IMPACT OF MOTHERHOOD ON WOMEN'S WAGES AND PERMANENCE IN THE LABOR MARKET – IMPLICATIONS FOR THE ARGENTINE SOCIAL SECURITY SYSTEM

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Executive Summary

The traditional role of women as caregivers in the household and, closely linked to this, motherhood, are factors that explain the disadvantaged position of women in the labor market, contributing to the origin and persistence of gender gaps.

The purpose of this report is to analyze the effects of motherhood both on women's participation in the labor market and on the wages they receive (effects referred to in the academic literature as motherhood penalty), and their implications for the Argentine Social Security System.

To this end, we first quantify the effects of motherhood on women's labor participation and wages for the term 2004-2020 based on the microdata from the Permanent Household Survey (*Encuesta Permanente de Hogares*, EPH), conducted by INDEC (National Institute of Statistics and Census of Argentina). We also examine whether these effects differ among women with different characteristics (age, educational attainment, and sector of the labor market in which they are employed). Secondly, we estimate the impact of motherhood on the likelihood of accessing social security benefits (measured by the number of years of accumulated contributions), as well as on initial pension benefits.

The results obtained indicate that there is a motherhood penalty in Argentina. Women with children are less likely to enter the labor market than those without children and, if they do, they earn a lower hourly wage.

In terms of labor participation, the likelihood that a mother will enter the paid labor force is 11.5 percentage points lower than that of a woman without children, an effect that is more pronounced for mothers of children under 10 years of age. In terms of wages, a woman with children earns 12% less than a woman who is not a mother, and this penalty is greater for women with adolescent children.

These effects of motherhood on labor participation and wages are worsened by the number of children. A woman with three or more children is 15 percentage points less likely to work than a woman who is not a mother and has a relative wage 18% lower.

In addition, these effects do not have the same impact on different groups of women. It is observed that the greatest motherhood penalties are among the youngest women, those with intermediate qualifications (with completed secondary education), and those in the informal labor market. Unregistered employment offers the possibility of combining household chores with paid work. A mother is more likely to be employed in the informal labor market, if she is at all.

Based on the likelihood that each group of women has of entering the formal labor market, both women without children and mothers face great difficulties in reaching the required number of years of contributions to the Social Security System, a situation that is worsened for mothers. Among those who do not reach the required number of years of contributions, more than half of those who are mothers and one third of those who are not, accumulate less than 10 years of contributions.

Other factors, besides motherhood, keep women away from the possibility of accessing social security benefits. Addressing the causes that produce these phenomena will reduce the subsequent need to use measures to deal with these effects, such as pension moratoriums. In this sense, if structural issues that prevent reaching the required years of contributions, such as difficulties in entering and staying in the formal labor market, are not addressed, and only access to social security benefits is considered, the economic and financial inconsistencies of the pension system could be worsened by creating greater imbalances between inflows and outflows.

The results show that only 25% of mothers manage to reach the years of contributions required by the regulations, while the percentage is 41% when analyzing women who do not have children. Within this select group, 9 out of 10 mothers and slightly more than 8 out of 10 women without children have completed university studies and only 2 out of 10 mothers have a large family (3 or more children).

In terms of wages, despite the small differences observed in the formal sector between the groups of women analyzed, these differences are carried over to retirement, implying lower relative social security benefits for mothers. However, there are equalizing effects of the Social Security System that reduce these gaps thanks to the leverage of the Universal Basic Benefit on the lowest wages.

Promoting integration into the formal labor market would guarantee not only better working conditions (given that the informal sector has the largest wage gaps between mothers and non-mothers) but also access to social protection for women workers and their families, if they have any. Likewise, the registration of the activity would result in greater resources for the public coffers, thus contributing to the fulfillment of one of the basic principles of any social security system, which is its self-financing.

The results obtained in this report provide unequivocal evidence of the economic benefits of including a gender perspective in public policies, in addition to the well-known benefits in terms of equity and social justice.

Introduction

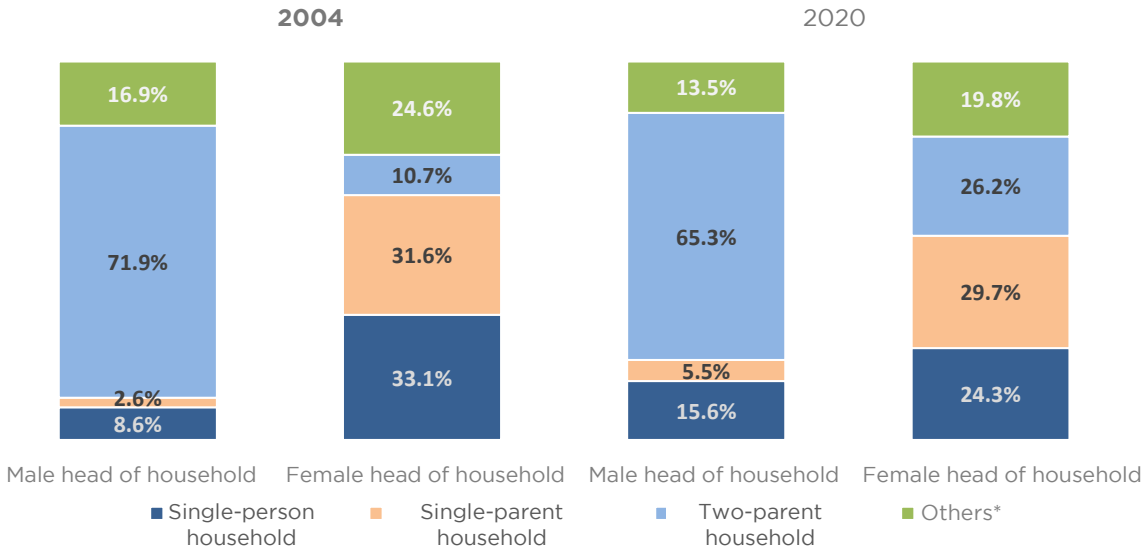
In recent decades, there has been a significant increase in female labor participation, as well as higher levels of education (Ridgeway and Corell, 2004). However, there are still marked gaps between men and women that keep the latter from fulfilling their rights.

A glance at the composition of households in Argentina reveals a preponderance of two-parent households in which the head (usually related to the highest income within the family group) is the man. From a historical perspective, this situation has been constant over the years, despite the increase in the participation of female-headed households.

On the other hand, in single-parent households (those in which only one of the parents lives with the children) the situation is the opposite, that is, there is a greater proportion of households headed by a woman. In other words, it is mainly women who provide for the children, a situation that has persisted over time.

Figure 1. Composition of households in Argentina

Comparison between 2020 and 2004



Note: (*) *Others* include composite and extended households

SOURCE: OPC, based on Permanent Household Survey (INDEC).

These dynamics have their origin in the persistence of stereotypes that assign different roles to men and women within the household. In effect, this generates an unfair division of labor that assigns women greater responsibility for household chores (unpaid work). Based on the information provided by the Survey on Unpaid Work and Time Use (INDEC 2013), on average women spend almost twice as many hours performing household chores. Although employed women spend slightly less time than unemployed women on household chores, they spend almost twice as much time as unemployed men. These differences are even more pronounced when there are children in the home.

In the labor market, women participate less than men, and those who do participate do so in worse conditions. According to data from INDEC's Permanent Household Survey (EPH), as of the fourth quarter of 2020, the activity rate of women was 20 percentage points lower than that of men (47.6% versus 67.2%) and their wages were on average 20% lower. Likewise, nearly 35% of employed women were in the informal market, compared to 33% of men.

Women's traditional role as caregivers and, closely linked to this, motherhood, appear as a "natural" explanation for the fact that they are in a disadvantaged position in their jobs (Budig and England, 2001). These disadvantages refer to lower labor participation rates and/or interruptions in mothers'

career, as well as lower wages compared to childless women. This report will use the term the academic literature gives to both effects, motherhood penalty.

The analysis of the effects of motherhood on women's labor participation and wages is important in the formulation of public policies for several reasons.

From an individual perspective, on the one hand, motherhood penalty constitutes a form of gender inequality and, as such, prevents the full development of women's economic autonomy. On the other hand, it worsens household poverty and reinforces its reproduction: female-headed households are more likely to be in poverty and have fewer opportunities to overcome it because of the tension between family responsibility and labor participation in well-paid jobs. According to EPH data as of the fourth quarter of 2020, 34% of poor households in Argentina are headed by a woman, a higher percentage than poor households headed by a man (31%), even though a large part of public policy prioritizes women in access to allowances that provide greater economic autonomy. In addition, work interruptions and lower wages imply, in the long term, greater difficulty (even impossibility) in accessing Social Security benefits, which not only include income for retirement, but also other benefits such as health care.

From a collective perspective, these situations require greater governmental involvement, given that the National Government is committed to protecting and guaranteeing the rights of all women. This has been the case of the different measures that have been adopted over time within the framework of the Argentine Social Security System aimed at covering the basic needs of households in vulnerable situations or extending access to social security benefits; all of which have had a significant effect on equity.

Consequently, including gender perspective in public policies would not only lead to fairer and more equitable societies, but would also contribute to greater economic growth and development.

The purpose of this report is to quantify the effects of motherhood on women's labor participation and wages in Argentina and to determine whether these effects differ among women with different characteristics (age, educational attainment, and sector of the labor market in which they are employed). We also estimate the implications of motherhood penalty on the Argentinean Social Security System.

For this purpose, we use data from the EPH for the term 2004-2020.

The most appropriate data structure for this type of study is one that combines a cross-sectional dimension (multiple observations at a given time) with a temporal dimension (one observation over time), known as a panel data structure, which allows us to analyze the labor trajectory of women over time. In this respect, in March of this year a request was made to ANSES (National Social Security Administration) for information with this configuration, a request that has not been answered as of the date of publication of this report. Given that analyzing these phenomena is the basis for obtaining benefits, not only in terms of equity but also in economic terms, it was decided not to suspend this publication, but to use the EPH as a subsidiary source of information.

This paper is structured as follows: first, the main theories that explain motherhood penalty are presented in the conceptual framework and the empirical evidence on the subject is reviewed. Secondly, a descriptive analysis of the sample under analysis is carried out, comparing the group of women with children with those who do not. Subsequently, the strategy and methodology used to estimate motherhood penalty is described. Fourth, we present the results obtained for the total number of women considered, as well as for different segmentations of the sample defined according to observable characteristics. Finally, the implications of these results for the Argentine Social Security System are analyzed.

Conceptual Framework

There are different mechanisms that could explain motherhood penalty, such as work interruptions caused by childbirth, lower productivity because of work overload (paid and household), greater willingness to sacrifice wages for jobs with flexible schedules or shorter working hours, or simply discrimination at the time of hiring. The empirical literature that seeks to contrast these hypotheses agrees that mothers receive a lower hourly wage compared to women without children, but not in the mechanism that generates it. Likewise, the literature finds that the effects of motherhood on labor participation and wages are heterogeneous for women of different ages, educational and socioeconomic levels.

The theoretical literature on the impact of motherhood on women's labor trajectory offers various explanations for wage penalty, which can be grouped under two categories. On the one hand, those that refer to observable factors of female workers and are based on the differences in characteristics, preferences and behaviors between mothers and childless women; and on the other hand, those that focus on the idea of discrimination against women with children by employers.

Motherhood penalty implies a lower likelihood of working and a lower hourly wage compared to childless women.

Within the first group we find the human capital theory (Becker, 1985), which states that the lower wages of mothers, in relation to childless women, are the result of differences in human capital factors between the two groups. Mothers have less education, work experience and length of service because of the interruptions in their work trajectories caused by motherhood or because they decide to work fewer hours to combine work and family life.

Another possible explanation within this group of theories holds that mothers face a greater workload between domestic and paid work that makes them less productive at work and therefore have lower wages than women without children.

Finally, women with children receive lower relative wages because, compared to women who are not mothers, they work in jobs that are more flexible, have shorter hours or require less effort to combine paid work with work at home. According to the theory of wage compensation, jobs with these characteristics offer lower wages.

The second group comprises theories that explain the wage gap based on discrimination by employers, such as the "taste-based discrimination" model (Becker, 1957) and the "statistical discrimination" model (Phelps, 1972 and Arrow, 1973). In both models, individuals with equal skills may have different employment trajectories, depending on the population group to which they belong (by sex, race, religion, etc.). The first model states that the employer applies discriminatory practices by preferring to work exclusively with childless women, while the second model argues that, in the presence of imperfect information in the labor market, the productivity of female workers (a characteristic that is unobservable) is deduced from the identity of the group to which they belong. In this sense, employers perceive childless women to be, on average, more productive than mothers and, based on this assumption, make different job and wage offers between the two groups of women.

Many empirical studies on the impact of motherhood seek to provide evidence to support or refute theoretical explanations of why motherhood may lead to lower wages.

Among the studies for developed economies, which are based on observable differences between women with and without children, some conclude that the lower wage paid to mothers disappears when variables such as labor productivity and characteristics related to a worker's qualifications are included in the models (Hill, 1979; Gupta and Smith, 2002).

In contrast, there are studies that find that the wage gap between mothers and childless women persists after considering variables related to human capital accumulation and other labor characteristics (Waldfogel, 1997; Budig and England, 2001).

When analyzing the effects of motherhood on labor participation, some authors find that having a child is related to a drop in the mother's labor market participation in the short term (Lundborg, Plug, & Rasmussen, 2017) or even that that drop is persistent over time (Kleven, Landais, & Søgaard, 2019).

In addition to estimating the average effect of children on women's wages, the literature on the subject has focused on explaining the heterogeneity in the wage penalty based on different factors such as the timing of maternity, education, socioeconomic level, among others.

According to the moment at which maternity occurs, several studies analyze whether wage penalty differs with the age of the mother at the time of the first birth, whose results suggest that postponing maternity reduces wage penalty by allowing women to accumulate greater human capital and work experience before the birth of the first child (Taniguchi, 1999; Amuedo-Dorantes and Kimmel, 2005 and Miller, 2011). Likewise, other studies focus, rather than on age, on the level of work experience accumulated at the time of the first pregnancy, considering whether this occurs before or after entry into the labor market. The results indicate that each year in which maternity is postponed leads to a wage increase (Herr, 2015).

Empirical research on how motherhood penalty varies according to the educational attainment of women finds mixed results. While some studies argue that women with higher education do not suffer any wage penalty (Amuedo-Dorantes and Kimmel, 2005; Taniguchi 1999), others find that this group of women suffers the highest penalty (Waldfogel, 1997). On the other hand, Budig and England (2001) find no significant relationship between the magnitude of the wage penalty and educational attainment, while Anderson, Binder and Krause (2003) find that women with medium qualifications (with secondary education) face a greater loss of wages compared to women with low and high educational attainment.

Considering women's socioeconomic status, some studies explore whether motherhood penalty differs across the income distribution of women, finding that, while it is present at all income levels, it is higher for lower-income women (Budig and Hodges, 2010; Budig and Hodges, 2014).

Although the empirical evidence for developed countries provides a framework for these issues, the results cannot be directly applied to the Latin American context given the differences in their labor institutions and practices, in the regulation of their labor markets, and in the provision of services that balance paid work with unpaid domestic chores, among others.

These developments are scarce for Latin America and are limited to the academic sphere.

Piras and Ripiani (2005) analyze the effect of motherhood on labor participation and wages in Bolivia, Brazil, Peru, and Ecuador, finding different results between countries: while in Peru there is evidence of motherhood penalty, there is a wage premium for having children in Bolivia and Brazil, and in Ecuador there are no statistically significant results. Olarte and Peña (2010) conducted the analysis for Colombia, finding a wage gap between mothers and childless women. In Chile and Uruguay, the results show that having a child implies a drop in the hourly wage and labor offer for the mother (Berniell, de la Mata, Edo, and Marchionni, 2019; Querejeta Rabosto, 2020).

For Argentina the studies that address these effects are not numerous or at least are not available to the public. A study by Casal and Barham (2013), which analyzes the differences in the wage penalty for motherhood between sectors of the labor market where women work, finds that mothers with jobs in the informal sector suffer a wage penalty, while there is no evidence of this in the formal sector.

