

# The impact of births on single parent's earnings: Evidence from Spain

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## Abstract

Taking an event study approach with data from the 2019 Continuous Sample of Working Histories, I study the impact of having a child on single parent's annual earnings. The main finding is that, although these individuals do not have a partner whom they can share responsibilities with, after the birth of the first child, women's annual earnings fall, while men's are unaffected, same as what the literature had found for families with both parents. When the analysis is split by educational level, I find that the birth of the first child has no statistically significant effect on annual earnings of college-educated single-mothers, while it has a negative impact for non-college-educated single mothers. The picture is the opposite for single fathers: annual earnings of highly-educated single fathers are negatively affected by the birth of their first child.

**Keywords:** child penalty, gender inequality, single parents

**JEL Codes:** J13, J16, J22, J31, J71,

# 1. Introduction

Despite the undoubted progress in closing the wage gap between men and women, no society has been able to fully achieve gender equality in earnings. Initially, researchers tried to find the answers in the role of human capital (Blau & Kahn, 2017) and discrimination (Neumark et al., 1996; Goldin & Rouse, 2000), but as society develops these explanations have lost its initial weight. A recent line of research has put the focus on the role of children as the cause for this gap.

Using an event study approach, many researchers have followed Kleven et al. (2019a) and have estimated the impact of having children on a series of labour market outcomes. The results seem to be relatively homogeneous across countries: women and men's labour market trajectories are almost parallel before having children and diverge shortly after the birth of the first child. This phenomenon is a consequence of the effect that maternity has on women's outcomes rather than the effect on men's outcomes, as the latter seem to be unaffected.

There have been many mechanisms proposed to explain this child penalty, such as the cost of giving birth, childcare preferences, comparative advantage in the labour market or household work, discrimination, or traditional gender norms. (Becker, 1985; Kleven et al., 2021; Andersen & Nix, 2019; Oesch et al., 2017; Feldhoff, 2021). However, these studies have only focused on families with two parental figures.

Single parenting is becoming the reality of more and more households as time goes by. The share of children living with a single parent has increased by 7 percentage points from 2004 to 2018, representing in 2018 the 15.6% of all households (OECD, n.d.). In 2019, around 1.9 million of families were headed by single parents, although the vast majority of them (81.1%) consisted of single mothers (INE, 2019).

The existence of the observed child penalty is of remarkable importance for all working mothers, but it is extremely critical for single mothers. Single parenting collapses the role of breadwinner and caregiver into one individual, making it harder for them to conciliate their work and their home life. Despite the various benefits that these families are entitled to, in-work poverty and at-risk-of-poverty rate is exceptionally high for single-parents. In 2019, 21.5% of single-parent families were suffering from severe

poverty, 10.4% experienced some form of severe material deprivation, and 74.9% stated making ends meet with some degree of difficulty. (EAPN, 2020)

Considering the situation these families find themselves in, and the lack of research on them, this paper aims to explore the child penalty of single parents. In which way does the impact of having children in labour market outcomes differs when the individual has to assume both roles of provider and caregiver affect? If the observed child penalty is a result of women and men specializing in home production and labour market respectively, what happens in households where this specialization is not possible?

This paper is structured as follows. Section 2 reviews the literature on child penalties. Section 3 presents some facts about the Spanish context. Section 4 describes the characteristics of households with a single parent in Spain. Section 5 briefly examines the existing policies regarding single-parent households in order to justify the importance of this analysis. Section 6 presents the data set used. Section 7 describes the econometric technique for the analysis. Section 8 describes and examines the main results. And, finally, Section 9 summarizes the findings.

## **2. Literature Review**

Despite the considerable improvement in women's labour market outcomes that has been observed all over the world during the last decades, it seems like the convergence process of labour market outcomes of men and women has slowed down. As a result, the gender gap in outcomes such as earnings or employment is still present in all countries.

Earlier research had focused on the role of human capital and the role of discrimination as an explanation as to why the earnings and wage rate gender gap persists. However, the numerous policies taken to address gender discrimination and the increase in women's educational levels suggest that the explanation for the remaining inequality must be somewhere else. Recent research has focused on the role of children to understand the persistent gender inequality in the different labour market outcomes.

Children can have two different effects on labour market outcomes. On the one hand, those women who desire to have children in the future may invest less on education or choose a family-friendly career path in anticipation in order to prepare themselves for motherhood. On the other hand, once women have a child, they may change their hours

worked, occupation, or sector, so that they can reconcile their life with a child with their work life.

As societies developed, women have met men in terms of educational and career investment, which suggests that the pre-child effects of anticipated fertility are not as important as they once were. However, the increasing body of literature that study the effect of motherhood on women's labour market outcomes points out enough evidence to say that women still end up suffering the consequences of having a child.

Kleven et al. (2019a) define the child penalty as “the percentage by which women fall behind men due to children”. Using an event study approach and data from Denmark, they study the impact of having a child on the gender gap in labour market outcomes. The results show an immediate drop in women's earnings of almost 30% the moment their first child is born, while men's earnings are unaffected. Even more worrying is the fact that then years after the birth of the child, women's earnings are still 20% below their pre-birth level, which originates a long-run child penalty of 19.4%.

This impact comes from three different mechanisms, all of them equally important. Prior to having children, the trajectories of hours worked, labour force participation and wage rate are almost parallel for men and women. After the birth of their first child, all three outcomes diverge immediately. Besides, the authors find that after the arrival of the first child, women are 26% less likely to rise to the manager level, are 12% more likely to work in the public sector, and are 8% more likely to work in a family-friendly firm than men. This suggests women's career trajectories are changed in both quantitative and qualitative dimensions as a result of being a mother, while men's careers are unaffected.

Many studies have followed Kleven and co-authors' path and have studied the child penalties for other countries. The qualitative effects of children are similar across countries, but the magnitudes differ. Denmark and Finland account for the lowest long-run penalties, of 21 and 25% respectively, closely followed by Spain and Sweden, with 25 and 26%. The United States and the United Kingdom follow with a rate of 31 and 44%. Germany and Austria feature the highest penalties of 51 and 61% respectively. The differences in the level of the penalty seem to be a result of the differences in culture and gender norms. (Kleven et al., 2019b; Sieppi & Pehkonen, 2019). Not only they find a positive relationship between long-run earnings and employment penalty and the fraction

of people in the country agreeing with the statement that women with young children should not work full-time, but also that women that grew up in more traditional households, those where the mother worked less relative to the father, incur in higher penalties.

Pora and Wilner (2019) study three different explanations associated to this child penalty. The arrival of a child increases the need for home production, which may lead parents to specialize in either labour market or home production. Women's relative advantage in home production can be the mechanism behind the decrease in female labour supply and earnings.

