that considers the cost of basic goods, including food, education, housing, and health) is given to households with a monthly income per capita below the poverty line with at least one woman with children under five years old who has a formal job. The monthly income per capita is the disposable income per capita of the household without childcare costs. The transfer will last until the children are five years old and be conditioned to women having and keeping a formal job. Since the survey was implemented in 2019, the official per capita poverty line used is MXN 3,400 pesos per month, which comes from CONEVAL (2021). There can be only one transfer per household, regardless of the number of members or children under five years old.

The targeting of poor households with women who have children under five years old is normally done through proxy means tests, which are used when there is data on household or individual characteristics that are correlated with welfare or income (Grosh and Baker, 1995; Dávila, 2016) for the application of these in Mexico). The percentage of women living in a household with a monthly income per capita below the poverty line is 33.6% for women working a part-time job and 36.3% for full-time jobs.

Similar to the tax credit previously discussed, the model does not show significant changes in most states. The only significant change is the increase in part-time formal workers, from 3.7% in the baseline to 4.1% after the cash transfer. The percentage of women who use public childcare marginally increases from 11.7% to 12.4%, while the

number of women not employed also decreases slightly, from 64.5% to 63.5%

According to the estimations, the number of beneficiaries from the measure would reach almost 300 thousand women. Taking into account the monthly amount of cash transfer mentioned above and assuming no administrative costs, the annual cost of this cash transfer would be close to 12.2 billion pesos, roughly half of the estimated cost for the reduction in ISR and more than 2.5 times the cost of the tax break.

8. Conclusions

Most women with children under five choose not to enter the labor market. As shown by the latest data from ENOE, this situation was aggravated further by the COVID-19 pandemic since the recovery for women has been slower than for men. Research from Nieves and Robles (2016) on policies in Latin America suggests that labor regulation, fiscal policies, and social protection systems can effectively reduce childcare work and increase labor participation in the market. This paper focused on the fiscal and social policy components and analyzed three policy simulations that explored the possible increase of labor force participation and childcare centers through increasing the disposable income of women with children under five years old. However, the options have different effects on labor markets and childcare options.

The most effective policy simulation, and the one with the highest direct cost, was the reduction of income taxes through adjusting the marginal tax rate for lower income brackets. The reduction of personal income tax marginal rates increases formal employment and reduces informal work and parental childcare for women who are not employed. In contrast, the tax credit and the conditional cash transfer have very limited effects. The former increases the percentage of women working in the formal sector with private childcare but has only a marginal effect on women not employed or childcare centers. The latter increases part-time formal employment but also has marginal effects on other states.

Fiscal and social policies targeted at formal workers have considerable limitations. In the analyzed sample, only 17% of the women are working in the formal sector. The other 15% of employed women are in the informal sector. It is also worth noting that even tax reduction has limited effects since the majority of the sample is concentrated

in the lower brackets of the distribution and, therefore, the effective taxes paid -both in relative and absolute terms- are already low. An important area for future research is to analyze policies that could support women in the informal sector who tend to have lower wages without creating perverse incentives in the labor market. Most of these women are self-employed and have more flexibility in terms of working hours, a potential area of research outside the assumptions and design of this discrete choice model but important in terms of policymaking.

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Appendix

Table A1
Mixed logit estimation (Part 1/2)

	Alternative specific coefficients
Disposable income	0.00049***
	(0.00004)
Leisure (part-time job)	-2.4352***
	(0.3572)
Leisure (full-time job)	-5.2243***
	(0.482)
Options (no options)	2.4812***
	(0.6211)
Options (public and parental)	-7.1165**
	(1.1114)
McFadden pseudo-R2	0.186
N	3,534

Note: The baseline state is (b_1, s_3). For the Leisure variable the baseline is "no paid job" and for the Options variable is "no options". Standard errors in parenthesis. ***p<0.01, **p<0.05, *p<0.1

Source: Author's elaboration.

Table A2

Mixed logit estimation (Part 2/2)