These studies provide unequivocal evidence of the importance of including gender perspective in the formulation of public policy, for example, pension policy. In this respect, the recent measure implemented by the Executive Branch through Necessity and Urgency Decree No. 475/2021, aimed at recognizing years of pension contributions per child for women who have performed domestic work.

In Argentina, social security, understood as the protection provided to persons in the event of the potential inability to generate income because of old age, adopts different schemes depending on the activity and labor sector in which they are employed during their economically active life.

However, the general characteristic of all schemes is the need to make compulsory contributions (employee or employer contributions) during the person's economically active life for a predefined minimum number of years to access certain benefits at a stipulated age, so that the variables of interest in this study (labor participation and women's wages) will be decisive in the calculation of pension benefits.

This paper intends to enrich the debate on public policies aimed at greater gender equality, as well as to provide elements of analysis that will allow identifying the magnitude of the challenges the pension system faces in the future.

Methodological design

This study is conducted on a sample of women between 18 and 55 years of age, heads of household or spouses of the head of household, based on microdata from the EPH. First, the analysis focuses on the effect of motherhood on the real hourly wage for all employed women (since only employed women earn a wage). For this purpose, we use a model that includes different variables that have an impact on wages, such as those related to human capital, labor variables and the type of household a woman lives in. Secondly, to also include unemployed and economically inactive women (who do not receive a wage), a correction is made by including in the analysis the likelihood that a woman enters the labor market. Finally, we examine whether the effects of motherhood on labor participation and wages vary according to different characteristics of women, considering segmentations of the sample by age, educational attainment, and labor market sector.

This section describes the empirical strategy adopted in this paper to test for the existence of motherhood penalty in Argentina during the term 2004-2020. That is, the methodology used to evaluate the effects of children on their mother's wages and on her labor participation, measured in terms of the likelihood of being part of the labor market.

The most appropriate model to analyze this would be one that uses a data structure that combines a cross-sectional dimension with a temporal dimension, so that the same woman can be observed over time (known as a panel data structure). However, the lack of public information in Argentina with this structure makes it impossible to compare the employment situation of a woman before and after maternity. In March of this year, ANSES was asked to provide anonymized information on the employment history of a random sample of women who had been beneficiaries of maternity benefits. As of the date of publication of this report, ANSES has not responded to such request.

For these reasons, this study uses the structure known as cross-sectional data pooling, which consists of observing a sample (defined according to certain selection criteria) obtained independently at different points in time. This implies that the observations do not necessarily come from the same individuals in each period.

The sample selected for analysis consists of women between 18 and 55 years of age, heads of household or spouses of the head of household, living in single-person, single-parent, or two-parent households.

The source of information used is the microdata from the Permanent Household Survey, carried out by the INDEC during the fourth quarter of each year for the term 2004-2020[1]. A limitation of this data source is that it is impossible to identify which person is the mother within a family group, so it has been necessary to adopt certain methodological criteria to approximate this.

A detailed description of the selected sample is provided in Annex I, while Annex II explains the criteria used in the construction of the analysis variables.

We start from the model traditionally used in the literature on human capital (Mincer model), which estimates the hourly wage as a function of various determinants, such as educational attainment and age.

[1] Except for 2015, which is excluded from the analysis, since the fourth quarter EPH microdata for that year are not available.

To quantify the effects of motherhood on a woman's hourly wage, the following specifications are considered:

- Specification 1: whether there are children in the household.
- Specification 2: the number of children in the household (one, two, three, or more)
- Specification 3: whether the children have reached the age of majority.
- Specification 4: children in the household by age range (under 10, between 10 and 17 years of age, and 18 years of age or older).

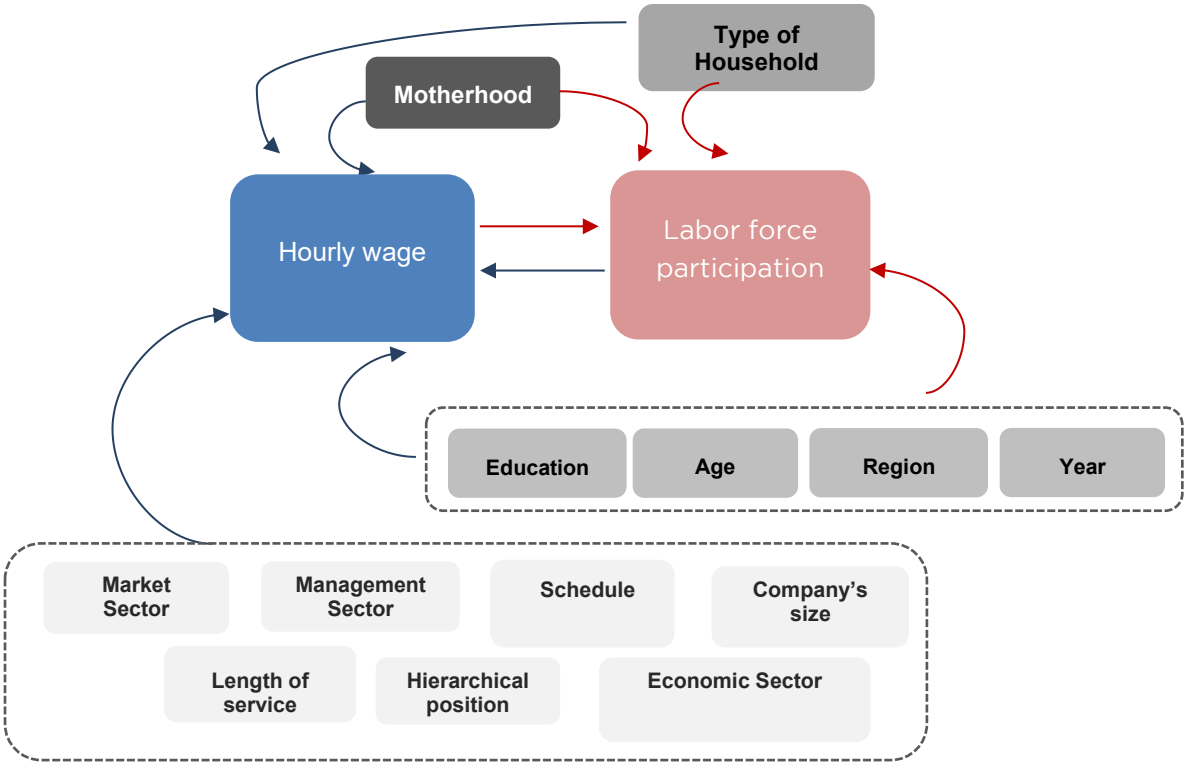
According to studies on the subject, it is expected that the hourly wage of women who live with children will be lower than that of women who do not and, if the number of children is considered, that the mother's wage will decrease as the number of children increases. Likewise, depending on the age of the children, a negative relation is expected between women's hourly wages and the presence of minors in the home, which becomes more pronounced as the age of the children decreases, since they require more attention and care.

The study also includes other variables that have an impact on wages, such as length of service, hierarchical position, formality, schedule, size of the company, management sector (government/private) and economic sector in which women work. The model also considers the different years and geographic regions of the country to capture the different realities of the Argentine territory and the period considered.

One aspect to highlight in the analysis is that it is carried out considering the different types of households that a woman lives in (single-person, single-parent, and two-parent) given that household composition can have a different impact on the decision to enter the labor market and this can indirectly affect her wages. For example, being the head of a single-parent household could imply a greater need to enter the labor market in the absence of other members who contribute to the family economy, and this in turn reduces the wage for which this woman would be willing to work (reservation wage).

Schematic diagram of the interactions between the variables under analysis:

Figure 2. Interactions between variables



SOURCE: OPC.

The analysis strategy described so far includes only the group of employed women, for whom the wage paid is shown. Given that the sample selected for this study also includes women who do not receive wage because they are unemployed or economically inactive, it is necessary to include them in the analysis by adjusting the estimates. This adjustment consists of first estimating how likely is a woman to enter the labor market and then adjusting the estimates of the effects of motherhood on wages by this likelihood.

Annex III provides a detailed description of the estimation methodology used in this study, including the methodology used to adjust the results by the likelihood of working.

To analyze whether the effects of motherhood on labor participation and wages differ among women with different characteristics, estimates are again made, but for different segmentations of the sample, defined based on the following variables: age, educational attainment, and sector of the labor market in which women are employed. Specifically, these segmentations are:

- Segmentation 1: considers three age ranges of women (between 18 and 29 of age, between 30 and 41 and between 42 and 55).
- Segmentation 2: considers three educational levels (up to incomplete secondary education, complete secondary education or incomplete university education, and complete university education).
- Segmentation 3: considers whether the woman is employed in the formal or informal sector of the labor market.

Based on the literature reviewed, it is expected that younger women face the highest motherhood penalty, as well as women employed in the informal sector. In relation to educational attainment, it is not possible to anticipate the expected effects since the studies do not provide conclusive evidence.

As for to the impact of motherhood on the Social Security System, the effects on the likelihood of accessing social security benefits, as well as on initial pension benefit, are calculated.

The calculation of pension benefits involves four variables: total contributions, time of contribution, benefit to be received and retirement age. Considering that retirement age and the method for calculating the benefit are defined by the regulations in force, the impact of motherhood on the other two variables (initial pension benefit and years of contributions) will be analyzed based on the remunerations received in the formal labor market, as well as the likelihood of joining it, values that arise from the estimates previously made.

The analysis is carried out on the general pension system established by Law 24,241, since it is the one with the largest number of contributors in the country. However, the logic of the analysis and the conclusions obtained can be applied (with the necessary reservations) to other schemes since, as mentioned, they all include the same types of variables.

Descriptive Analysis

The analysis by personal and labor characteristics shows that mothers generally have a lower *educational attainment* than women without children. *Participation in the labor market* is closely related to the type of household: women who do not live with a partner (whether they are mothers or not) have higher percentages of employment. Likewise, the proportion of women employed in the *informal sector* or with *part-time* jobs is higher for women with children, especially those who live with minors. Women with the longest *length of service* are those who live with children over 18 years of age, who are older on average. In terms of *economic sector*, a higher proportion of mothers are employed in domestic service than women without children. The analysis by wage level shows that women without children earn a higher average wage than mothers. The gap between the two groups is most pronounced for women who do not live with a partner.

Prior to estimating the model, it is of interest to examine the data from a descriptive point of view to see if mothers have characteristics that differentiate them from other women and explain a possible wage gap between them. In fact, this section characterizes the analysis sample, which consisted of 121,909 women. Annex I provides a detailed description of the sample selection process and explains the methodological decisions adopted for its composition.

First, a descriptive analysis is carried out based on the personal and labor characteristics of the women in the sample, and second, the analysis focuses on the market wage received by employed women.

Descriptive analysis in terms of personal and labor characteristics

An analysis of the structure of the households in which women in the sample live shows that 77.6% live in two-parent households (i.e., also composed of their partner, with or without children); 16.0% live in single-parent households (women who live with at least one child); and 6.5% live alone in single-person households.

Likewise, 72.5% (88,333 women) live with a child under 18 years of age, 17.6% do not have children or do not live with them and the remaining 10.0% are women with children over 18 years of age.

Table 1. Structure of women's households in the sample

Distribution of women by type of household and children

	Number of households	Participation
Single-person household	7,890	6.5%
Single-parent household	19,450	16.0%
With children < 18	15,706	12.9%
With children >= 18	3,744	3.1%
Two-parent	94,569	77.6%
Without children	13,539	11.1%
With children < 18	72,627	59.6%
With children >= 18	8,403	6.9%
Total	**121,909**	100%

Note: only households composed of core families are considered (for more details see Annex I).
SOURCE: OPC, based on Permanent Household Survey (INDEC).

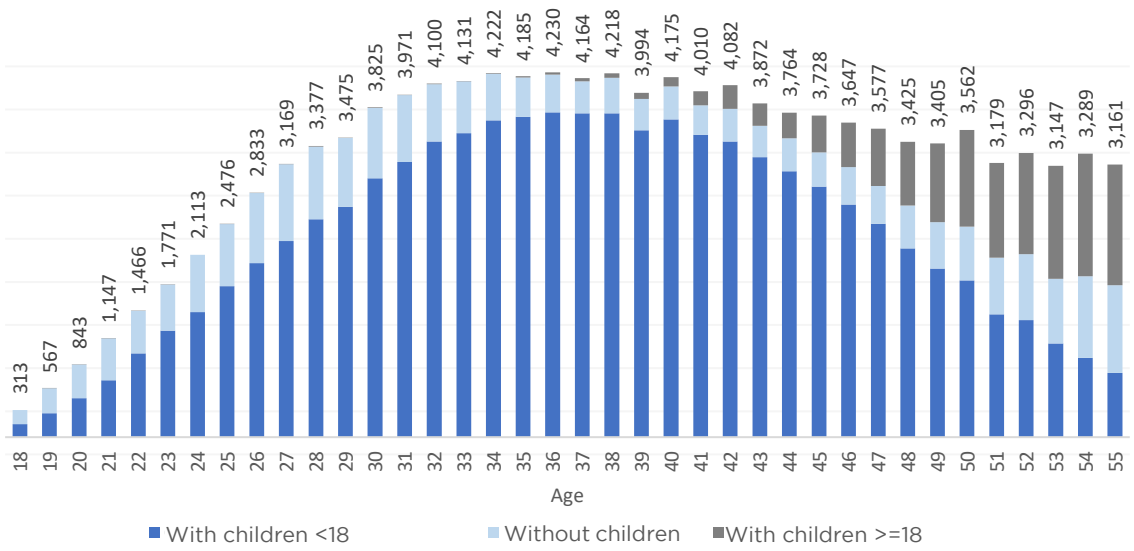
The average age of the groups of women analyzed, those who do not have or do not live with children are the youngest (37 years of age on average), followed by women with minors in the household (38 years of age) and, finally, women who live with children over the age of 18 (50 years of age).

Figure 3 shows the simple age distribution of the women in the sample. In general terms, the number of women who live with children under 18 years of age shows a bell-shaped distribution, increasing with age until it reaches a maximum at 36 years of age, after which it decreases.

The number of women who do not have or do not live with children also shows a similar distribution, although after the age of 40, the number of observations begins to accumulate again. This phenomenon could be explained by the presence of women who are in fact mothers, but at the time of answering the survey do not live with their children; although it is not possible to affirm this because it is impossible to identify the mother within the household from the data source. This will be considered at the time of reading the results.

Finally, the number of women living with adult children is steadily increasing with age.

Figure 3. Distribution of women in the sample by age



SOURCE: OPC, based on Permanent Household Survey (INDEC).

Women heads of household mostly belong to single-parent households. In two-parent households, the head is mainly the man

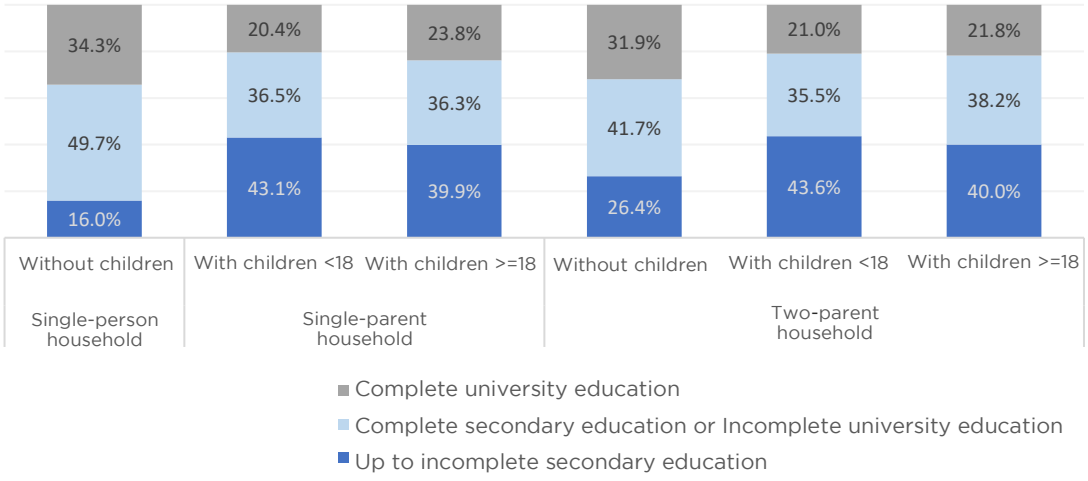
When we analyze which member heads the household, we see that 32.7% of the women under analysis are heads of household (only one third of these belong to two-parent households) and the remaining 67.3% are female spouses of the head of household (who live in two-parent households).