However, the authors also mention that women may just have a stronger preference for childcare, which is the reason why they change their time allocation from the labour market to home production. It can also be the case that social norms are behind this specialization, the traditional gender role that women should be the one responsible for childcare while men are the breadwinner of the family. (Kleven, 2022)

Using data from France, Pora and Wilner (2019) find that child penalties are decreasing along the wage distribution, supporting the idea of specialization, since those women who experience a higher cost of career interruption due to higher wages are less likely to reduce their working hours.

Despite the rapidly growing evidence in this line of research, there is little knowledge on the effects of having children on the labour market outcomes of single parents. Single parents do not have the option of specializing on either labour market or home production as they have to assume both roles of breadwinner and caregiver. Besides, traditional social norms concerning who must assume family caregiving or the breadwinning role is likely to be dissociated from the gender of the parent in these households.

Being a single parent is a signal that the parent must manage to support financially their family and caring for their children. Being a woman is traditionally associated with being responsible for childcare. However, single mothers have the added responsibility of being the main provider, which could potentially affect their labour market outcomes.

For single mothers, child penalties are likely to be detrimental. Not only marriage has the economic benefit of pooling income, but also, the couple can exploit the

economies of scale that can be generated from living together. Kiernan et al (2020) show that, on average, single mothers are younger, less educated, less likely to be employed and have lower income than married mothers at the time of their birth child. This implies that single mothers are in disadvantage prior to motherhood. The reduction of earnings and the increased income needs associated with the birth of a first child increases the risk of poverty when a partner's income is absent. Benefits such as compensatory or widow's pensions could help to mitigate this negative effect.

Some studies have found that the child penalty is higher for married mothers than for single mothers. Abromaviciute (2018) studies the effects of marital status on the way the employee is perceived, salary and employment outcomes for mothers and fathers. She finds that single mothers and fathers are not perceived differently from each other, and the child penalty found in the subsample of married applicants is not observed for single applicants. Besides, single mothers were evaluated more favourably in all outcomes than their childless counterparts, suggesting that single women can actually benefit from being a mother. Her results suggests that the traditional roles of breadwinner and caregiver are indistinguishably linked to marriage.

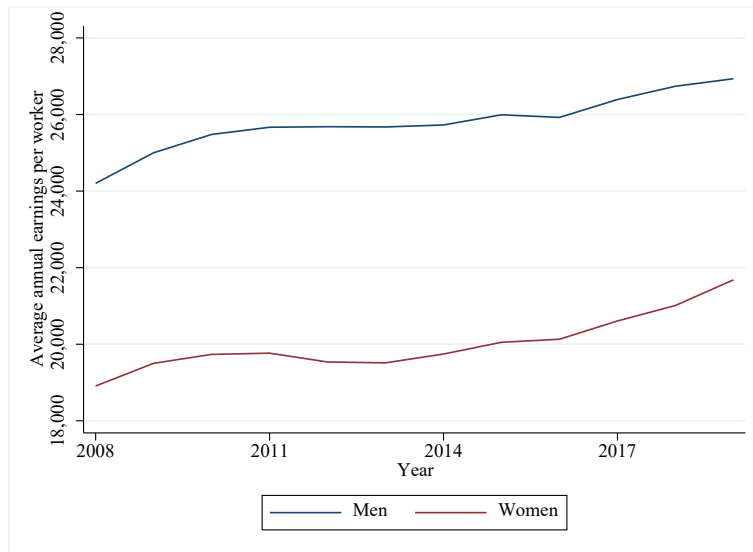
Harkness (2022) finds that married mothers' average income suffered a 26% reduction after the birth of their first child, while those who were single saw a fall of only 11%. Income penalties are larger for those women who were previously married than for those who were not married in the first place.

This paper would contribute to the existing literature on child penalties by studying the impact of having a child in a context where the parent does not have the option to specialize in either home production or labour market. Studying the impact of children on single-parent's labour market outcomes is of a great importance in order to establish the right policies to help and support these households.

### **3. The Spanish context**

Figure 1 shows the average annual earnings per worker. In Spain, women's average annual earnings per worker was 80.50% of that of men in 2019. The gap in average earnings between men and women has been relatively stable since 2008, being the mean gap in the 2008 to 2019 period of 77.62%.

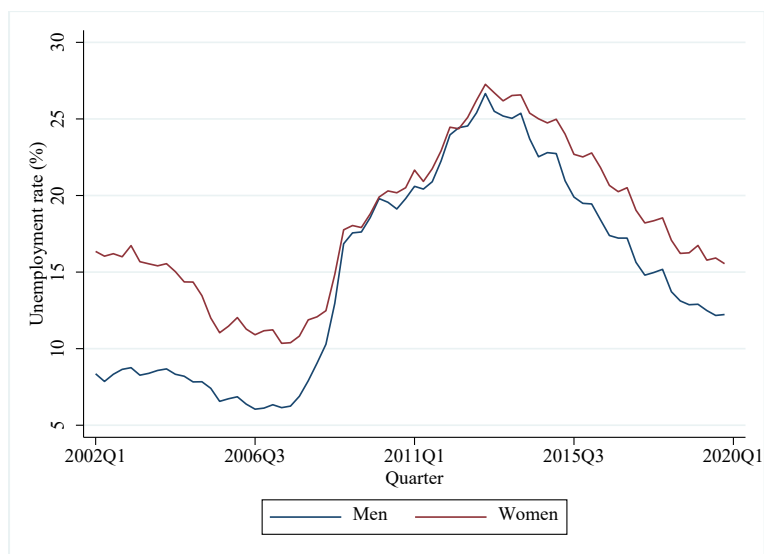
FIGURE 1: Average annual earnings per worker, 2008-2019



Source: Author's elaboration using data from the 2019 Annual Wage Structure Survey carried out by the Spanish' National Statistics Institute

Unemployment rate has always been greater for women than for men, as can be observing in figure 2. In 2002, it was almost 8 percentage points higher for men than for women. With the 2007 financial crisis, the gap was nearly inexistent, but with the economic recovery, the gap started opening again. In the last trimester of 2019, women's unemployment rate was over 3 percentage points higher than men's.

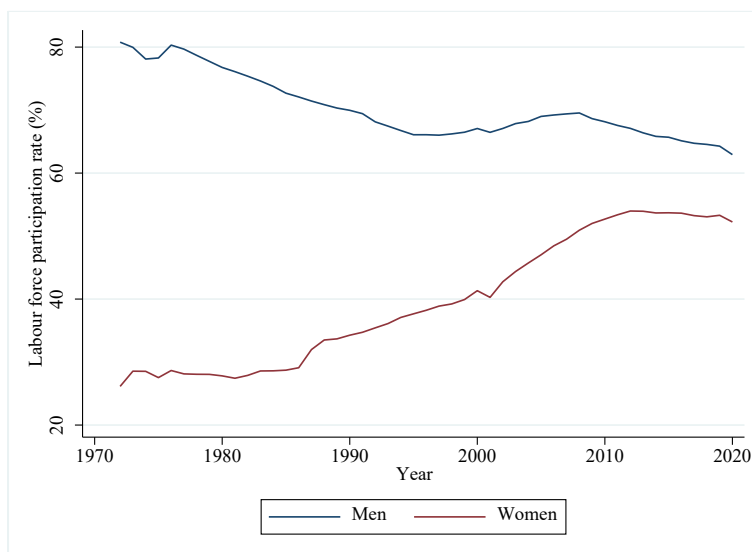
FIGURE 2: Unemployment rate in Spain, 2001-2020



Source: Author's elaboration using data from the Spanish' National Statistics Institute

As for the female labour force participation rate, it has increased from a 26% in 1972 to over 52% in 2020, as can be seen in figure 3. Male labour force participation rate shows a very different picture, decreasing from about 80% in 1972 to almost 63% in 2020. The labour force participation rate has decreased from 54.6 percentage points in 1972 to 10.7 in 2020.