Case-specific coefficients	*Not employed / private*	*Part-time informal / private*	*Part-time informal / parental*	*Full-time informal / private*	*Part-time formal / public*	*Part-time formal / private*	*Part-time formal / parental*	*Full-time formal / public*	*Full-time formal / private*
Health (social	-0.0273	-0.1007	-0.1783	-0.2638	2.6133***	1.9816***	2.0088***	3.2471***	1.6806***
security)	(0.1102)	(0.1976)	(0.1701)	(0.1631)	(0.6222)	(0.6813)	(0.4913)	(0.3210)	(0.2473)
Household	-0.0352	-0.2504***	0.0007	0.1303**	-0.0229	-0.0672	-0.0340	-0.0928	0.0435
size	(0.0435)	(0.0840)	(0.0608)	(0.0622)	(0.1518)	(0.1873)	(0.1173)	(0.0635)	(0.0682)
TV	-0.5779***	-0.324	0.1878	0.4155	0.5162	-1.8375**	-0.0930	-0.3003	0.5785
	(0.1612)	(0.3328)	(0.3219)	(0.3722)	(1.0128)	(0.7310)	(0.7365)	(0.3653)	(0.5196)
Fridge	-0.4554***	0.0339	0.0453	-0.1156	0.3157	1.2833	0.5844	-0.2093	0.0719
	(0.1372)	(0.2731)	(0.2288)	(0.2294)	(0.7792)	(1.0844)	(0.7371)	(0.2908)	(0.3602)
Car	0.2194**	-0.2884	-0.7057***	0.0148	0.6586*	0.3617	0.3246	0.4043***	0.1120
	(0.1103)	(0.2055)	(0.1871)	(0.1640)	(0.3515)	(0.4866)	(0.3210)	(0.1549)	(0.1894)
Computer	0.3958**	0.6876**	0.0159	0.6695***	1.2806***	2.0807***	0.5439	1.0151***	0.5790**
	(0.1779)	(0.3039)	(0.2856)	(0.2497)	(0.3760)	(0.5860)	(0.3848)	(0.1838)	(0.2378)
Internet	-0.1516	-0.2394	0.2117	-0.2225	-0.121	-0.9953*	0.1464	0.3291*	0.4079*
	(0.1353)	(0.2495)	(0.2036)	(0.2048)	(0.3707)	(0.5678)	(0.3579)	(0.1714)	(0.2125)
Children (0-2	-1.1513***	-1.1972***	-0.419	-1.233***	-1.5666***	-0.9021*	0.5467	-0.9428***	-1.8708***
years old)	(0.1194)	(0.2317)	(0.2561)	(0.2001)	(0.4488)	(0.5353)	(0.5256)	(0.1960)	(0.2510)
Children (3-5	2.1127***	2.5556***	-0.1481	1.7243***	1.1062**	2.5141***	0.3197	1.2758***	1.3926***
years old)	(0.1390)	(0.3309)	(0.2234)	(0.2450)	(0.5104)	(0.7396)	(0.3855)	(0.2043)	(0.3000)
Children (6-9	-0.2162*	-0.073	-0.0152	0.0327	-0.0102	0.0033	-0.0164	0.0669	-0.2435
years old)	(0.1106)	(0.2044)	(0.1745)	(0.1647)	(0.3245)	(0.4807)	(0.3303)	(0.1541)	(0.1945)
Children (10-12	-0.1967	0.0767	0.4103**	0.3259*	-0.4401	-0.2917	-0.0570	-0.0087	-0.0493
years old)	(0.1275)	(0.2344)	(0.1879)	(0.1812)	(0.4242)	(0.5932)	(0.4189)	(0.1888)	(0.2247)
Grandparents	0.0457	0.9572***	0.7120***	1.0982***	-0.0457	0.8003	0.7510*	0.8723***	1.0699***
	(0.1470)	(0.2585)	(0.2174)	(0.2089)	(0.4760)	(0.6134)	(0.4024)	(0.2003)	(0.2410)

Note: The baseline state is (b_1, s_3). Standard errors in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Source: Author's elaboration.

Table A3

Results of the simulations by aggregated categories

	Baseline		*S1: Income tax reduction*		*S2: Tax credit*		*S3: Cash transfer*	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
By labor status (Set B)								
Not employed	0.6450	0.0067	0.6177*	0.0067	0.6407	0.0067	0.6349	0.0067
Part-time, informal	0.0965	0.0011	0.0911*	0.0012	0.096	0.0011	0.0946	0.0011
Full-time, informal	0.0693	0.0014	0.0648*	0.0014	0.0695	0.0014	0.0677	0.0014
Part-time, formal	0.0369	0.0016	0.0437*	0.0016	0.0373	0.0016	0.0409*	0.0016
Full-time, formal	0.1519	0.0057	0.1826*	0.0068	0.1565	0.0058	0.1619	0.0058
By childcare option (Set S)								
Public childcare	0.1166	0.0051	0.1384*	0.0063	0.1144	0.0050	0.1240	0.0052
Private childcare	0.4025	0.0061	0.3961	0.0061	0.4073	0.0061	0.3998	0.006
Parental childcare	0.4809	0.0071	0.4655	0.0071	0.4783	0.0071	0.4762	0.0071

Note: Model estimates and simulated presented use ENUT 2019 sampling weights. Estimates with * are statistically significant than the baseline with a 95% confidence interval and a one tail hypothesis test

Source: Author's elaboration.