In terms of educational attainment, there are marked differences between women with children and those who do not have or do not live with them. The latter show a higher proportion at the highest level of education (complete university studies), while women with children concentrate at lower levels of education (up to incomplete secondary education). This occurs regardless of their children's age.

In the group of mothers, there is a higher proportion of women with a low educational attainment compared to women without children, with a higher proportion at the highest educational level.

Women living alone are the group with the highest proportion of complete university education and the lowest proportion of incomplete secondary education or lower.

Figure 4. Women composition of the sample by educational level



SOURCE: OPC, based on Permanent Household Survey (INDEC).

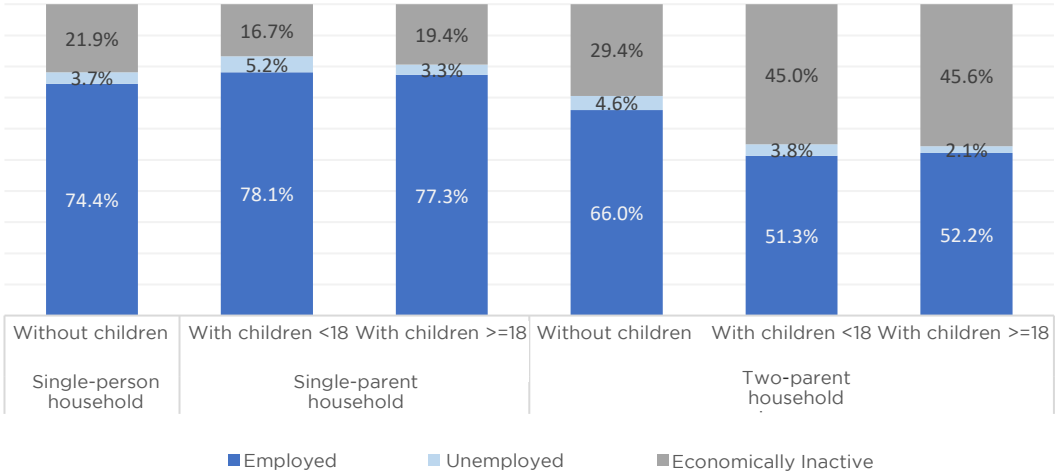
When considering the participation of women in the labor market according to the type of household they live in, we find that employed women belong mostly to single-person and single-parent households, as opposed to economically inactive women who are concentrated in two-parent households. This situation could suggest that another income in the household is a key factor influencing women's decision to participate in the labor market. In other words, women whose income is the main or only support for the household show the highest percentages of employment.

The highest percentage of economically inactive women is found in two-parent households, and even more so if there are children in these households.

Within two-parent households, the presence of children is also a factor that affects women's decision to work for the market. In these households, the highest percentages of economic inactivity are found among women who live with children.

Women in single-parent households show the highest percentages of employment, even above those living alone.

Figure 5. Distribution of women in the sample by occupational status



SOURCE: OPC, based on Permanent Household Survey (INDEC).

Figure 6 shows the activity rate[2] by simple age for the groups of women analyzed, distinguishing between those women who do not have or do not live with children and those who do. For all ages, childless women have higher activity rates than mothers (the blue curve is always above the light blue curve).

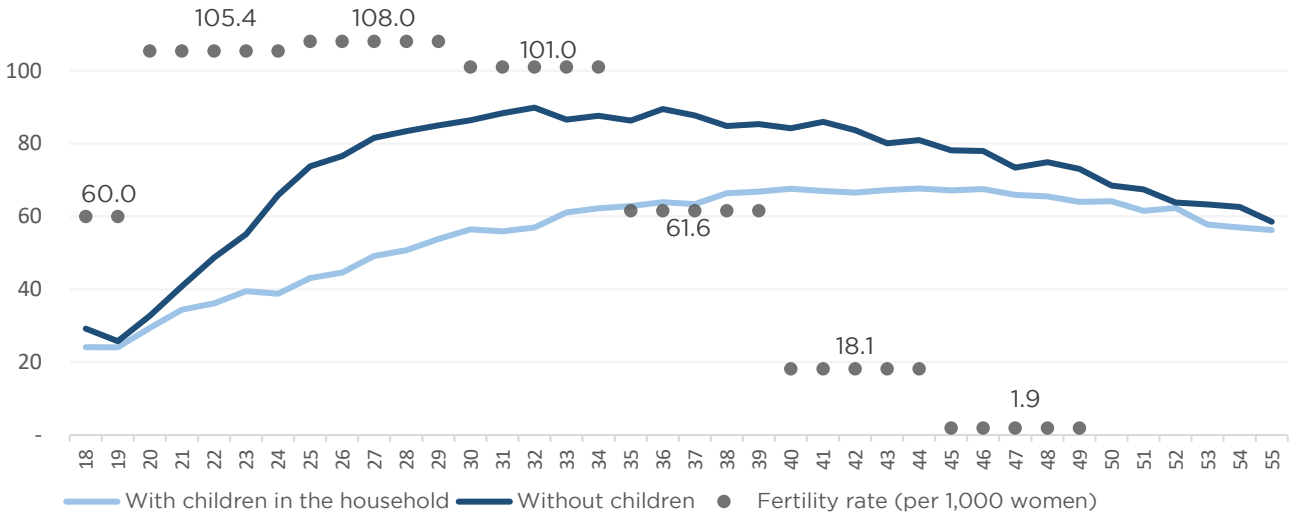
The largest gap between the two groups occurs from ages 23 to 32, the age period in which the highest fertility rates[3] are recorded. During these years, women without children experience a pronounced increase in their labor participation, reaching an activity rate of 89.9% at age 32, and then decreasing as they get older. On the other hand, labor participation of women who live with children increases at a slower rate as they get older.

Youngest women (between 18 and 22 years of age) in both groups analyzed have the lowest activity rates. However, when the possible reasons behind the relatively low activity rate in this age range are explored, they appear to be different depending on whether they woman has children in the household. Seventy percent of economically inactive women without children stated that they were students, and 27% that they were housewives. On the other hand, in the group of women who live with children, these percentages are drastically inverted, reaching 10% and 88%, respectively. From these data, it can be inferred that while for women without children the reason for not participating in the labor market could be related to studying, for mothers it could be related to unpaid domestic work.

Of young mothers who do not work, more than 80% report doing unpaid domestic work, a figure that drops below 30% for women of the same age who are not mothers.

Figure 6. Activity rate, by age

Activity rate by simple age and specific fertility rate by five-year age groups (per 1,000 women). Average 2004-2020.



SOURCE: OPC, based on Permanent Household Survey and National projections (INDEC).

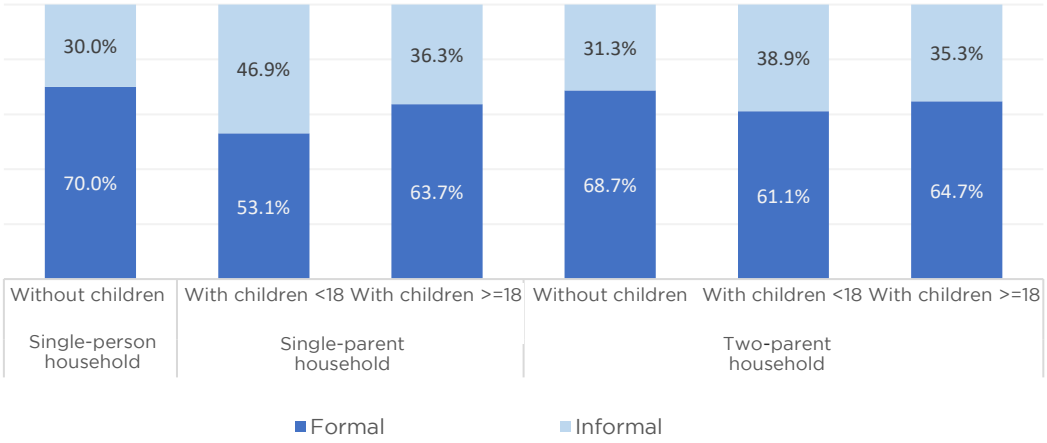
[2] It measures the economically active population (EAP) over the total population. The EAP is composed of both employed and unemployed persons. For this study, the total population consists of all the women in the sample.
[3] It measures the number of births that occur during a year or reference period per 1,000 women of reproductive age, classified in five-year age groups. They are calculated as the ratio between the total number of children born to women in a five-year age group and the total number of women in that age group.

The following is an analysis of the labor characteristics of women in the sample who are employed (71,603 women)

As for the level of labor formality, women who live with children have less access to formal jobs, especially those with young children and adolescents (Figure 7). Although this situation occurs in both single-parent and two-parent households, female heads of single-parent households have the highest percentage of informal employment (46.9% versus 38.9%).

Forty-seven percent of single mothers with minor children work in the informal sector.

Figure 7. Distribution of employed women in the sample by labor market sector

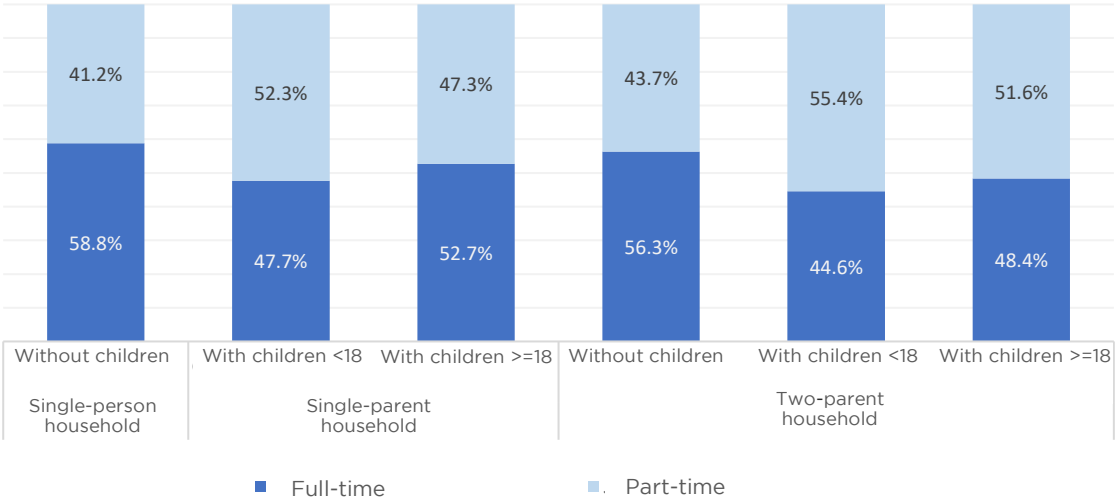


SOURCE: OPC, based on Permanent Household Survey (INDEC).

If we consider the type of paid work schedule (Figure 8), we observe a greater concentration of part-time jobs for households with children and, more specifically, in households where the children are minors. Similarly, women who do not have or do not live with children are mainly engaged in full-time jobs.

More than 50% of mothers of children and adolescents are employed in part-time jobs.

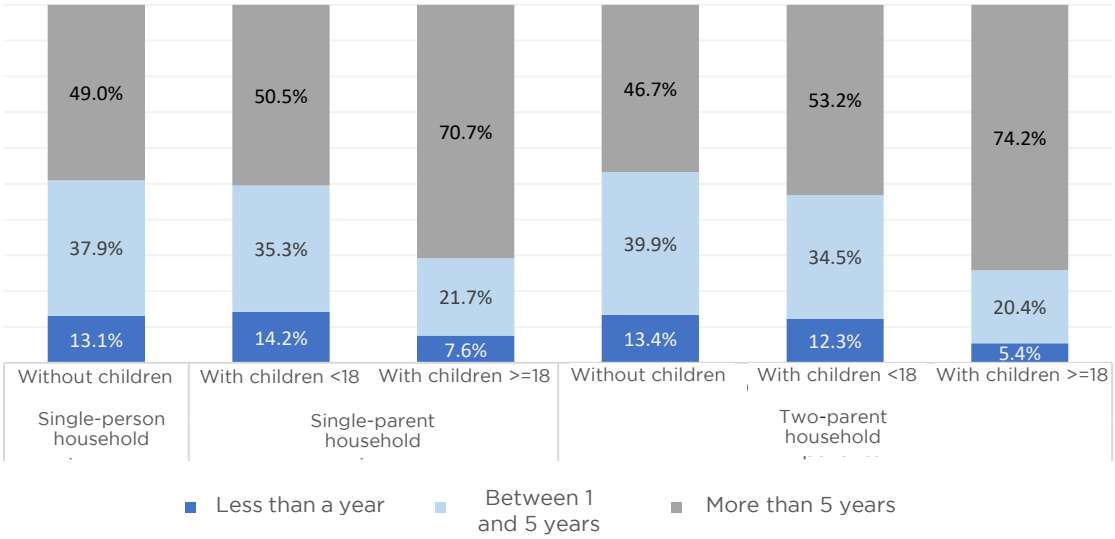
Figure 8. Distribution of employed women in the sample by type of work schedule



SOURCE: OPC, based on Permanent Household Survey (INDEC).

As for length of service in the last declared occupation, there is a positive correlation with the average age of the women in the sample. In fact, mothers of children over 18 years of age (who are the oldest on average) mainly have more than 5 years of work experience, while mothers of minors and those who do not have or do not live with children (whose average ages are alike) have a similar distribution along the length of service ranges analyzed.

Figure 9. Distribution of employed women in the sample by length of service



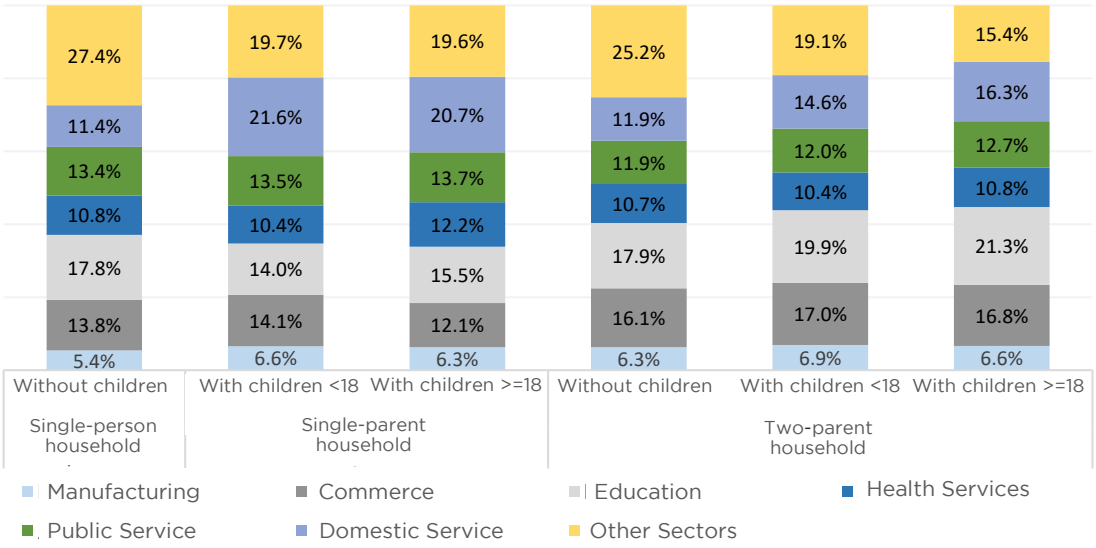
SOURCE: OPC, based on Permanent Household Survey (INDEC).