*FIGURE 3: Labour force participation rate in Spain, 1970-2020*



Source: Author's elaboration using data from the Spanish' National Statistics Institute

Important for the object of my analysis is the transformation of the structure of Spanish households over the last decades. Gonzalez and Requena (2008) attribute this change to the process of secularisation.<sup>1</sup> Households are becoming more diverse as they shift from more traditional to more modern families.

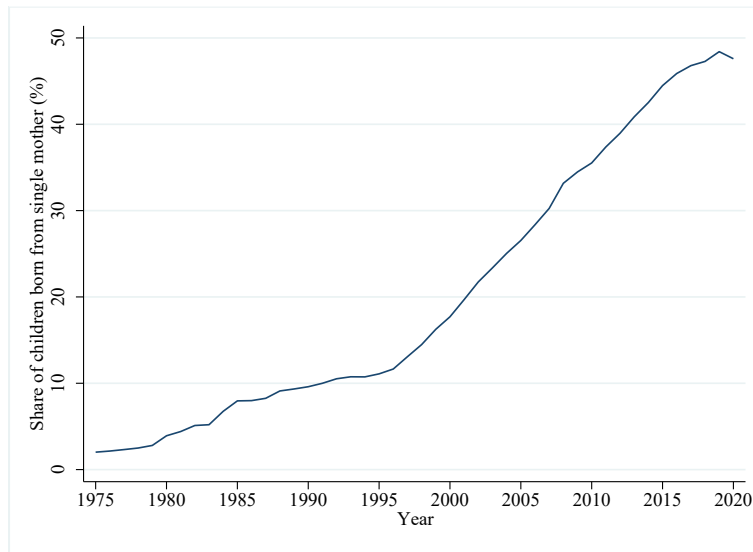
The number of single-parent households is in increase. As shown in figure 4, the proportion of children born from a non-married women has substantially increased from around 2% in the mid-1970s until almost 50% in 2020.

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<sup>1</sup> Secularization refers to the process in which religion loses its relevance in a society as said society progresses.



FIGURE 4: Share of children born from a single mother, 1975-2020

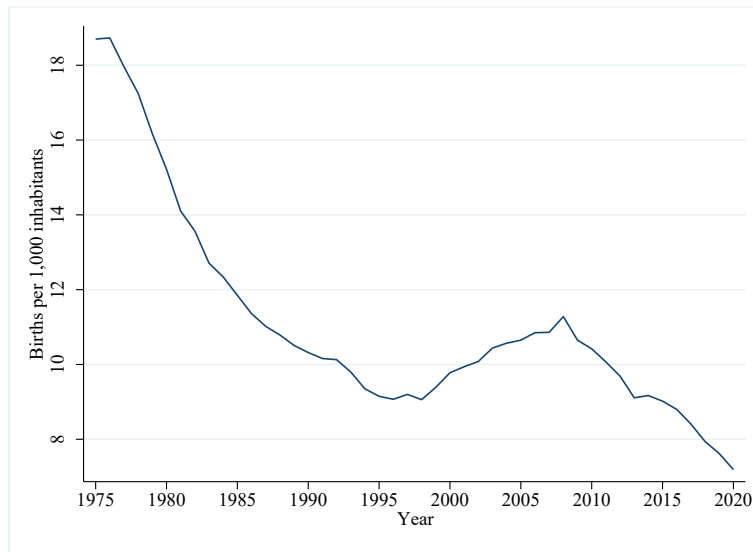


Source: Author's elaboration using data from the Spanish' National Statistics Institute

In contrast to 2004, the share of minor children living in married families has decreased by 7 percentage points, representing a 82.8% of the families in 2008. The proportion of minors living with a single parent, however, increased by 7 percentage points, reaching 15.6% in 2008 (OECD, n.d.). There are several reasons as to why we observe this pattern, from demographic to legislative changes.

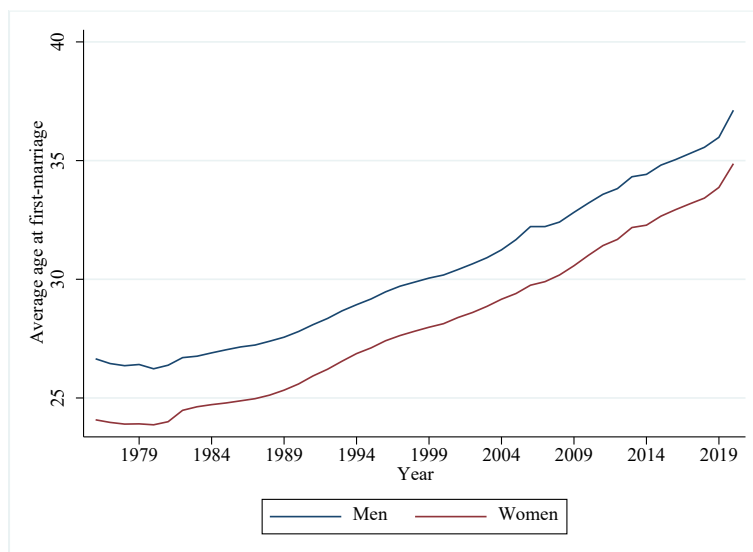
There are two main demographic changes that can be observed during the last decades. The first one is the decrease in natality. As can be seen in figure 5, the gross birth rate has suffered a constant decline from over 18 births per thousands of people in the mid-70s to less than 8 in 2020. The second one is the increase in the average age of both men and women at which they first get married, which is associated to a delay in motherhood. Figure 6 illustrates this phenomenon.

FIGURE 5: Gross birth rate in Spain, 1975-2020



Source: Author’s elaboration using data from the Spanish’ National Statistics Institute

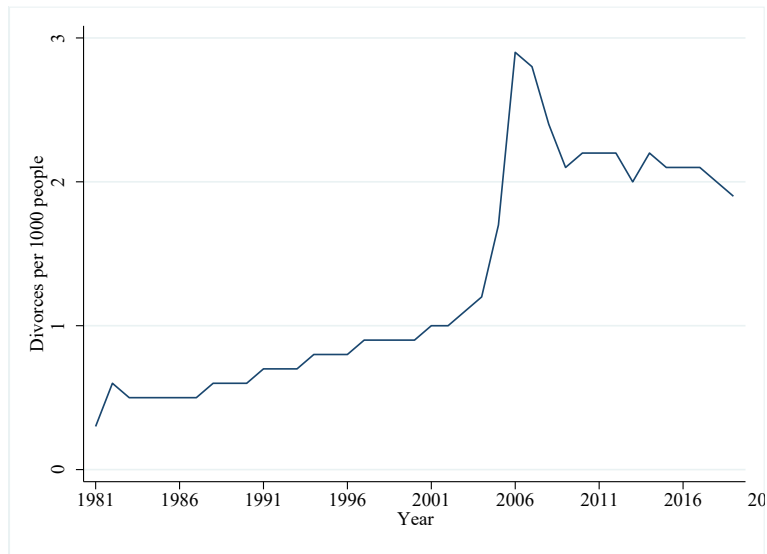
FIGURE 6: Average age at first-marriage in Spain, 1976-2020



Source: Author’s elaboration using data from the Spanish’ National Statistics Institute

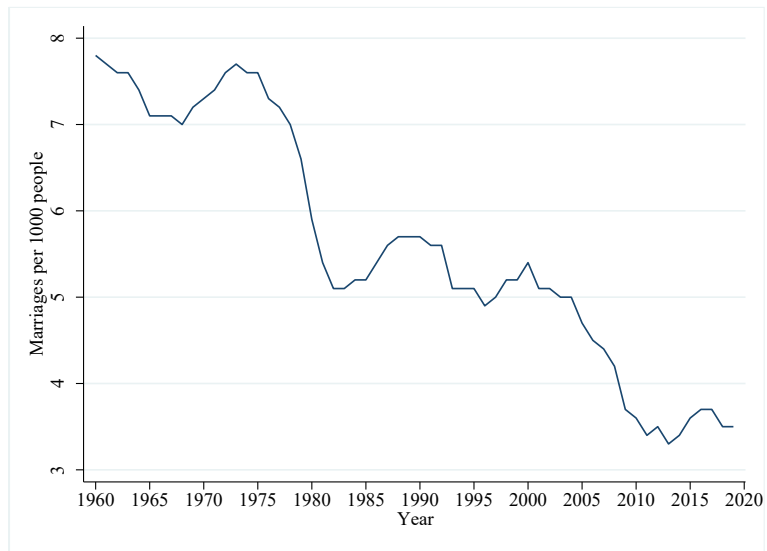
The main legislative change has been the introduction of the divorce law in 1981. Since then, the crude divorce rate has been on the rise, with the rise being more pronounced during the last two decades. This pattern is shown in figure 7. At the same time, the number of marriages has experienced a continuous decline since 1960, as can be observed in figure 8.

*FIGURE 7: Crude divorce rate in Spain, 1980-2019*



Source: Author’s elaboration using data from the OECD database

*FIGURE 8: Crude marriage rate, 1960-2019*



Source: Author’s elaboration using data from the OECD database

According to the Continuous Household Survey (Encuesta continua de hogares) carried out by the Spanish National Statistics Institute, in 2019, around 10% of children lived in a single-parent household in Spain. These households are mostly headed by single mothers. There were around 1.9 million of single-parent households in Spain. 356,900

were single-father households (18.9%), in contrast to the 1,530,600 that were single-mother households (81.1%).

Single parenting implies there is only one person who needs to both sustain and take care of their family. For these families, it is harder to get the required means to be able to pay all of their expenses, as they only count with the salary from one person, increasing their risk of poverty. In 2018,

Despite this situation, single parents are entitled to some benefits that could help to improve their situation. For instance, in Spain, if the divorce or separation leads to an economic imbalance for one of the spouses relative to the other, he or she is entitled to a compensation. On the other hand, if the reason for being single is due to the decease of the partner, the spouse is entitled to a widow's pension as long as some conditions are met.<sup>3</sup>

According to the 2019 European Commission's report on Spain, in-work poverty is increasing and remains amongst the highest rates in the European Union (13.1%), and it was particularly high for single-parents (27.8%). Spanish children also face one of the highest risk-of-poverty rates (31.1%), being again even higher for children living in a single-parent household (42.9%).

The European Anti-Poverty Network's 2020 report on Spain states lone-parent households have high rates of social exclusion and at-risk-of poverty. In 2019, 46.8% of people living in lone-parent households are at-risk-of poverty and exclusion, almost 20 percentage points higher than the risk suffered by households with two adults and one or more children, and 21.5% are suffering severe poverty (INE, 2019). 10.4% of single-parent households are suffering from severe material deprivation and 74.9% declare to make ends meet with some degree of difficulty. This rate has been relatively stable around that level during the last decade.

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<sup>3</sup> To mention some, the deceased has to have paid into the Spanish Social Security System or the couple has to be legally married at least one year before the death or have children in common.

## 4. Characteristics of single-mother households

The Federation of Associations of Single Mothers (Federación de Asociaciones de Madres Solteras) carried out a survey addressed to single women that establish a lone-parent household with children under 25. (Assiego Cruz et al., 2019)

The most common age range is between 35 and 44 (51%), followed by 45-54 (35%). Half of the families are living in either Madrid (27%) or Cataluña (23%), and 93% of the mothers have the Spanish nationality. As for their educational level, 58% of the mothers have university studies, whereas only 5% have less than secondary education. 70% of the families have only one child. This child is under 10 in 58% of those families.

As to what is the origin of single parenting, Hernández Monleón (2016) distinguish two main reasons: personal choice or due to personal circumstances. The difference between these two reasons is very small. 57% of the mothers stated it was a personal choice against the 43% of them who said it was due to some personal circumstance.

Adoption, assisted reproduction, or surrogacy are the primary approaches by those individuals that decide to become a single parent. Among those who chose to become a single-mother, 82% was via assisted reproduction technology, while only 9% of them did it through adoption. The remaining 9% was through other sources.

There are many different experiences that could lead a woman to become a single mother. The most usual one is divorce or separation (32%) from their former partner. Only 5% of the women were widows, despite being the most common manner to become a single parent during the last decades (Hernandez, 2016). 27% state it was due to an “unwanted” situation, and 14% to a domestic violence situation. 22% declare they had not either been married or lived with the parent of their child.

76% of women affirm they have sole child custody, and, among those that have split custody, 79% of women state they are the ones that assume all childcare responsibility. Only 3% of mothers state they do not need any type of help. The rest express needing some help in things related to childcare, when they or their children is sick, with housework and with their children’s activities and homework, among others.

54% of women state having or ever had problems conciliating their work life with childcare and 80% state they have felt the need to choose between their family and their

career. 84% of the mothers are working, and only 28% affirms that their work can be fully conciliated with their life. 27% declare there is not any measure of conciliation in their firm, and among those mothers that are unemployed, 57% states there were any measure of conciliation in their previous job.