Finally, in terms of economic sector, we find that the sector in which mothers are mainly employed varies according to the type of household. In single-parent households, the highest percentage of employment is in the domestic service sector, while in two-parent households it is in the education sector.

A greater presence of professional and technical activities is observed among women without children, compared to those who are mothers.

On the other hand, those who do not have or do not live with children have a higher percentage of employment in the category Other sectors. Within this category, which is composed of a dozen mainly service sectors, professional, scientific and technical activities account for more than 20%.

Figure 10. Distribution of employed women in the sample by economic sector



SOURCE: OPC, based on Permanent Household Survey (INDEC).

Time-use

The way women who are mothers and those who are not mothers spend their time is conditioned by the social division of labor, according to which women, being mothers, are practically exclusively responsible for household chores.

According to the data from the Survey on Unpaid Work and Time Use, conducted by INDEC in 2013, there were differences in the distribution of time spent by employed women depending both on the type of household in which they live and on the fact of being a mother. These differences were statistically significant when comparing women with dependent children with those without children.

Having children under 18 years of age in the household is related to a greater number of hours dedicated to unpaid work, which is mainly explained by the increased time spent in caregiving (of the 4 additional hours that mothers dedicate to housework, more than 2 hours are dedicated to caring for other members of the household). This dynamic was present both when comparing women in single-person households with those in single-parent households (column 2 versus 1), and within two-parent households (column 5 versus 4).

Likewise, given the greater time dedicated to unpaid work, it was observed that market work is reduced for mothers of young children by only 0.5 hours. In fact, these mothers have a total hourly workload (the sum of time dedicated to paid and unpaid work) of more than 11 hours per day, the highest compared to the other groups of women.

The described relations are not verified when comparing mothers of minor children with mothers of adult children (the differences are not included, but they were statistically significant in all cases), whose time distribution is like that of women without children.

Disribution of hours per day according to activity and type of household of employed women

Average time (hours per day)

	Single-person household	Single-parent household		Difference (2)-(1)	Two-parent household			Difference (5)-(4)
	Without children n = 382 (1)	With children <=18 n = 772 (2)	With children >18 n = 191 (3)		Without children n = 623 (4)	With children <=18 n=2,400 (5)	With children >18 n = 279 (6)	
Unpaid domestic work	2.6	6.6	3.1	4.0***	2.8	7.2	3.3	4.4***
Household chores	2.6	3.4	3.0	0.9***	2.7	3.5	3.2	0.8***
Education Support	0.0	0.9	0.0	0.9***	0.0	0.9	0.0	0.9***
Caregiving	0.0	2.3	0.1	2.3***	0.1	2.8	0.1	2.8***
Paid work	5.5	5.0	5.4	-0.5***	5.3	4.7	5.1	-0.5***
Total	**8.1**	**11.6**	**8.5**	**3.5*** **	**8.0**	**11.9**	**8.4**	**3.8*** **

Note: (***) Significant at 1% according to T-test for mean differences calculated in hours.

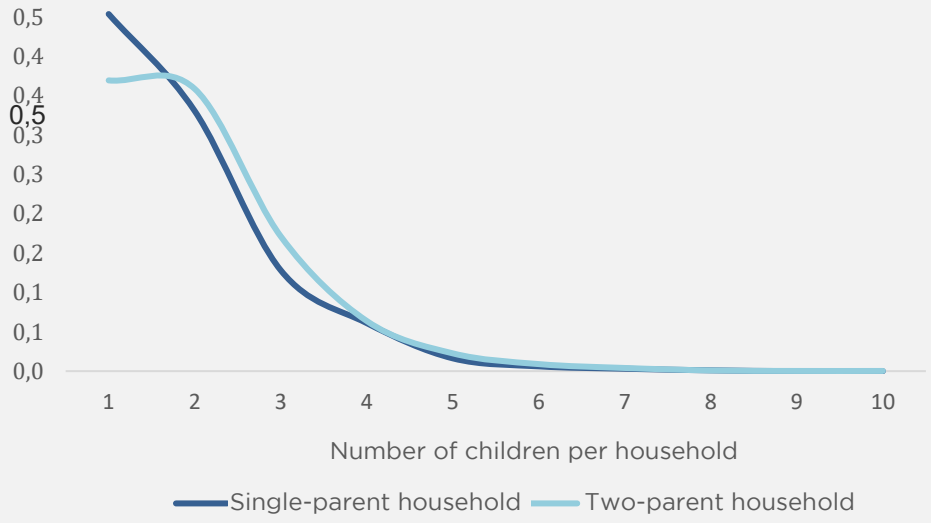
According to INDEC definitions, unpaid domestic work includes all activities performed to provide services for one's own final use in the home and for which no type of remuneration is received. It includes: 1) household chores (house cleaning and mending clothes; food preparation and cooking, household shopping; repair and maintenance of household goods); 2) activities for the care of children, sick or elderly household members (grooming and body care, recreation, provision of medicine, transfer and stay in care, educational or health services) and 3) activities to support school and/or learning for household members.

The time dedicated to paid work was calculated from the quotient between the weekly hours declared in the main occupation and other occupations, and the seven days of a week.

SOURCE: OPC, based on Survey on Unpaid Work and Time Use (INDEC, 2013).

Likewise, it was observed that for women with children under 18 years of age, the average time spent on different domestic activities is greater for women living in two-parent households compared to their counterparts in single-parent households (column 5 versus 2). While in a single-parent household the mother of children spends an average of 2.3 hours caregiving, in a two-parent household she spends 2.8 hours. This difference could be explained by the greater relative number of children in two-parent households. Observing how women are distributed according to the number of children in the household (density function of the number of children) a difference in favor of two-parent households, with the curve slightly shifted to the right.

Density function of the number of children per household



SOURCE: OPC, based on Survey on Unpaid Work and Time Use (INDEC, 2013).

Descriptive analysis in terms of wage characteristics

Table 2 shows the real hourly wage (in logarithm) of the women in the sample who are employed, based on the personal and work characteristics analyzed, whether they have children in the household, and the type of household they live in. The analysis covers only employed women because they are the only ones who report wages.

To explore whether there are wage gaps between mothers and women without children, there is also a column showing this variable between the two groups of women. This comparison is made, on the one hand, between women living in single-person households (column 1) and those living in single-parent households (column 4) and, on the other hand, between women in two-parent households with and without children (columns 6 and 9).

In general terms, there are significant differences in the real hourly wage received by women with children compared to those without children, with the latter receiving a higher wage. The difference between the two groups is more pronounced for women who do not live with a partner. Women who live in single-person

Women without children earn on average a higher hourly wage than those who are mothers.

households earn the highest relative wage, in contrast to mothers in single-parent households who earn the lowest.

As for the labor market sector, it is observed that women employed in the formal economy are better paid (per hour) than those employed in the informal market.

In the informal sector, women without children have a higher relative wage compared to those who are mothers, while in the formal sector this situation is not so clear, but varies according to the type of household. Heads of single-parent households earn lower wages than women living alone, while in two-parent households the wage gap is in favor of mothers.

In the informal sector, mothers earn lower wages than women without dependents.

Likewise, in the formal economy segment, there are gaps in wages among mothers, with those who have older children receiving lower wages than those who have younger children. This could be related to the payment of the family allowance per child under the Family Allowance System, which consists of a monthly payment for each dependent child under 18 years of age, thus increasing the income of this group.

Educational attainment generally indicates that the higher the level of education, the higher the wages received, in line with the postulate of economic theory.

In the low and medium educational levels (with less than a complete university education), women with children receive a lower hourly wage than women who do not have children or do not live with them .In turn, among the first group, mothers of minors are those who receive the lowest relative wages.

Among women without university education, the wages of those without children are higher than those of mothers.

The wage gap in favor of childless women decreases with the level of education, disappearing when they reach complete university education. Moreover, in two-parent households, a statistically significant difference in favor of mothers is observed.

When considering the paid workday, higher wages are observed for women who work part-time versus those who work full-time. In both types of work schedules, the lowest average wage rates are for women with children.

As for the length of service, wages increase as the number of years of service increases.

In the first two ranges considered (five or less years of service), it is observed that motherhood is linked to a lower average wage. In the third range (more than five years of service) this situation is different depending on the type of household: female heads of single-parent households receive a lower wage compared to women who live alone, while in two-parent households there is no wage gap between mothers and non-mothers. Likewise, the wage gap observed in favor of women without children decreases as length of service increases.

In terms of economic sector, the education sector is the one that pays the highest hourly wage, as opposed to commerce and domestic service, which, depending on the group of women analyzed, are the ones with the lowest hourly wages.

The manufacturing sector is the one that shows the greatest difference in terms of wages between mothers and women without dependents.

Except for domestic service, in all other sectors mothers earn a lower average wage than non-mothers. The manufacturing sector is the one that shows the greatest difference.

In all economic sectors, the wage gap in favor of childless women is greater when the comparison is made between women who do not live with a partner (single-parent versus single-person households).

In summary, the analysis shows that the group of mothers with children under 18 years of age in single-parent households is the group that receives the lowest wages for their work in the labor market and that of women living alone is the group with the highest wages. This is the case for most of the variables analyzed in which it is possible to divide the sample.

Single mothers of minor children receive the lowest relative hourly wage.

Table 2. Wages by type of household where children live.

Real hourly wage (in logarithm)

	Single-person household	Single-parent household			Difference	Two-parent household				Difference
	Without children	With children <18	With children >=18	Total with children		Without children	With children <18	With children >=18	Total with children	
	(1)	(2)	(3)	(4) = (2) +(3)	(5) = (4) - (1)	(6)	(7)	(8)	(9) = (7) + (8)	(10) = (9)- (6)
Total	**1.605**	**1.354**	**1.438**	**1.370**	**-0.235*****	**1.573**	**1.476**	**1.484**	**1.477**	**-0.096*****
Labor market sector										
Formal	1.821	1.769	1.734	1.761	-0.060***	1.786	1.825	1.782	1.820	0.034***
Informal	1.099	0.884	0.919	0.890	-0.210***	1.104	0.928	0.938	0.929	-0.175***
Education Attainment										
Up to incomplete secondary education	1.085	0.960	1.046	0.976	-0.109***	1.062	0.968	1.081	0.982	-0.080***
Complete secondary education and incomplete university education	1.450	1.364	1.432	1.377	-0.073***	1.449	1.395	1.408	1.396	-0.053***
Complete university education	1.936	1.938	1.948	1.940	0.004	1.914	1.981	2.011	1.984	0.070***
Schedule										
Part-time	1.699	1.429	1.583	1.456	-0.243***	1.683	1.584	1.644	1.589	-0.093***
Full-time	1.539	1.272	1.308	1.279	-0.260***	1.488	1.342	1.314	1.339	-0.149***
Length of service										
Less than 1 year	1.344	0.952	1.006	0.958	-0.387***	1.403	1.088	1.038	1.085	-0.318***
Between 1 and 5 years	1.622	1.297	1.247	1.291	-0.331***	1.598	1.376	1.240	1.367	-0.231***
More than 5 years	1.841	1.720	1.702	1.715	-0.125***	1.758	1.769	1.692	1.759	0.001
Economic sector										
Manufacturing	1.391	1.032	1.123	1.049	-0.342***	1.376	1.143	1.055	1.134	-0.242***
Commerce	1.235	0.971	0.950	0.967	-0.268***	1.205	0.977	0.924	0.971	-0.233***
Education	2.001	1.905	1.961	1.917	-0.084***	2.017	1.986	2.000	1.988	-0.029*
Health services	1.745	1.498	1.603	1.520	-0.225***	1.737	1.659	1.655	1.658	-0.079***
Public service	1.948	1.793	1.951	1.823	-0.125***	1.895	1.837	1.902	1.844	-0.051**
Domestic service	0.893	0.940	0.998	0.951	0.058**	1.007	1.029	1.059	1.032	0.025
Other sectors	1.643	1.402	1.425	1.406	-0.237***	1.582	1.512	1.529	1.513	-0.069***

Note: (*) significant at 10%, (**) significant at 5% and (***) significant at 1%, according to the T-test for mean difference.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Results

The evidence found confirms the existence of a motherhood penalty, both in terms of labor market participation and wages. In other words, living with at least one child implies for the mother a lower likelihood of joining the paid labor force by 11.5 percentage points compared to a woman without children; and if she does join the labor force, she receives a relative wage 12.3% lower. These effects are increased by the number of children and whether they are under 18 years of age. When considering different segmentations of the sample, we find that the greatest penalties are found among the youngest women, those with intermediate qualifications (with complete secondary education), and those in the informal labor market.

The wage gap observed in the formal sector between women with and without children is reflected in the pension benefits received while in retirement. However, the gap between pension benefits is reduced, showing an equalizing effect of the Social Security System. Greater problems are observed in accessing pension benefits: on average, both groups of women do not reach 30 years of contributions. Among those who do not, more than half of those who are mothers and a third of those who are not, have less than 10 years of contributions. Among those who do reach the required number of years of contribution, women with university education and fewer children are predominant.

Effect estimates of motherhood on wages and permanence in the labor market

The result of the effect estimates of the presence of children in the household on the real hourly wage of the mothers in the sample are provided in Table 3. Table 3 shows the results for the different specifications defined in the Methodological Design section: presence of children (specification 1), number of children (specification 2), children according to whether they have reached the age of majority (specification 3) and according to the age range to which they belong (specification 4).

Table 3. Effects of motherhood on employed women's wages

Dependent variable: logarithm of the real hourly wage.

	Specification 1	Specification 2	Specification 3	Specification 4
With children in the household	-11.5%*** (0.015)			
One child		-7.9%*** (0.017)		
2 children		-9.5%*** (0.017)		
3 or more children		-17.7%*** (0.018)		
Minor children			-11.6%*** (0.015)	
Adult children			-10.3%*** (0.024)	
Under 10				-10.9%*** (0.016)
Between 10 and 17				-13.1%*** (0.018)
18 or older				-10.8%%*** (0.024)
Single-parent household	-4.2%*** (0.012)	-4.3%*** (0.012)	-4.1%*** (0.012)	-3.9%*** (0.012)
Two-parent household	-2.5%** (0.010)	-2.5%** (0.010)	-2.5%** (0.010)	-2.5%** (0.010)
R^2	0.488	0.488	0.488	0.488
Observations†	56,781	56,781	56,781	56,781

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

(†) The number of observations differs from the number of employed women in the sample because the regression analysis excludes those women with missing data on at least one of the variables considered.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

From the results shown in Table 3, we can observe the existence of a wage penalty for mothers, which continues once the personal and labor characteristics of each woman are included in the analysis.

This penalty is present in all four specifications considered:

- Presence of children in the household is related to an 11.5% lower real hourly wage for a mother compared to a woman without children (specification 1). This effect on the mother's remuneration worsens with the number of children, going from 7.9% with one child to 17.7% with three or more (specification 2).
- The wage penalty is greater when there are minors in the household (11.6% compared to 10.3% when the children are of legal age), mainly when there are children between 10 and 17 years of age (13.1%) (specifications 3 and 4, respectively).

Finally, the empirical evidence shows a differential impact of household types on women's wages, with a greater drop in hourly wages in single-parent households than in two-parent households, with respect to women living alone. That is, a woman head of a single-parent household earns on average 4% lower hourly wages than a woman living alone, a ratio that is reduced by half if the woman lives in a two-parent household.

The results up to this point refer to the group of women who are employed, and who therefore report wages.

To consider unemployed and economically inactive women in the analysis, the model is re-estimated by adding the adjustment for the likelihood of working for the market. Table 4 shows the results after applying this correction. The left panel of the table shows the effects of motherhood on labor participation, while the right panel shows the effects on the real hourly wage.

Table 4. Effects of motherhood on labor participation and wages of all women in the sample

Dependent variable left panel: labor participation. Dependent variable right panel: logarithm of real hourly wage.