## 5. Policies

After considering the high rates of poverty among single-parent households, the existing policies directed to them, despite being necessary and urgent, are scarce and insufficient. There is not any framework of public policies regarding single parenting at the state level, which prevents a homogeneous legal, social, economic, and labour treatment when it comes to the rights of these families. Instead, most policies are implemented at the community level and are very disperse and heterogeneous among them. This implies a very different treatment of these families across Spain.

Only two communities, Extremadura and Castilla La Mancha, lack of any consideration regarding single-parent families. The rest of the communities have some sort of attention towards these families, but only six of them have a specific regulation about these families.<sup>5</sup> Moreover, these regulations present substantial differences among them, including in the concept of what a single-parent household is.

All of them state that a single-parent household is that formed by one progenitor or legal tutor. However, regarding the relationship with their children, each community considers a different definition respecting economic dependence, age, coexistence and place of residence. The norms also differ in matters of the motives that causes losing the condition of single-parenting, as well as the different forms of constituting a single-parent household.

Without taking attention to this issue, it is important to state that these families are entitled to some specific benefits at the state level. They can receive a single payment of 1000 euros per birth or adoption. Single parents with more than two dependent children have the possibility of a 1200 euros reduction in their personal income tax. Besides, they

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<sup>5</sup> Aragón, Baleares, Cantabria, Cataluña, Comunidad Valenciana and Comunidad Foral de Navarra.

are entitled to two additional weeks on their maternity or paternity leave and their Minimum Vital Income is increased in 22%.

## 6. Data

The data used in this paper is drawn from the 2019 Continuous Sample of Working Histories (Muestra Continua de Vidas Laborales, MCVL), a set of microdata from the Social Security, the municipal register of inhabitants and the Tax Agency, which constitute a representative sample of everyone that was registered to the Social Security in each reference year. The analysis is done using data until 2019 to avoid any conflict that may originate due to the COVID-19 crisis.

Each year, the sample is formed by four out of a hundred people in the reference population. From 2005 onwards, it has a longitudinal design. It follows every individual over time as long as they have been registered to the Social Security as an active affiliate or as a pensioner for at least one day each year. Besides, to remain representative, each year some individuals are dropped out of the sample and replaced by others, in the same proportion as it happens in the reference population.

It is necessary to acknowledge that the fact that the 2019 MCVL only follows the individuals as long as they have somehow been affiliated to the Social Security in 2019 implies those who had not worked again after motherhood would be excluded (García & González, 2019). As a result, the impact of children could be underestimated.

Despite the richness of the MCVL data, the information available does not allow to identify the relationship between the individual in the sample and the individuals whom they live with. There is also no information about the marital status of the employee. Therefore, I will infer that the employee is a single parent when they are the only adult living with a child. This inference, however, will only allow us to identify those households where the parent was single at the moment of the survey, in 2019. Thus, it will be necessary to assume that those employees that are single in 2019 were also single in the past and are a representative sample of the single-parents population.

Furthermore, I will deviate from Kleven et al. (2019a), who track the same workers from up to five years before the birth of their first child up to only ten years after the birth. Instead, I will analyse the most recent births, so that the assumption that needs

to be made about the relationship status of the workers can be as realistic as possible. Hence, the analysis will be performed over a balanced panel of families who had their first child in 2014, 2015 and 2016, and will only follow them up to three years after the birth, which is the longest period of time I can study.<sup>6</sup>

Due to this restriction, the number of observations I am left with is considerably small.<sup>7</sup> Therefore, the results are not as precise as they could be, and further research needs to be made with the appropriate data.

The outcome variable for gross annual earnings is the total annual contribution base of each individual. Since some of the workers have been employed by different employers, the variable for earnings is the sum of all the different contribution bases that that individual has each year.

*TABLE 1: Summary statistics*

	Age		Annual earnings		College (yes=1)	
	Mean	Sd	Mean	Sd	Mean	Sd
Fathers	39,86	4,63	22079,13	11518,90	0,31	0,46
Fathers college	40,86	4,20	28658,67	11650,32		
Fathers non-college	39,42	4,75	19162,43	10182,82		
Mothers	37,99	4,83	18521,54	10755,03	0,39	0,49
Mothers college	39,58	4,07	24429,72	11919,99		
Mothers non-college	36,99	5,00	14795,44	7945,45		

*Notes:* Statistics over the balanced sample of single fathers and mothers over the period of study (from three years before until three years after the birth of their first child). Sd: standard deviation. Annual earnings in euros.

Table 1 shows the summary statistics for each group. Annual earnings are larger for single fathers (22,079 euros) than for single mothers (18,521 euros). Single mothers are, on average, younger than single fathers (37.99 vs 39.86, respectively), and are more likely to have tertiary education (39% vs 31%, respectively). When the groups are split by educational level, annual earnings of both men and women with tertiary education are

<sup>6</sup> The balanced panel includes all individuals that remained affiliated to the Social Security system for the whole period. For households that had their first child in 2014, the period goes from 2011 until 2017, for those who had their first child in 2015, it goes from 2012 until 2018, and for those who had their first child in 2016, from 2013 to 2019.

<sup>7</sup> I have a total sample of 2,940 single fathers and 8,561 single mothers.



larger than those of men and women without tertiary education. College-educated individuals are older than those who do not hold college education.

## **7. Empirical design**

There is a negative relationship between the gender gaps in earnings and in employment and the level of development, measured as GDP per capita. At the same time, women have fewer children and have them later in life as GDP per capita increases (Kleven & Landais, 2017). Whether fertility choices are responsible for the changes in gender inequality over time is one of the main questions economists have been tried to answer for a very long time.

Yet finding a causal relationship between these two variables is challenging given the endogenous nature of fertility. It is expected that fertility has a causal impact on gender inequality, but gender inequality is also likely to affect fertility choices. Or even a third factor could be the one driving both variables.

The ideal framework to examine this relationship would be the random allocation of children. The lack of such setting has led economists to find a different approach to study the causal link between fertility and gender inequality. There is a large body of literature that adopts an instrumental variable approach, using instruments such as sibling sex mix (Angrist & Evans, 1998) or twins (Rosenzweig & Wolpin, 1980).

Despite the brightness and importance of these studies, they can only measure the effect of a second or a third child, and lack the ability of answering the main question, which is what is the impact of children on gender inequality.

Kleven et al. (2019a) suggests adopting an event study approach. Women's labour market outcomes can be directly affected by children by inducing women to change their careers or hours worked so that they can conciliate their work life with childcare responsibilities. Besides, there is a pre-children effect of future children. Women that are planning on having children in the future may not invest in their education and careers as much as other women.

Unfortunately, the event study approach cannot capture this dependence between labour market choices and anticipated lifetime fertility. However, it will allow us to

identify the causal effect of having a first child in labour market outcomes by exploiting the sharp change in said outcomes that having a first child generates.

At a certain time, the event takes place, and the treatment is put into place. The idea of the event study approach is that everything that changes after the event occurs is a consequence of treatment. For the event study to correctly identify the impact of children, it is necessary to assume that the pattern that is observed before having a child would have continued if the event had not happened, and that the disruption in said pattern at the time of the event is caused exclusively by event itself. (Cunningham, 2021; Huntington-Klein, 2021)

For each individual, I denote the year of birth of their first child as  $t = 0$ , and index all years relative to that date. They will be followed from three years prior up to three years after the birth of the child, so the event time  $t$  runs from -3 to +3.

Denoting the outcome of interest for individual  $i$  of gender  $g$  in year  $s$  at event time  $t$  by  $Y_{ist}^g$ , I will run the following regression separately for single fathers and mothers:

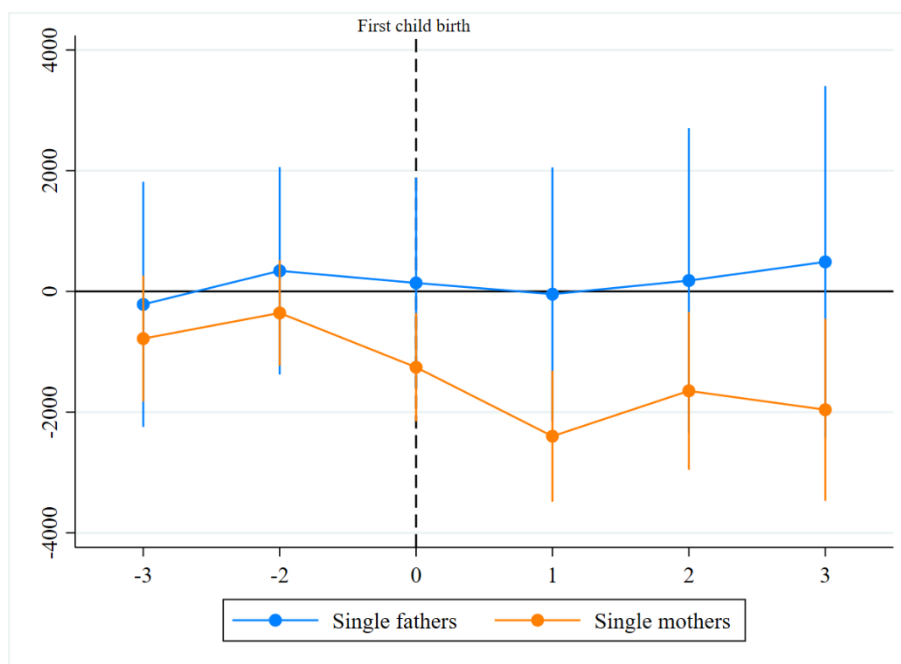
$$Y_{ist}^g = \sum_{j \neq -1} \alpha_j^g \cdot I[j = t] + \sum_k \beta_k^g \cdot I[k = age_{is}] + \sum_y \gamma_y^g \cdot I[y = s] + v_{ist}^g$$

Following Kleven et al. (2019a), I will include a set of event time dummies (first term on the right-hand side), age dummies (second term) and year dummies (third term). By excluding event time  $t = -1$ , the event time coefficients will measure the impact of having a child relative to the year prior of the first childbirth. The set of age dummies will allow us to control for life-cycle trends, whereas year dummies will control for time trends, such as wage inflation or business cycles.

## 8. Results and discussion

As mentioned above, the event time coefficients capture the effect of children in earnings relative to the year prior to the first childbirth. Figure 9 plots these coefficients for the sample of single mothers and single fathers. The results of all regressions can be found in the appendix.

FIGURE 9: Event study results for the impact of children in single parents' annual earnings



Notes: This figure represents the coefficients of the event time coefficients estimated from the previous equation for single fathers and single mothers separately. I have omitted the event time dummy at  $t = 1$ , so these coefficients represent the impact of children in earnings relative to the year prior to the birth of the child.

The first thing to notice is that, once the life cycle and time trends are taken out, prior to the birth of the first child, the earnings of single fathers and mothers are following the same trend. Although this is not enough evidence to support the parallel trend assumption, as this pre-child trend should be examined for a longer period of time, it is a good sign that allow us to link the estimated effect to the event.

For the sample of single fathers, none of the event time coefficients are statistically significant: single fathers' earnings after having a child are not statistically different than their earnings the year before the birth. However, for the sample of single mothers, the picture is completely different. Right after the birth of the first child, they experience an instantaneous fall in earnings. The year the child is born, they experience a drop of 1256 euros in their annual earnings. In the three years following the birth of their first child, there is no sign of recovery: three years after the birth, their annual earnings are almost 2000 euros lower than what they were the year prior to motherhood. This suggests that women experience these negative effects on their earnings while men's

are unaffected, regardless of their marital status. Whether the size of the impact is larger or smaller for single women than for married women is something that should be studied in the future, when more precise data on single women is available.

As mentioned above, in families where both parents are present, they may choose to specialize in either home production or labour market. The observed child penalty in women's labour market outcomes after the birth of their first child and the fact that men's are unaffected may be an indicator that women are more likely to specialize in child-care, while men assume the role of breadwinner.<sup>8</sup> Moriconi and Rodriguez-Planas (2021) find evidence in support of the idea that gender norms are behind this situation, as they identify a positive relationship between more progressive beliefs in the grandmothers' cohort and mothers with small children's likelihood of working.

Unlike in families with two parental figures, single parents do not have the option of specialization. They must assume both roles, no matter the gender of the parent. Surprisingly, they follow the same pattern: single mothers are penalized after having children in terms of earnings, whereas single fathers seem to be unaffected.

It could be the case that single fathers receive more external help than single mothers. It might look like single mothers need less help, since they are meant to take care of their children anyways, while single fathers require more support to deal with this task. After all, the idea that women should be the main caretaker of the household is still one of the most prevalent gender norms. However, a more deep and precise analysis should be made in order to draw concrete conclusions and to understand the mechanisms behind this effect.