	Marginal effects on labor participation (in percentage points)				Effects on real hourly wage			
	Specification 1	**Specification 2**	**Specification 3**	**Specification 4**	**Specification 1**	**Specification 2**	**Specification 3**	**Specification 4**
With children in the household	-11.5*** (0.004)				-12.3%*** (0.016)			
One child		-8.4*** (0.005)				-8.4%*** (0.018)		
2 children		-11.9*** (0.005)				-10.3%*** (0.018)		
3 or more children		-15.3*** (0.005)				-18.8%*** (0.019)		
Minor children			-11.6*** (0.004)				-12.5%*** (0.016)	
Adult children			-10.8*** (0.006)				-11.0%*** (0.024)	
Under 10				-13.4*** (0.004)				-12.1%*** (0.016)
Between 10 and 17				-8.0*** (0,005)				-13.8%*** (0.018)
18 or older				-09.0*** (0.006)				-11.4%*** (0.024)
Single-parent household	16.5*** (0.008)	15.9*** (0.008)	16.5*** (0.008)	16.4*** (0.008)	-3.5%*** (0.012)	-3.7%*** (0.012)	-3.3%*** (0.012)	-3.1%** (0.012)
Two-parent household	-11.7*** (0.007)	-12.1*** (0.007)	-11.7*** (0.007)	-11.2*** (0.007)	-3.0%*** (0.010)	-3.0%*** (0.010)	-3.1%*** (0.010)	-3.1%*** (0.010)
Lambda (λ)					0.030** (0.018)	0.029** (0.018)	0.033** (0.018)	0.037** (0.018)
R^2					0.488	0.488	0.488	0.488
Observations†	121,909	121,909	121,909	121,909	56,781	56,781	56,781	56,781

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

(†) The number of observations in the OLS regression differs from the number of employed women because the regression analysis excludes those women with missing data in at least one of the variables considered.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Based on the results found, living with children is linked to a lower likelihood of participating in the labor market and a lower hourly wage received by women.

This situation is repeated in all the specifications considered:

A mother is 8 to 15 percentage points less likely to work for the market than a woman without children.

- The presence of at least one child in the household implies a lower likelihood that the mother will enter the paid labor force, by about 11.5 percentage points.

On the other hand, for those who work for the market, a negative relation between motherhood and hourly wages is observed. In other words, women with children earn on average 12.3% less than women who do not have children or do not live with them.

An employed woman with children earns between 8% and 19% less than a woman without children.

- The effect of motherhood on labor participation increases with the number of children in the household, reaching a drop of 15.3 percentage points in the presence of three or more children.

Motherhood penalty increases with the number of children. A woman with three or more children is 15 percentage points less likely to work than a woman who is not a mother and earns 18% less in relative terms.

The same dynamic is observed when considering the impact on wages, with the wage penalty rising from 8.4% with one child to 18.8% with three or more children.

- The estimated effects differ with the age of the children, being of greater magnitude when they are minors. Specifically, the lowest likelihood of entering the labor market occurs during early childhood of their children (under 10 years of age) related to the greater care responsibilities that these children entail in comparison with children of other age groups. Women in this situation have about 14 percentage points less chances of entering the labor market.

The effect of motherhood on labor participation is greater with children under 10 years of age. On wages, it is greater with children between 10 and 17 years of age.

The greatest impact on wages is evident when the children are between 10 and 17 years of age, which may be the result of interruptions in the labor trajectory during children's early childhood.

Finally, belonging to a single-parent household increases by around 16 percentage points the likelihood that the woman will work for pay, a dynamic that could be related to a greater need to work since she is the main source of income in her family. In contrast, belonging to a two-parent household shows a drop in labor participation of close to 12 percentage points, a situation that could be influenced by the presence of another income in the household that reduces the need to work for the labor market.

Having another income in the household is linked to a lower participation of women in the labor market

When analyzing the relationship between household type and hourly wages, it is observed that women in single-parent and two-parent households show a drop in wages of approximately 3% compared to women living alone.

Heterogeneity in motherhood penalty

To examine whether the effects of motherhood on labor participation and wages vary according to different characteristics of women, in this section the estimates are again made, but for different subgroups, considering age, educational attainment and labor market sector (formal/informal).

For each of the variables mentioned, we analyze, first, the effects of motherhood on the likelihood of entering the labor market and, second, the effects on the real hourly wage for employed women.

Sample segmentation by women's age

This section analyzes the effects of motherhood for women of different ages, grouping them according to the following age ranges: between 18 and 29, between 30 and 41, and between 42 and 55.

As shown in Table 5, being a mother is linked, for all the age groups considered, to a lower likelihood of working in the paid labor market compared to a woman without children, with a greater impact among younger women. Specifically, for women between 18 and 29 years of age, being a mother implies a drop in the likelihood of working for the market of 17.2 percentage points, which is reduced to 3.8 points for women between 42 and 55 years of age.

The dynamics described (greater impact on younger women, which decreases as age increases) is also present in the specifications that consider the number of children and their ages. Thus, it is the youngest mothers who have the lowest likelihood of entering the labor market, with drops ranging from 15.3 (with one child) to 25.3 percentage points (with three or more). For them, having children under 10 years of age implies 18.3 percentage points lower likelihood of working compared to a woman without children, a figure that is reduced to 5.4 pp in women between 42 and 55 years of age.

Younger mothers are less likely to enter the labor market, as opposed to those who are heads of single-parent households.

Similar results are obtained when considering the effects of motherhood on wages (Table 6). For younger mothers, the penalty is around 24.8%, while for those between 30 and 41 years of age, it is 14.1%. For mothers between 42 and 55 years of age, there is no significant evidence of a wage penalty.

Wage penalty is higher for younger women and decreases with age.

It is also observed that, for mothers in the first two age ranges considered (which are those who experience a wage loss), the penalty is explained entirely by the presence of minor children and increases with the number of children, the effect being greater in all cases when the mothers are between 18 and 29 years of age. For them, the penalty can reach up to 42.0% for those with three or more children.

Among young women, wage loss can be as high as 42% for those with three or more children.

These results, which show greater effects of motherhood on the labor variables analyzed in young women, could be related to the moment at which she becomes a mother within the woman's labor trajectory. In other words, it is expected that older women have accumulated greater human capital until the birth of their first child that allows them to compensate, at least partially, the negative effects on their wages (Taniguchi, 1999; Amuedo-Dorantes and Kimmel, 2005 and Herr, 2015).

These results are even more significant given the limitation of the data source used, which made it impossible to identify the mother within the household. This circumstance does not allow us to

determine, within the group of childless women, those who are indeed mothers, but at the time of answering the survey are not living with their children.

in the analysis by age (Figure 3), this phenomenon occurs mainly from the age of 40 onwards.

Consequently, the estimates for the first two age ranges analyzed would more adequately reflect the effects of motherhood on labor participation and wages.

The analysis by type of household shows that young and single mothers have the greater likelihood, among the age groups analyzed, of joining the labor market than those who are not mothers. These differences with respect to women who are not mothers become smaller as age increases because of the inclusion of women without dependents in the labor market and the possibility that other members of the household will begin to contribute to the family income.

For women living in two-parent households, as they get older, the likelihood of entering the labor market decreases compared to women without a dependent family.

The facts described in the last two paragraphs are shown for all the specifications considered.

Finally, in terms of wages, the result obtained for the older age range stands out, where, although both women in single-parent and two-parent households suffer a penalty with respect to those who do not have a dependent family, this penalty is greater for women who live with a partner. This situation is compatible with the greater interruption in the labor trajectory of this group of women since they have a lower chance of entering the labor market.

Table 5. Effects of motherhood on labor participation, by age range

Effects measured in percentage points. Dependent variable: labor participation.

	Specification 1			Specification 2			Specification 3			Specification 4		
	18-29	30-41	42-55	18-29	30-41	42-55	18-29	30-41	42-55	18-29	30-41	42-55
With children in the household	-17.2*** (0.008)	-15.2*** (0.008)	-3.8*** (0.007)									
One child				-15.3*** (0.009)	-10.1*** (0.009)	-2.4*** (0.008)						
2 children				-21.5*** (0.010)	-15.2*** (0.008)	-3.4*** (0.007)						
3 or more children				-25.3*** (0.012)	-19.8*** (0.009)	-6.0*** (0.008)						
Minor children							-18.1*** (0.009)	-15.0*** (0.008)	-3.3*** (0.007)			
Adult children							-20.1*** (†) (0.073)	-10.3*** (0.024)	-4.6*** (0.008)			
Under 10										-18.3*** (0.009)	-16.0*** (0.008)	-5.4*** (0.008)
Between 10 and 17										-7.1** (0.029)	-9.6*** (0.009)	-2.7*** (0.007)
18 or older										-20.0*** (0.073)	-9.1*** (0.023)	-4.5*** (0.008)
Single-parent household	29.5*** (0.0154)	10.9*** (0.015)	6.4** (0.012)	29.0*** (0.015)	10.4*** (0.015)	6.2*** (0.012)	29.5*** (0.015)	10.9*** (0.015)	6.5*** (0.012)	29.3*** (0.015)	10.3*** (0.015)	6.4*** (0.012)
Two-parent household	-1.1 (0.013)	-17.7*** (0.015)	-19.4*** (0.011)	-1.0 (0.013)	-17.5*** (0.015)	-19.5*** (0.011)	-1.1 (0.013)	-17.7*** (0.015)	-19.4*** (0.011)	-1.1 (0.013)	-17.7*** (0.015)	-19.4*** (0.011)
Observations	23,550	49,225	49,134	23,550	49,225	49,134	23,550	49,225	49,134	23,550	49,225	49,134

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

(†) this coefficient should be interpreted with caution given the low number of observations.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Table 6. Effects of motherhood on wages, by age group

Dependent variable: logarithm of the real hourly wage.

	Specification 1			Specification 2			Specification 3			Specification 4		
	18-29	30-41	42-55	18-29	30-41	42-55	18-29	30-41	42-55	18-29	30-41	42-55
With children in the household	-24.8%*** (0.030)	-14.1%*** (0.029)	-3.6% (0.027)									
One child				-19.8%*** (0.031)	-8.9%*** (0.031)	-1.9% (0.032)						
2 children				-31.0%*** (0.040)	-11.4%*** (0.030)	-1.6% (0.031)						
3 or more children				-42.0%*** (0.047)	-23.1%*** (0.032)	-7.1%** (0.031)						
Minor children							-24.8%*** (0.030)	-14.4%*** (0.028)	-3.8% (0.028)			
Adult children							7.5% (0.234)	-0.2% (0.084)	-2.5% (0.032)			
Under 10										-25.0%*** (0.030)	-14.0%*** (0.028)	-2.9% (0.034)
Between 10 and 17										-15.2% (0.104)	-16.9%*** (0.031)	-4.2% (0.029)
18 or older										7.6% (0.235)	-1.1% (0.084)	-2.5% (0.032)
Single-parent household	0.5% (0.033)	-4.4%** (0.020)	-6.3%*** (0.020)	1.7% (0.033)	-3.9%** (0.020)	-6.5%*** (0.020)	0.3% (0.033)	-4.3%** (0.020)	-6.2%*** (0.020)	0.2% (0.034)	-3.6%* (0.020)	-6.2%*** (0.020)
Two-parent household	-0.7% (0.018)	0.2% (0.017)	-8.6%*** (0.020)	-1.1% (0.018)	-0.3% (0.017)	-8.4%*** (0.020)	-0.7% (0.018)	0.1% (0.017)	-8.6%*** (0.020)	-0.7% (0.018)	0.2% (0.017)	-8.7%*** (0.020)
Lambda (λ)	0.073** (0.040)	-0.047 (0.032)	0.086*** (0.027)	0.113*** (0.041)	-0.042 (0.032)	0.079*** (0.027)	0.079%** (0.040)	-0.019 (0.033)	0.084*** (0.027)	0.080** (0.040)	-0.043 (0.032)	0.085*** (0.027)
R^2	0.443	0.484	0.498	0.443	0.484	0.498	0.443	0.484	0.498	0.443	0.484	0.498
Observations	8,396	24,413	**23,972**	8,396	24,413	**23,972**	8,396	24,413	**23,972**	8,396	24,413	**23,972**

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Sample segmentation by educational attainment

This section estimates the effects of motherhood on labor market participation and wages for women with different educational attainment: incomplete secondary education (level 1), complete secondary education or incomplete university education (level 2) and complete university education (level 3).

In terms of labor participation (Table 7), the presence of children in the household is related to a lower likelihood that women will enter the labor market at all levels of education. However, this effect differs in magnitude according to the education achieved, being greater in women with intermediate qualifications. In these women, the likelihood of entering the paid labor force is 17.9 percentage points lower than in women without a dependent family.

These results are also verified for the specifications that consider the number of children and their ages.

As for the effects of motherhood on wages, Table 8 shows that women of all educational attainments receive a lower hourly wage when they live with children. There is a non-linear relationship between education and wage penalty for mothers, with women of intermediate qualification facing the highest penalty (12.8% versus 8.5% for the other groups). This phenomenon (higher penalty in the intermediate educational attainment group) worsens with the number of children, reaching 17.1% for women with three or more children.

The biggest penalty is among women with complete secondary education, both in terms of wages and labor participation.

As described in the previous paragraph, this is in line with the findings of Anderson, Binder and Krause (2003). According to these authors, women with an intermediate educational attainment are more likely to have jobs that are not very flexible in terms of the place and time of work, which makes it difficult for them to combine domestic chores and caregiving with paid work. On the other hand, the rest of women can partially offset the wage penalty. Women with a high educational attainment have greater autonomy in their jobs (for example, they can substitute office hours with work at other times or from home), and women with a low educational attainment have more flexible jobs (hourly or shift work).

This is also compatible with what was observed in the Descriptive Analysis section, which shows that mothers with a higher educational attainment earn higher wages on average, which would allow them to have access to better childcare arrangements and thus better coordination between work and family life.

The analysis by type of household shows that single mothers with intermediate qualifications have the greatest likelihood, among the groups analyzed, of entering the labor market compared to those who are not mothers, with a difference of 29.5 percentage points. For mothers with lower and higher educational attainment, this difference is reduced, although it continues to be verified that the responsibility of having a dependent family increases the need to enter the labor market.

Although women in two-parent households are less likely to work in the labor market than women in single-parent households, those with intermediate educational attainment are more likely to enter the labor force.

Finally, in terms of wages, it can be observed that in single-parent households, only women with a higher educational attainment have a wage penalty compared to those who are not mothers. The same situation is seen in two-parent households, but for women with a lower educational attainment.

Table 7. Effects of motherhood on labor participation by educational attainment

Effects measured in percentage points. Dependent variable: labor participation.

	Specification 1			Specification 2			Specification 3			Specification 4		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
With children in the household	-4.5*** (0.009)	-17.9*** (0.007)	-8.0*** (0.006)									
One child				-1.9* (0.010)	-13.6*** (0.008)	-6.7*** (0.007)						
2 children				-4.0*** (0.009)	-19.4*** (0.008)	-8.4*** (0.007)						
3 or more children				-7.9*** (0.009)	-23.2*** (0.008)	-10.1*** (0.008)						
Minor children							-4.7*** (0.009)	-18.1*** (0.007)	-7.9*** (0.006)			
Adult children							-4.0*** (0.011)	-16.3*** (0.011)	-8.6*** (0.010)			
Under 10										-8.1*** (0.009)	-19.5*** (0.007)	-9.1*** (0.007)
Between 10 and 17										-1.4 (0.009)	-14.3*** (0.009)	-5.2*** (0.008)
18 or older										-2.7** (0.011)	-14.3*** (0.011)	-7.1*** (0.010)
Single-parent household	6.6*** (0.018)	29.5*** (0.013)	8.1*** (0.013)	6.5*** (0.018)	28.2*** (0.013)	8.2*** (0.013)	6.3*** (0.018)	29.5*** (0.013)	7.8*** (0.013)	5.9*** (0.018)	29.3*** (0.013)	7.6*** (0.013)
Two-parent household	-19.6*** (0.017)	-7.9*** (0.011)	-13.7*** (0.012)	-19.5*** (0.017)	-8.4*** (0.011)	-13.7*** (0.012)	-19.7*** (0.017)	-7.8*** (0.011)	-13.7*** (0.012)	-19.7*** (0.017)	-7.3*** (0.011)	-13.8*** (0.012)
Observations	45,784	47,380	**28,745**	45,784	47,380	**28,745**	45,784	47,380	**28,745**	45,784	47,380	**28,745**

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Table 8. Effects of motherhood on wages by educational attainment

Dependent variable: logarithm of the real hourly wage.