An additional study that can be carried out is the impact of the first child by educational level, separating the analysis for fathers and mothers with and without tertiary education. These results, however, must be read with caution, as the number of observations for each group is relatively low.<sup>9</sup>

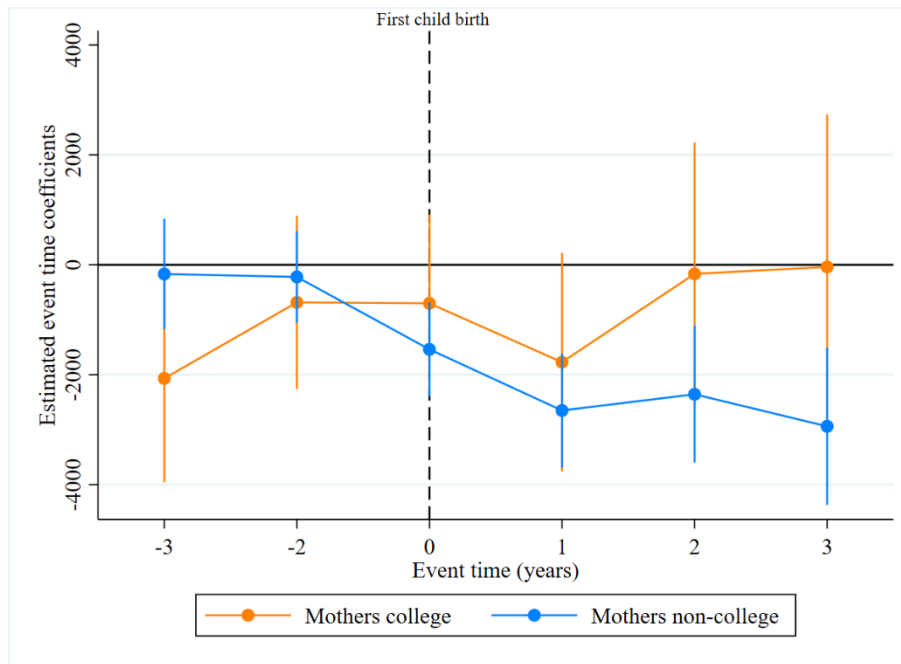
Figure 10 plots the coefficients of the event time dummies for the sample of single mothers with and without tertiary education.

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<sup>8</sup> Which could be a result of gender norms, preferences, or comparative advantage.

<sup>9</sup> There are 2037 fathers and 5250 mothers without tertiary education, and 903 fathers and 3311 mothers with tertiary education.

FIGURE 10: Event study results for the impact of children in single mothers' annual earnings, by education



There are two main findings to highlight about this figure. The first important result is that the drop in earnings after the birth of the first child seems to be larger for non-college-educated single mothers than for college-educated single mothers. The second is that college-educated single mothers' earnings reach their pre-birth level three years after the birth of their first child.

However, due to the low number of observations, none of the coefficients of the event time dummies are statistically significant for the sample of mothers with tertiary education, so that it cannot be established that this group of women have had a statistically significant effect on their earnings after the birth of their first child.

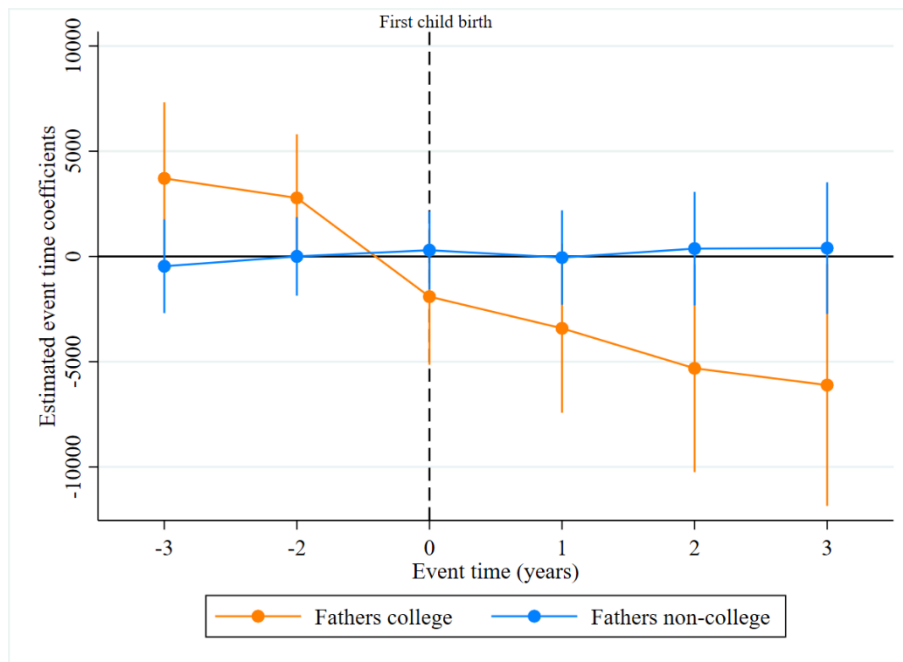
These results seem to be aligned with de Quinto et al. (2021), who find heterogeneity in child penalties when they split the analysis by education levels. They are also consistent with the finding that highly educated women have a higher probability of entering and lower probability of exiting the labour market than the rest of women (Alba & Álvarez, 2004).

Even if high educated women are more attached to the labour market, single mothers do not have a partner to share their responsibilities with, and they still have to assimilate their work life with taking care of their new-born. One way in which non-

college-educated single mothers are more affected by the birth of their child than college-educated single mothers may be due to their resource constraints. As it has been shown, college-educated single mothers had, on average, higher annual earnings than those who had no college education.<sup>10</sup> Therefore they might be able to hire some help in order to keep up with their work life, whilst those less educated cannot count with that comfort.

The result for single fathers is unexpected. As can be observed in figure 11, contrary to what happened with mothers, children have a negative impact on single fathers with tertiary education. One year after the birth of the first child, their annual earnings drop in 3,415 euros, and three years after, the drop is of 6,112 euros, in comparison to their earnings one year before the event. I would like to mention again the fact that there are only 903 single fathers with tertiary education in the sample, so that the accuracy of this analysis is questionable.

*FIGURE 11: Event study results for the impact of children in single fathers' annual earnings, by education*



<sup>10</sup> Mean annual earnings for college-educated single mothers were 24429,72 euros, whereas for non-college-educated single mothers, they were 14795,44 euros.

## 9. Conclusions

Recent literature has focused on the role of motherhood as an explanation for the remaining gender gap in earnings. The conclusion for all the countries that have been studied is the same: women and men's labour market outcomes follow the same path until the birth of their first child. After that, their outcomes strongly diverge given the negative impact in labour market outcomes for women.

Many mechanisms have been proposed in order to explain this child penalty, including the specialization of women in childcare and of men in labour market. But what happens in those households that do not have the option of specialization? Do they suffer a bigger penalty? Are men also affected when they have to assume the role of caretaker?

To bring light to some of these questions, I used data from the 2019 Continuous Sample of Working Histories to analyse the impact of births on annual earnings on a sample of single parents. The main finding is that, even when they are single and cannot divide responsibilities, men are still unaffected by the arrival of their child. One possible explanation could lie in the external help that these men are likely to purchase in order to take care of their child, which is potentially less affordable to single mothers.

Although the analysis must be taken with some caution due to the small sample size, I have also studied the impact of births of single parents by educational group. Results indicate that children have no statistically significant effect on earnings for single mothers with college education, whereas for those non-college-educated, there is a negative impact. For single fathers, however, it is the opposite: while the earnings of non-college-educated single fathers remain unchanged after the birth of their first child, earnings of college-educated single fathers have a negative impact.

Despite the number of limitations that this study has, being among the most important the need to impute marital status of individuals and sample size, the results confirm some of the previous findings in the literature. However, it is necessary to carry out a more precise study analysing child penalties on single parent's labour market outcomes (potentially with large administrative records) to deeply understand what is the reason behind them and to propose some policies to treat this situation.