	Specification 1			Specification 2			Specification 3			Specification 4		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
With children in the household	-8.5%*** (0.032)	-12.8%*** (0.023)	-8.5%*** (0.031)									
One child				-3.2% (0.035)	-10.1%*** (0.025)	-9.1%** (0.038)						
2 children				-6.8%* (0.035)	-11.5%*** (0.026)	-7.1%* (0.039)						
3 or more children				-15.2%*** (0.035)	-17.1%*** (0.029)	-10.2%* (0.053)						
Minor children							-10.1%*** (0.033)	-12.7%*** (0.023)	-7.7%** (0.031)			
Adult children							-1.9% (0.040)	-14.4%*** (0.036)	-17.9%** (0.078)			
Under 10										-11.3%*** (0.035)	-12.9%*** (0.024)	-5.9%* (0.034)
Between 10 and 17										-9.3%*** (0.035)	-12.9%*** (0.027)	-14.0%*** (0.045)
18 or older										-1.9% (0.041)	-14.5%*** (0.036)	-19.4%** (0.078)
Single-parent household	-6.2% (0.038)	-1.4% (0.021)	-6.2%*** (0.017)	-6.4%* (0.038)	-2.0% (0.021)	-6.1%*** (0.017)	-6.4%* (0.038)	-1.1% (0.021)	-5.8%*** (0.017)	-6.3%* (0.0380)	-0.9% (0.021)	-5.2%*** (0.017)
Two-parent household	-7.9%** (0.039)	-2.1% (0.016)	0.8% (0.015)	-8.9%** (0.040)	-1.9% (0.016)	-0.7% (0.015)	-8.4%** (0.039)	-2.1% (0.016)	-0.6% (0.015)	-9.0%** (0.040)	-2.2% (0.016)	-0.6% (0.015)
Lambda (λ)	0.058 (0.035)	0.028 (0.029)	-0.108*** (0.041)	0.080** (0.037)	0.017 (0.030)	-0.116*** (0.041)	0.066* (0.035)	0.032 (0.029)	-0.113*** (0.041)	0.079** (0.036)	0.037 (0.029)	-0.109*** (0.041)
R^2	0.382	0.400	0.288	0.384	0.400	0.289	0.383	0.400	0.289	0.383	0.400	0.289
Observations	11,887	22,047	22,847	11,887	22,047	22,847	11,887	22,047	22,847	11,887	22,047	22,847

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Sample segmentation by labor market sector

We examine whether the effects of motherhood on labor participation and wages differ between the formal and informal sectors of the labor market. For this purpose, the groups were divided by considering, on the one hand, employed women in the formal sector as well as unemployed and economically inactive women, and, on the other hand, employed women in the informal sector, as well as unemployed and economically inactive women.

As can be seen in Table 9, being a mother implies a lower likelihood of entering the labor market, let alone entering the formal sector. In other words, a mother is 11.2 percentage points less likely to work in a formal job than a woman without children. In the informal sector, the difference is 9.7 percentage points.

A mother is more likely to be in the informal sector than in the formal sector of the labor market.

When observing the effects of motherhood on wages (Table 10) in general terms, there is no evidence of a wage penalty in the formal sector, a situation that is compatible with the greater protection of labor rights that female workers who manage to enter the formal sector enjoy.

The largest relative wage gap between mothers and childless women is observed in the informal sector.

In line with the latter, a wage penalty of 5.1% is observed in women with children of legal age, which could be linked, as stated in the descriptive analysis, to the discontinuation of the payment of the child allowance provided for in the Family Allowance Regime.

For women in the informal sector, there is a wage penalty for mothers in all specifications. Living with children reduces women's hourly wages by 13.9%, a situation that is aggravated by a higher number of children in the household.

The wage gap in the informal sector can be as high as 22% between childless women and mothers of 3 or more children.

These results are in line with those found by Casal and Berham (2013).

Although mothers in single-parent households are more likely than women without children to be in the labor market, they are even more likely to be in the informal sector. In other words, a mother is 19.3 percentage points more likely to be employed in the informal sector than a woman who is not a mother. However, once she enters the informal market, no wage gap is observed with childless women.

Women in two-parent households are less likely to work for pay than women in single-parent households and are even less likely to enter the formal market. In terms of wages, in both formal and informal sectors, women in two-parent households earn lower wages than women in single-person households, a gap that is more pronounced in the informal sector.

Table 9. Effects of motherhood on labor participation by sector of the labor market

Effects measured in percentage points. Dependent variable: labor participation.

	Specification 1		Specification 2		Specification 3		Specification 4	
	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal
With children in the household	-11.2*** (0.004)	-9.7*** (0.005)						
One child			-8.2*** (0.005)	-8.4*** (0.007)				
2 children			-12.1*** (0.005)	-10.8*** (0.007)				
3 or more children			-15.9*** (0.005)	-12.7*** (0.007)				
Minor children					-11.7*** (0.004)	-10.4*** (0.006)		
Adult children					-10.1*** (0.006)	-10.1*** (0.008)		
Under 10							-13.5*** (0.004)	-12.0*** (0.006)
Between 10 and 17							-8.4*** (0.005)	-7.4*** (0.007)
18 or older							-8.4*** (0.006)	-8.7*** (0.008)
Single-parent household	15.6*** (0.008)	19.3*** (0.011)	15.6*** (0.008)	19.3*** (0.011)	14.9*** (0.008)	18.8*** (0.011)	15.4*** (0.008)	19.3*** (0.011)
Two-parent household	-13.4*** (0.007)	-8.6*** (0.010)	-13.3*** (0.007)	-8.5*** (0.010)	-13.8*** (0.007)	-8.8*** (0.010)	-12.9*** (0.007)	-8.0*** (0.010)
Observations	94,494	77,698	94,494	77,698	94,494	77,698	94,494	77,698

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Table 10. Effects of motherhood on wages by sector of the labor market

Dependent variable: logarithm of the real hourly wage.

	Specification 1		Specification 2		Specification 3		Specification 4	
	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal
With children in the household	-1.1% (0.008)	-13.9%*** (0.022)						
One child			-1.1% (0.009)	-10.9%*** (0.022)				
2 children			0.2% (0.009)	-14.2%*** (0.024)				
3 or more children			-2.7%*** (0.010)	-22.1%*** (0.027)				
Minor children					-0.6% (0.008)	-14.6%*** (0.022)		
Adult children					-5.1%*** (0.012)	-10.2%*** (0.029)		
Under 10							0.10% (0.009)	-16.4%*** (0.023)
Between 10 and 17							-2.1%** (0.009)	-12.6%*** (0.023)
18 or older							-6.0%*** (0.012)	-9.6%*** (0.029)
Single-parent household	-3.6%*** (0.012)	1.5% (0.031)	-3.8%*** (0.012)	2.0% (0.032)	-3.2%*** (0.012)	1.4% (0.031)	-2.8%** (0.012)	1.9% (0.032)
Two-parent household	-2.6%** (0.011)	-9.6%*** (0.028)	-2.4%** (0.011)	-10.7%*** (0.028)	-2.5%** (0.011)	-9.7%*** (0.028)	-2.5%** (0.011)	-9.9%*** (0.028)
Lambda (λ)	0.015 (0.013)	0.229*** (0.045)	0.007 (0.014)	0.270*** (0.047)	0.015 (0.013)	0.233*** (0.045)	0.017 (0.013)	0.252*** (0.045)
R^2	0.335	0.301	0.355	0.302	0.355	0.301	0.355	0.302
Observations	39,542	17,239	39,542	17,239	39,542	17,239	39,542	17,239

Note: Robust standard errors in parentheses.

(*) significant at 10%, (**) significant at 5% and (***) significant at 1%.

SOURCE: OPC, based on Permanent Household Survey (INDEC).

Effect estimates of motherhood on the Social Security System

This section analyzes the effects of motherhood on the likelihood of accessing social security benefits, as well as on initial pension benefit.

The analysis is carried out on the general pension scheme established by Law 24,241, since it is the one with the largest number of contributors in the country. The general scheme requires that contributions represent, on average, 11% of the remunerations as contributions and 16% as employer contributions. Also, at least 30 years of contributions accredited before the competent authority (ANSES) are required and the minimum age to access benefits for women is 60 years. The amount of the benefit to be received at the time of retirement (initial benefit) is calculated by adding the following items:

- Universal Basic Benefit (PBU): fixed amount (ARS11,858.33 as of September 2021) plus 1% for each year exceeding the minimum 30 years required (maximum 15 years - 45 years of contributions).
- Compensatory Benefit (PC) - for contributions prior to June 1994 - and Additional Permanence Benefit (PAP) - for contributions since July 1994 -: the calculation of both benefits is identical, and represents 1.5% for each year of service subject to contributions (up to a maximum of 45 years, considering the most favorable years if contributing for a longer term), multiplied by the average of updated remunerations (according to coefficients defined by ANSES regulations) received in the last 10 years of service.

Considering that retirement age and the method of calculating the pension benefit are defined by regulations for the general system, the impact of motherhood on the other two variables: initial pension benefit and years of contributions, will be discussed according to the results previously obtained. The analysis considers the effect of motherhood for each of these variables separately, on the assumption that the remaining variable remains constant.

Impact on initial pension benefit

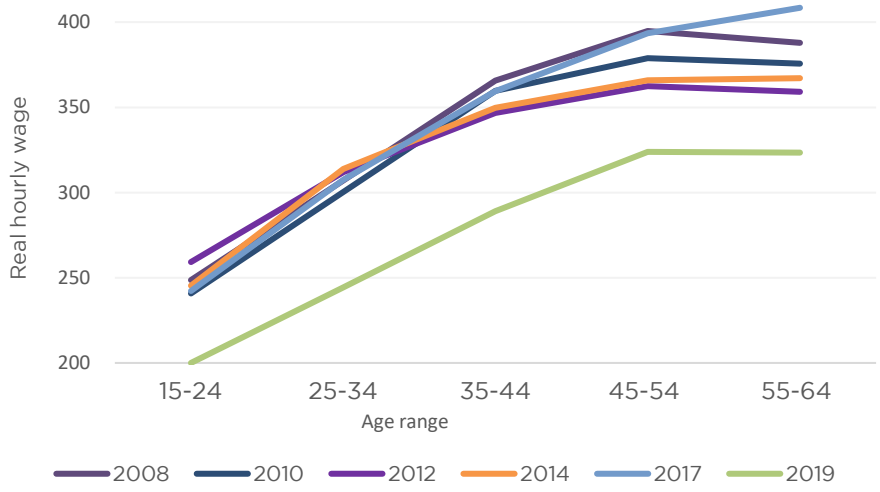
As was previously mentioned, women with children earn on average lower wages than women without dependents, and the magnitude of the difference varies with the number and age of the children of the former. It is therefore important to evaluate the impact of these gaps in wages in the economically active years on the pension benefits to be received in the economically inactive years for each group of women.

Considering that access to benefits requires 30 years of contributions during the economically active years and having reached 60 years of age, the following analysis of the initial pension benefit assumes that these requirements are fully met and does not consider the additional years of contributions, i.e., those cases in which women have contributed for more than 30 years.

Therefore, the analysis is focused on the calculation of the initial pension benefit according to the concepts already mentioned, taking as a variable the remunerations obtained for the different groups of women under analysis. Given the lack of response from ANSES with respect to nominal information that allows us to observe the labor trajectory of women, the methodological criterion for calculating the CP and PAP will be taken as the average value of the last 120 remunerations, the value of the average monthly remuneration updated to December 2020 for the age group of women over 45 years old and employed in the formal sector, since the evidence presented by the EPH indicates the existence of general stability in the remuneration received as of that age, coinciding with the remunerations to be taken for the calculation (Figure 11).

Figure 11. Evolution of wages by age

Real hourly wage at 2020 constant value



Source: OPC based on Permanent Household Survey (INDEC).

Also, considering that the data used in this analysis refers to December 2020, the regulations established that as of that date the value of the PBU, the minimum pension and the maximum pension were:

- PBU: ARS8,144.14
- Minimum pension: ARS19,035.29
- Maximum pension: ARS128,089.54
- Minimum base: ARS6,411.08
- Maximum base: ARS208,357.30

With all the variables defined, the calculation of the average initial pension benefit is analyzed for each specification considered in this report.[4]

Table 11. Initial Pension Benefit - Specification 1

	Women without children	Women with children
Average of 120 adjusted remunerations	ARS58,243.87	ARS53,129.34
Adjusted pension benefit	ARS34,353.88	ARS32,052.34
Benefit in relation to last remuneration	59.0%	60.3%

Source: OPC, based on current regulations and Permanent Household Survey (INDEC).

[4] This section does not include the analysis of the impact on specification 4, which considers the presence of children by different age ranges, since there are no observations in the group of women with children under 10 years of age who meet the requirements for accessing the pension benefit.

The results show that the gap observed in the economically active years is transferred to retirement. However, the gap between the pension benefits of each group of women is smaller than the wage gap; a situation that shows an equalizing effect of the National Social Security System.

Although the gap in earnings observed in the economically active age are transferred to retirement, they are reduced in magnitude.

The percentage of representation of the pension benefit in relation to the last remuneration received is slightly higher for mothers (60.3% vs. 59.0%). This situation is explained by the leverage that the PBU has on the lower benefits, since it is a fixed amount which represents a higher percentage of the total amount of lower benefits.

The initial pension benefit represents a higher percentage of the last remuneration received when the latter is lower, reflecting an equalizing effect of the National Social Security System.

As for the specification that considers the number of children (specification 2), it is again observed that the initial pension benefit represents a higher percentage of the last remuneration received when the latter was lower. That is, although mothers with 3 or more children have the lowest relative wages compared to mothers with 1 or 2 children, they receive a pension benefit that is slightly higher than the last remuneration obtained.

Table 12. Initial Pension Benefit - Specification 2

	With 1 child	With 2 children	With 3 or more children
Average of 120 adjusted remunerations	ARS55,213.43	ARS53,942.06	ARS49,563.03
Adjusted pension benefit	ARS32,990.18	ARS32,418.07	ARS30,447.50
Benefit in relation to last remuneration	59.8%	60.1%	61.4%

Source: OPC, based on current regulations and Permanent Household Survey (INDEC).

Finally, for the specification that considers children's age (specification 3), the equalizing effects of the Social Security System are once again evident. Comparing the gap between mothers of adult and minor children, we see that this gap is reduced as they move from the economically active age to retirement.

Table 13. Initial pension Benefit- Specification 3

	With minor children	With adult children
Average of 120 adjusted remuneration	ARS53,82277	ARS51,239.75
Adjusted pension benefit	ARS32,364.39	ARS31,202.03
Benefit in relation to last remuneration	60.1%	60.9%

Source: OPC, based on current regulations and Permanent Household Survey (INDEC).

Impact on the eligibility for social security benefits

Based on the differences between the likelihood of each group of women to enter the formal labor market (discussed in the section 'Heterogeneity in the maternity penalty'), it is possible to determine the average likelihood for each group. Thus, according to the estimates made, mothers have a lower likelihood of working in the formal sector than the group of women who do not have dependents: for mothers this likelihood is 41.0%, while for non-mothers it is 58.1%.

Considering that the age from which contributions can be made to the SIPA (Argentine Integrated Social Security System) is from 18 years of age and that the theoretical age of retirement for women begins at 60 years of age, the number of years between these extremes (42 years) can be taken as an approximation of the economically active years in labor terms.

The number of years of contributions that each group of women will accumulate (on average) can be calculated from the product of the likelihood of entering the formal market and the possible years of activity. Thus, women with children will have an average of just over 17 years of contributions, while women without dependents will have just over 24 years. These results are more than striking, since they reveal that none of the groups of women analyzed, on average, manages to cover the 30 years of contributions required by the regulations to access pension benefits. For mothers, 13 years remain to be covered, and for women without children, 6 years.

On average, neither group of women can reach the 30 years of contributions required by the regulations.

This situation reflects other factors beyond motherhood that keep this population group away from the possibility of accessing pension benefits. Focusing on the causes that produce these phenomena will reduce the subsequent need to apply measures to address the effects of these phenomena, for example, pension moratoriums.

Focusing on the causes that prevent the population from accessing pension benefits will reduce the subsequent need to apply emergency measures, for example, pension moratoriums.

Therefore, if structural issues that prevent reaching the required 30 years of contributions are not addressed, such as difficulties in entering and remaining in the formal labor market, and only access to social security benefits is addressed, the economic and financial inconsistencies of the pension system could worsen by creating greater imbalances between income and outflows than those currently existing.

However, these are average values and there are observations with results above and below those figures for each group of women under analysis. It is therefore helpful to disaggregate the information to analyze individually, within each group, those women who manage to meet the 30 years of contributions required as well as those who do not.

Taking the values shown as a reference, the requirement on the number of years of contributions will be met for those women who have a likelihood of entering the formal labor market of more than 71.4%.

Only 25% of mothers and 41% of childless women can meet the years of contribution requirement.

Thus, only 25% of mothers manage to reach the years of contributions required by the regulations, while the percentage rises to 41% when analyzing women who do not have children.

Within this select group, mothers are concentrated in the range between 34 and 37 years of contributions, while women without dependents reach a higher number of years, mainly in the range of 38 years or more (lower panel of Table 14).

In the group of women who do not meet this requirement (upper panel of Table 14), more than half of the mothers have less than 10 years of contributions and only 2% of them are close to reaching the required 30 years of contributions; a situation that shows how far away this group is from accessing pension benefits.

Among the mothers who do not comply with the number of years of contributions, more than half have less than 10 years of contributions. Only 2% are close to meeting the requirement.

On the other hand, women who do not have children are more evenly distributed among the ranges considered, with a greater number of women in the ranges close to the limit established by the regulations.

Among women with more than 30 years of contributions, mothers are average 35 years, while childless women 41 years.

This small number of years of accumulated contributions because of exclusion from the labor market and labor informality across the economically active population would result in a disproportionate rate of sustainability of the pension system, resulting in very few active workers per every retired worker to finance the system.

Table 14. Distribution of women based on whether they have reached the required number of years of contributions and on their motherhood status

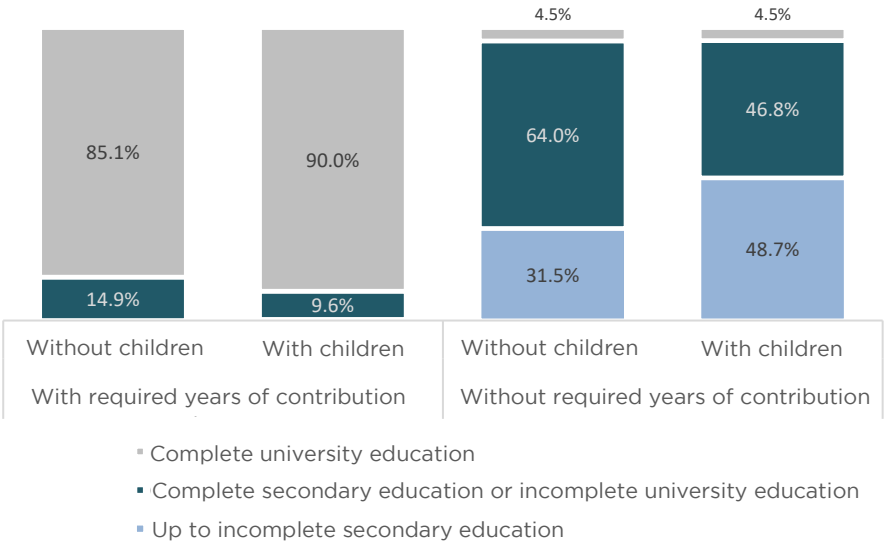
Women who do not reach the required number of years of contributions		
	Without children	**With children**
Less than 10 years	32%	53%
Between 10 and 13 years	16%	10%
Between 14 and 17 years	12%	15%
Between 18 and 21 years	13%	13%
Between 22 and 25 years	16%	7%
Between 26 and 29 years	12%	2%
Women who have reached the required years of contributions		
	Without children	**With children**
Between 30 and 33 years	17%	26%
Between 34 and 37 years	32%	57%
38 or more years	52%	17%

Source: OPC, based on Permanent Household Survey (INDEC).

As for educational attainment, 9 out of 10 mothers and slightly more than 8 out of 10 childless women who manage to accumulate the years of contributions have completed university studies, while the proportion of women with university studies is very low among those who do not manage to accumulate the years of contributions.

Most women (mothers and non-mothers) who accumulate at least 30 years of contribution have university education.

Figure 12. Distribution of women according to whether they have reached the required number of years of contributions and educational attainment

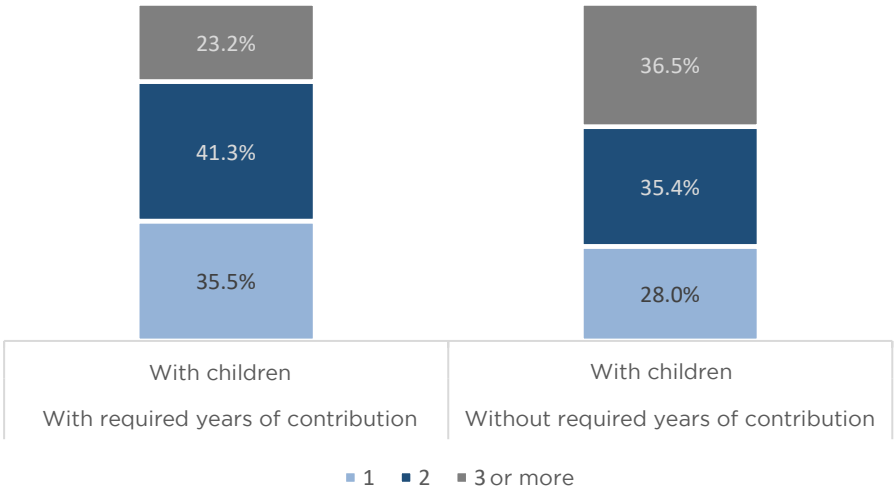


Source: OPC, based on Permanent Household Survey (INDEC).

Finally, we observe that only 2 out of every 10 mothers who manage to reach the required number of years of contributions have 3 or more children, while this proportion rises to almost 4 out of every 10 among women who do not have the required number of years of contributions. These figures reinforce the results obtained previously on the difficulty of combining work and family life.

The greater the number of children, the greater the difficulty in meeting the years of contribution requirement.

Figure 13. Distribution of mothers according to whether they have reached the required number of years of contributions and number of dependent children



Source: OPC, based on Permanent Household Survey (INDEC).

In conclusion, despite the small wage gap observed in the formal sector between the groups of women analyzed, these gaps are carried over to retirement, implying lower relative pension benefits for mothers. However, there are equalizing effects of the Social Security System that reduce these gaps. On the other hand, greater effects are observed in the likelihood of reaching 30 years of contributions and therefore accessing pension benefits. Both women without dependents and mothers face great difficulties in complying with the required years of contributions, a situation that is aggravated for mothers.

From a rights-based approach, promoting integration into the formal labor market would guarantee not only better working conditions (given that the informal sector has the largest wage gaps between mothers and non-mothers) but also access to social protection for women workers and their families in case they have one. From the economic point of view, the registration of the activity would result in greater resources for the public coffers, thus contributing to the fulfillment of one of the basic principles of any social security system, which is its self-financing.

Annex I: Sample selection

As already mentioned, the purpose of this paper is to analyze the effect of children on women's wages for the years 2004-2020. To this end, the sample was restricted to the female population with and without children. The EPH database does not allow us to determine whether a woman is a mother, so its identification was carried out by mapping the household database with that of individuals, considering as mothers those women who live with people who declare that they are the children of the head of household.

The procedure for the sample selection used in this work is described in the following paragraphs.

From a total of 470,772 women with and without children identified in the analyzed time frame, women under 18 and over 55 years of age were excluded. The selection of this age range was arbitrary so that, based on the definition of a dependent child (child between 0 and 17 years of age), the analysis could focus on women who are in the age period of greatest fertility (or, equivalently, who have been mothers up to the age of 41).

From the subtotal obtained (243,035 observations), we selected the women who declared to be heads of household or spouses of the head of household, removing those who declared to be the daughter, daughter-in-law, granddaughter, mother, mother-in-law, sister or other relative or non-relative of the head of household to ensure that the sample contained only one possible mother per household.

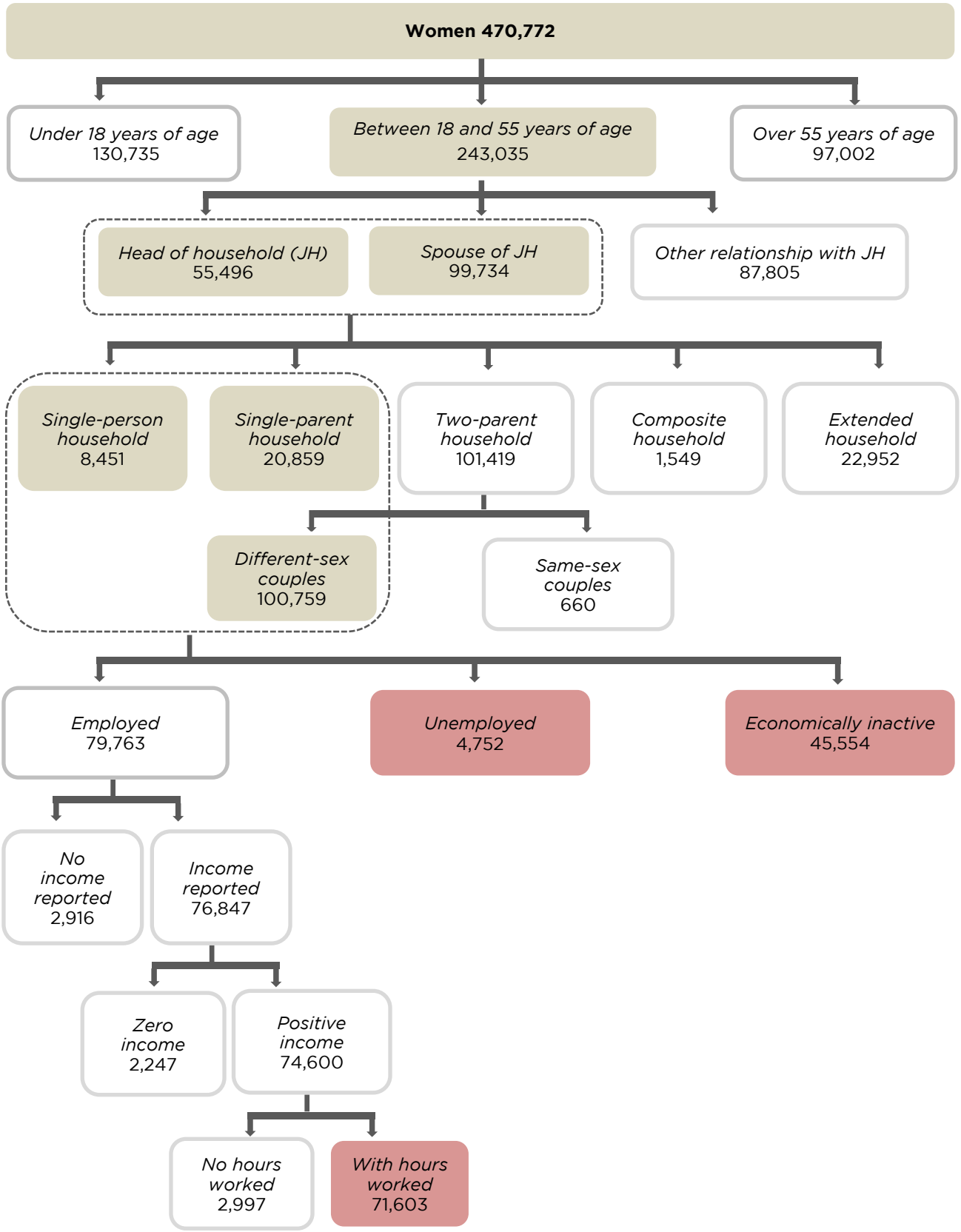
Because of the mentioned difficulty in identifying the mother within the family group from the survey, it was not possible to consider same-sex couples (660 observations) and extended and composite households, i.e., with more members than the core family (24,501 observations) in the analysis. This restricts the universe of analysis to women living alone (in single-person households), women living with their children (single-parent households) and women living with their spouse, or with their spouse and children (two-parent households).

From the subtotal of 130,069 observations, employed women who reported no income (2,916 observations), zero income (2,247) and those with no hours worked during the reference week (2,997 observations) were also excluded because of the impossibility of calculating the real hourly wage, the dependent variable of this study.

Based on the considerations made, a final sample of 121,909 women was obtained, which is composed, according to women's occupational status, of: 71,603 employed, 4,752 unemployed and 45,554 economically inactive women.

The diagram in Figure I.1 describes the sample selection process, showing in pink the subsets of women that comprise the final sample.

Figure I.1 Sample selection



Annex II: Survey Processing

This section describes the variables used in the analysis and the way in which they have been constructed, based on information from the Permanent Household Survey.

Table II.1: Description of variables

Variable	Description
One child in household	Dummy variable: 1 if the woman lives with at least one child
One child	Dummy variable: 1 if the woman lives with one child
2 children	Dummy variable: 1 if the woman lives with two children
3 or more children	Dummy variable: 1 if the woman lives with two or more children
Minor children	Dummy variable: 1 if the woman lives with at least on child under 18 years of age
Adult children	Dummy variable: 1 if the woman lives only with children 18 years of age or older
Under 10	Dummy variable: 1 if the woman lives with at least one child under 10 years of age
Between 10 and 17	Dummy variable: 1 if the woman lives with at least one child between 10 and 18 years of age
18 or older	Dummy variable: 1 if the woman lives only with children 18 years of age or older
age	Years of age
age^2	Age squared
Single-person household	Dummy variable: 1 if the woman lives alone
Single-parent household	Dummy variable: 1 if the woman lives with at least one child
Two parent household	Dummy variable: 1 if the woman lives with her spouse or spouse and children
educ_level_1	Dummy variable: 1 if the highest level attained is incomplete secondary education or less
educ_level_2	Dunny variable:1 if the highest level attained is complete secondary education or incomplete university education
educ_level_3	Dummy variable: 1 if the highest level attained is complete university education
employed	Dummy variable: 1 if the woman is employed (has at least one occupation)
unemployed	Dummy variable: 1 if the woman in unemployed (without occupation and actively looking for work)
Economically inactive	Dummy variable: 1 if the woman is economically inactive (without occupation and not actively looking for work)
Nl w	Natural logarithm of the real hourly wage of the woman's main occupation
formal	Dummy variable: 1 if job is in the formal sector
informal	Dummy variable: 1 if job is in the informal sector
Public sector	Dummy variable: assumes 1 if job is in the public sector.
Private sector	Dummy variable: assumes 1 if job is in the private sector.
full_time	Dummy variable: 1 if job is full time (more than 32 hours per week)
part_time	Dummy variable: 1 if job is part-time (32 or fewer hours per week)
Length of service_1	Dummy variable: 1 If the woman has less than one year of service in her primary occupation
Length of service_2	Dummy variable: 1 if the woman has between 1 and 5 years of service in her primary occupation
Length of service_3	Dummy variable: 1 if the woman has 6 or more years of service in her primary occupation
Management	Dummy variable: 1 if the woman occupies a management position
Supervision	Dummy variable: 1 if the woman occupies a supervision position
direct_execution	Dummy variable: 1 if the woman occupies a position as a paid employee
independent	Dummy variable: 1 if the woman is self-employed
Company_size_1	Dummy variable: 1 if the Company has up to 5 employees
Company_size_2	Dummy variable: 1 if the Company has between 6 and 40 employees
Company_size_3	Dummy variable: 1 if the Company has between 41 and 500 employees
Company_size_4	Dummy variable: 1 if the Company has more than 500 employees

Manufacturing_s	Dummy variable: 1 if the woman works in the manufacturing sector
Commerce_s	Dummy variable: 1 if the woman works in the commerce sector
Education_s	Dummy variable: 1 if the woman works in the education sector
Healthcare_s	Dummy variables: 1 if the woman works in the healthcare sector
Administration_s	Dummy variables: 1 if the woman works in the public administration
Domestic_s	Dummy variable: 1 if the woman works in domestic service
Others_s	Dummy variable: 1 if the woman works in the service sector
GBA_region	Dummy variable: 1 for the Greater Buenos Aires region
NOA_region	Dummy variable: 1 for the Northwest region (NOA)
NEA_region	Dummy variable: 1 for the Northeast region (NEA)
Cuyo_region	Dummy variable: 1 for Cuyo region
Pampas_region	Dummy variable: 1 for Pampas region
Patagonia_region	Dummy variable: 1 for Patagonia region
Nl_non_labor_inc	Natural logarithm of household non-labor income
Nl_other_members_inc	Natural logarithm of other household members income

The definitions, methodological decisions or assumptions used for the construction of some variables are summarized as follows:

Mother

As mentioned above, the EPH database does not allow us to determine whether a woman is a mother, considering as mothers those women who live with at least one child.

The rest of the sample is composed of women without children in the household. Because of the mentioned limitation of the survey, it is not possible to state that this group includes only women who are not mothers, since it could include women who have had children throughout their lives, but at the time of answering the survey do not live with them.

For the estimation model, with the specifications detailed in the Methodological Design section, the following variables were constructed according to whether the woman lives with children, the number of children and their ages.

Specification 1:

With one child in the household: includes all women living with at least one child.

Specification 2:

- With one child
- With two children
- With three or more children

Specification 3:

- Women who live with at least one child under 18 years of age.
- Women who live with children 18 years of age or older.

Specification 4:

- Women who live with at least one child under 10 years of age.
- Women who live with at least one child between the ages of 10 and 17 (and do not have children under the age of 10).
- Women who live only with children 18 years of age or older.

By considering different age ranges of children, it is possible to identify the implications for a mother of the different needs of her children according to their stage of life. The World Health Organization (WHO) defines childhood as the stage of life below 10 years of age, and adolescence as the stage of life above 10 years of age. Likewise, in Argentina, a person is considered to have reached the age of majority at 18 years of age.

Logarithm of the real hourly wage

The calculation of the hourly wage is based on the monthly income of the primary occupation and the number of hours worked in that occupation. Since these variables are reported with different periodicity (monthly for income and weekly for hours worked), it was necessary to restate the income, multiplying it by the number of months per year (12) and dividing by the number of weeks per year (52) and weekly hours worked.

The values obtained for the nominal hourly wage were adjusted for inflation, using the Consumer Price Index (CPI) of December of each year as a deflator. The monthly CPI series used is a combination of the CPI series published by INDEC for the term January 2004 to December 2006; average CPI of San Luis, Córdoba, and the Autonomous City of Buenos Aires (CABA) for the term January 2007 to May 2012; CPI CABA from June 2012 to April 2016; CPI Greater Buenos Aires Area (INDEC) from May 2016 to December 2016 and the National CPI (INDEC) from January 2017 to December 2020.

Occupational status

As for the occupational status of women, the activity status reported in the survey is taken. According to INDEC definitions, a woman is considered employed if she has worked at least one hour in an economic activity during the reference week; unemployed if she does not have a job but is available for work and has actively looked for an occupation during the reference week; and economically inactive if she does not have a job and is not actively looking for one.

Labor formality/informality status

According to the International Labor Organization (ILO), there are two different approaches to conceptualize labor informality. Under the productive approach, employment in the informal sector is defined as workers employed in small productive units, which use low levels of capital and technology and have low productivity. On the other hand, the legal approach defines informal employment as the group of workers not covered by labor legislation.

For the purposes of this paper, both approaches are used for the construction of the variables, depending on the woman's occupational status.

For employed women, informal workers are those who report that they do not make pension contributions and therefore are not registered in the Social Security System (legal approach).

For self-employed workers, the survey does not inquire about contributions to the Social Security System, so their formality/informality status is determined based on the characteristics of the productive units, considering self-employed workers and informal employers to be those working in the informal sector (productive approach). Because of the limitations of the EPH in terms of the characteristics of the Companies, the measurement criterion suggested by the ILO is adopted, which considers the informal sector composed of family units, small non-government-owned companies (up to 5 employees), non-professional independent workers and unpaid family members.

Work schedule

The distinction between full-time and part-time work is made by considering 32 hours per week in the primary occupation. This value is based on the provisions of Argentina's Labor Contract Law, which defines part-time work as work whose number of hours is below two thirds (2/3) of the normal working day and establishes 48 hours as the maximum number of hours per week for paid work.

Occupational hierarchy

The variables linked to the Occupational Hierarchy come from INDEC's National Classification of Occupations (CNO) and refer to the position of each occupation in the internal ordering of the productive units. The variables used in the analysis are the following:

- Management: includes occupations that are at the highest point of the command structure, giving orders and not receiving them from any other instance.
- Supervision: includes occupations whose purpose is the transmission and implementation of general decisions coming from management, as well as the organization and supervision of processes and persons involved in their execution.
- Direct execution: includes occupations that directly perform the production of goods or provision of services, without control over persons or processes.
- Independent: occupations in which there are no hierarchical structures since there is no employment relationship or personnel in charge.

Economic sector

This variable refers to the productive sector in which women work and comes from the Classification of Economic Activities for Mercosur Sociodemographic Surveys (CAES Mercosur).

For the 2004-2010 term, the version in force during those years (CAES Mercosur 2000) was used, while for the 2011-2020 term, the new version called CAES Mercosur 1.0, in force as of the first quarter of 2011, was used. To make the information for both terms compatible, the table of correspondence between both versions, published by INDEC, was used, following the order of sections included in the latest version.

The sections were regrouped according to their relative importance for the sample of women analyzed, with the classification by economic sector consisting of the following categories:

- Manufacturing Sector: includes all activities involving the processing of inputs (raw materials) and their transformation into intermediate or final consumer products.
- Commerce Sector: includes wholesale and retail trade and repair of motor vehicles and motorcycles.
- Education sector: includes teaching at all levels of education, educational support services and other types of education not previously classified.
- Human health and social services sector: include human health care activities, social assistance related to health care, and social services without accommodation.
- Public Administration Sector: includes public administration services, public provision of community services, and compulsory social security services.
- Domestic Service: includes services of care, cleaning, and housekeeping.

- Other sectors: covers all economic sectors not mentioned. These are: agriculture, livestock, forestry and fisheries; mining and quarrying; electricity, natural gas, steam and air conditioning supply; water supply; sewerage, waste management and sanitation activities; construction; transportation and storage; accommodation and food service activities; information and communication; financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities; arts, entertainment and recreation; other service activities; and activities of extraterritorial organizations and bodies.

Logarithm of other household members income

This variable is obtained by aggregating the real hourly wage of the primary occupation of the other members of the household in addition to the woman in the sample analyzed.

Logarithm of household non-labor income

This variable is obtained by aggregating the non-labor income received in the household. This includes retirement/pension; severance pay, unemployment insurance, social benefits, property rents, earnings from a business in which the person did not work, interest or income from fixed terms or investments, grants, assistance from people who do not live in the household, or other cash income.

Annex III: Estimation model used

The income equation to be estimated is as follows:

$$\ln w_i = \alpha_{ij} + \beta H_i + \delta_1 X_{1i} + \delta_2 X_{2i} + \delta_3 X_{3i} + \delta_4 X_{4i} + \mu_i \quad (1)$$

The dependent variable $ln\, w_i$ is the natural logarithm of woman real hourly wage i.

H_i is a vector of variables linked to parenting and child characteristics that varies according to the model specification, as will be detailed later;

X_{1i} is a vector of human capital variables: age and educational levels;

X_{2i} is a vector of dichotomous variables according to household typology: single-person, single-parent and two-parent;

X_{3i} es X_3i is composed of dummy variables for each region in which the woman lives and year of the survey;

X_{4i} is a vector of variables related to labor characteristics: length of service, hierarchical position, formality status, work schedule, Company size, management sector (public/private) and economic sector in which the woman works;

μ_i is the random error term that includes all the factors that are part of the wage-generating process and that are not explained by the independent variables of the model shown.

In line with the literature on the subject (Piras and Ripani, 2005; Olarte and Peña, 2010; Casal and Berham, 2013), different specifications are included to measure the impact of children on their mothers' wages:

- In the first specification H_i is a dummy variable that captures the presence or absence of children in the household. Equation (1) takes the following form:
  $$\ln w_i = \alpha_{ij} + \beta_1 (con\ hijo/a\ en\ el\ hogar)_i + \delta_1 X_{1i} + \delta_2 X_{2i} + \delta_3 X_{3i} + \delta_4 X_{4i} + \mu_i \quad (1.1)$$

- In the second specification H_i includes dummies for the number of children living with the woman, with the equation to be estimated as follows:
  $$\ln w_i = \alpha_{ij} + \beta_1 (un\ hijo/a)_i + \beta_2 (2\ hijos/as)_i + \beta_3 (3\ o\ más\ hijos/as)_i + \delta_1 X_{1i} + \delta_2 X_{2i} + \delta_3 X_{3i} + \delta_4 X_{4i} + \mu_i \quad (1.2)$$

- In the third specification H_i is a vector of variables that captures the presence of minor children, with the equation to be estimated as follows:
  $$\ln w_i = \alpha_{ij} + \beta_1 (con\ menor)_i + \beta_2 (con\ mayor)_i + \delta_1 X_{1i} + \delta_2 X_{2i} + \delta_3 X_{3i} + \delta_4 X_{4i} + \mu_i \quad (1.3)$$

- In the fourth specification, the vector H_i considers the presence of children in the household by age range. The regression equation is as follows:
  $$\ln w_i = \alpha_{ij} + \beta_1 (\ menor\ de\ 10)_i + \beta_2 (entre\ 10\ y\ 17)_i + \beta_3 (18\ o\ más)_i + \delta_1 X_{1i} + \delta_2 X_{2i} + \delta_3 X_{3i} + \delta_4 X_{4i} + \mu_i \quad (1.4)$$

In the analysis of wage gaps between groups of workers, the problem of selection bias is common. This is caused by the lack of randomness in the sample selection, by observing only the wages of women who work.

If the decision to work in the labor market were random, we could ignore the fact that not all wages are observed and use the Ordinary Least Squares method to estimate the model. However, the assumption of random participation is unrealistic since this participation is influenced by other factors, such as the difference between the opportunity cost of working and the wage offered by the market. In other words, if the market wage is not high enough to compensate a person for the cost of staying out of the market, that person will probably not enter the paid labor force.

Given that labor participation involves individual characteristics, both observable and unobservable, the coefficients of equation (1) capture unobservable heterogeneity and therefore OLS would show biased and inconsistent estimates. Therefore, the selection bias correction proposed by Heckman (1979) is applied in this paper.

Labor market participation can be modeled from the following selection equation:

$$p_i^* = \gamma z_i' + \varepsilon_i \quad \varepsilon_i \sim N(0,1) \tag{2}$$

z is the vector of characteristics of woman i that determine whether the event (participation in the labor market) occurs or not and $p_i^*$is a latent (unobservable) variable that measures preferences for entering the labor market. It is only possible to observe an indicator variable for labor participation (p)such that:

$p = 1$ (the woman work) if $p_i^* > 0$

$p = 0$ (the woman does not work) if $p_i^* \leq 0$ (3)

Since the dependent variable of the model is the hourly wage, the regression model (1) can only be estimated for women who are paid (i.e. with $p_i^* > 0$)) and can be restated in matrix form as:

$$\ln w_i = \beta H'_i + \delta X_i{}' + \mu_i \tag{4}$$

For $i = 1, \dots, m$ women, where m represents a subset of the total number of women in the sample (n), composed of those who are employed.

Applying the expected value to the equation (4) we have:

$$\mathrm{E}\,(\ln w_i \mid p_i^* > 0) = \beta H_i + \delta X_i' + \mathrm{E}\,(\mu_i \mid p_i^* > 0) \tag{5}$$

$$\mathrm{E}\,(\ln w_i \mid p_i^* > 0) = \beta H_i + \delta X_i' + \mathrm{E}\,(\mu_i \mid \varepsilon_i > -\gamma z_i') \tag{6}$$

Which finally can be expressed as:

$$\mathrm{E}\,(\ln w_i \mid p_i^* > 0) = \beta H_i + \delta X_i' + \rho\sigma_\mu \frac{\phi(\gamma z_i')}{\Phi(\gamma z_i')} \tag{7}$$

ρ is the correlation between the residuals $\mu_i$and ε_i, $\phi(.)$ and $\Phi(.)$ are, respectively, the density function and the cumulative distribution function of the likelihood of labor market participation. The quotient between the two functions (represented by the letter λ) is called the Inverse Mills Ratio and is a monotonically decreasing function of the likelihood that an observation is selected.

$$\lambda_i = \frac{\phi(\gamma z_i')}{\Phi(\gamma z_i')} \tag{8}$$

If the error terms are uncorrelated $\rho = 0$) the conditional expectation of μ_i is zero and the regression function for the observed sample subset (employed women) is the same as that of the total sample. In this case, OLS can be employed for the estimation of β and δ of the incomplete sample. However, in general $\rho \neq 0$, in which case OLS estimation would imply the omission of the third term of equation (7), generating the usual problems of estimations with omission of relevant variables; namely, biased, and inconsistent estimators for the β and δ vectors (Heckman, 1979).

To correct the selection bias and overcome the potential problems that the OLS estimation would imply, the procedure proposed by Heckman (1979) is followed. This consists of a two-stage estimation.

In the first stage, the likelihood of the woman participating in the labor market (p) is estimated based on a binary choice model (probit model) in which the dependent variable assumes the value 1 ($p = 1$) if the woman actively participates in the labor market and 0 ($p = 0$) if she does not participate (she is unemployed or economically inactive).

$$p_i = \gamma z_i' + \varepsilon_i \tag{9}$$

From the estimation of the selection equation, consistent estimators for γ are obtained which are used to calculate the Inverse Mills Ratio (λ).

In the second stage, equation (1) is estimated, adding the parameter λ as regressor.

$$ln\, w_i = \alpha_{ij} + \beta H_i + \delta_1 X_{1i} + \delta_2 X_{2i} + \delta_3 X_{3i} + +\delta_4 X_{4i} + \varphi\lambda + \mu_i \qquad (10)$$

The inclusion of λ in the wage equation allows us to determine the effect of selection bias, i.e., whether observing only employed women conditions the estimate of the real hourly wage that a woman would receive (whether she is working for pay). This depends on the significance of its coefficient; if it is statistically significant, it is possible to reject the null hypothesis of random selection and the estimated coefficients for the parameters $\beta, \delta_1, \delta_2, \delta_3$ and δ_4 will be consistent only by Heckman's selection bias correction.

For the identification of the model, it is required that the vector of control variables (z) of the selection equation contains at least one variable that affects the likelihood of participation, but not the wage (Olarte and Peña, 2010). Otherwise, λ is a function of the same variables included in the wage equation, which produces highly unstable estimators (Acosta, Perticara and Ramos, 2006).

In this paper we use two variables that meet the mentioned condition; namely, non-labor income and income of other household members (both measured in logarithm), which are included together with the remaining control variables.

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