# Appendix

TABLE A1: Regression for earnings of single fathers

Linear regression	Number of obs	=	2,940
	F(37, 2902)	=	13.56
	Prob > F	=	0.0000
	R-squared	=	0.0800
	Root MSE	=	11119

earnings	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
_Ieventtime_1	-214.4924	1035.421	-0.21	0.836	-2244.728	1815.743
_Ieventtime_2	341.8047	876.7728	0.39	0.697	-1377.355	2060.965
_Ieventtime_4	140.5814	890.4661	0.16	0.875	-1605.428	1886.591
_Ieventtime_5	-45.04689	1070.93	-0.04	0.966	-2144.906	2054.813
_Ieventtime_6	180.3472	1288.252	0.14	0.889	-2345.634	2706.329
_Ieventtime_7	489.7164	1485.481	0.33	0.742	-2422.989	3402.421
age_p						
28	-3825.05	3997.946	-0.96	0.339	-11664.15	4014.05
29	813.5709	4659.498	0.17	0.861	-8322.687	9949.829
30	-6927.632	4069.869	-1.70	0.089	-14907.76	1052.493
31	-1039.405	4068.588	-0.26	0.798	-9017.018	6938.208
32	-734.2266	4029.362	-0.18	0.855	-8634.925	7166.472
33	4891.933	4251.12	1.15	0.250	-3443.586	13227.45
34	2257.811	4093.581	0.55	0.581	-5768.808	10284.43
35	4876.166	4060.785	1.20	0.230	-3086.147	12838.48
36	4210.069	4046.984	1.04	0.298	-3725.184	12145.32
37	7632.435	4004.295	1.91	0.057	-219.1142	15483.98
38	1135.658	3974.849	0.29	0.775	-6658.153	8929.47
39	7324.103	4060.928	1.80	0.071	-638.4894	15286.7
40	5295.462	3985.003	1.33	0.184	-2518.259	13109.18
41	6382.168	4003.286	1.59	0.111	-1467.402	14231.74
42	5677.93	4028.428	1.41	0.159	-2220.938	13576.8
43	6960.443	3998.54	1.74	0.082	-879.8217	14800.71
44	9040.963	4019.078	2.25	0.025	1160.428	16921.5
45	6206.805	4066.501	1.53	0.127	-1766.715	14180.33
46	5625.13	4049.903	1.39	0.165	-2315.846	13566.11
47	3878.482	4184.563	0.93	0.354	-4326.532	12083.5
48	2584.207	4150.835	0.62	0.534	-5554.674	10723.09
49	6165.292	4432.014	1.39	0.164	-2524.92	14855.5
50	615.3009	4147.232	0.15	0.882	-7516.516	8747.117
year_cotiz						
2012	259.1101	1117.613	0.23	0.817	-1932.285	2450.505
2013	-175.8716	1120.841	-0.16	0.875	-2373.596	2021.853
2014	657.4321	1352.515	0.49	0.627	-1994.554	3309.419
2015	1581.479	1505.831	1.05	0.294	-1371.126	4534.085
2016	2131.545	1663.733	1.28	0.200	-1130.673	5393.762
2017	3257.327	1811.339	1.80	0.072	-294.3132	6808.967
2018	3901.187	1970.679	1.98	0.048	37.11577	7765.258
2019	4512.237	2257.329	2.00	0.046	86.10737	8938.366
_cons	15350.39	4176.026	3.68	0.000	7162.113	23538.67



TABLE A2: Regression for earnings of single mothers

Linear regression	Number of obs	=	8,561
	F(40, 8520)	=	63.03
	Prob > F	=	0.0000
	R-squared	=	0.1508
	Root MSE	=	9934.3

earnings	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
_Ieventtime_1	-781.3643	532.0101	-1.47	0.142	-1824.233	261.5044
_Ieventtime_2	-356.4117	446.0198	-0.80	0.424	-1230.719	517.8953
_Ieventtime_4	-1256.043	457.4823	-2.75	0.006	-2152.819	-359.267
_Ieventtime_5	-2399.169	554.3704	-4.33	0.000	-3485.869	-1312.468
_Ieventtime_6	-1647.208	667.0951	-2.47	0.014	-2954.876	-339.5401
_Ieventtime_7	-1959.682	769.9171	-2.55	0.011	-3468.907	-450.4582
age_p						
25	-707.3328	1686.601	-0.42	0.675	-4013.479	2598.813
26	201.8116	1537.017	0.13	0.896	-2811.115	3214.738
27	728.0822	1295.447	0.56	0.574	-1811.309	3267.473
28	2086.725	1292.587	1.61	0.106	-447.0585	4620.508
29	1905.963	1309.798	1.46	0.146	-661.5597	4473.485
30	3721.27	1280.659	2.91	0.004	1210.867	6231.673
31	5824.931	1273.326	4.57	0.000	3328.902	8320.959
32	7293.578	1298.051	5.62	0.000	4749.084	9838.073
33	6947.581	1271.95	5.46	0.000	4454.251	9440.912
34	7552.618	1278.196	5.91	0.000	5047.044	10058.19
35	8690.682	1264.423	6.87	0.000	6212.106	11169.26
36	10080.56	1269.51	7.94	0.000	7592.014	12569.11
37	11420.43	1286.046	8.88	0.000	8899.469	13941.39
38	12448.97	1279.324	9.73	0.000	9941.188	14956.76
39	12986.7	1270.599	10.22	0.000	10496.02	15477.38
40	12586.92	1294.213	9.73	0.000	10049.95	15123.89
41	15107.79	1305.195	11.58	0.000	12549.29	17666.29
42	14932.27	1325.96	11.26	0.000	12333.06	17531.47
43	14267.04	1334.898	10.69	0.000	11650.31	16883.76
44	17085.57	1403.433	12.17	0.000	14334.5	19836.64
45	18427.88	1379.927	13.35	0.000	15722.89	21132.87
46	15799.66	1560.398	10.13	0.000	12740.9	18858.42
47	18362.93	1543.219	11.90	0.000	15337.85	21388.01
48	13118.54	1871.854	7.01	0.000	9449.254	16787.83
49	18252.78	2289.38	7.97	0.000	13765.04	22740.52
50	9186.085	2220.924	4.14	0.000	4832.536	13539.63
year_cotiz						
2012	-272.4029	599.4475	-0.45	0.650	-1447.465	902.6595
2013	-451.2697	600.5686	-0.75	0.452	-1628.53	725.9904
2014	315.1192	711.4231	0.44	0.658	-1079.443	1709.681
2015	806.129	787.046	1.02	0.306	-736.672	2348.93
2016	1108.78	865.8198	1.28	0.200	-588.437	2805.996
2017	2044.366	941.2582	2.17	0.030	199.2717	3889.46
2018	3172.28	1017.206	3.12	0.002	1178.309	5166.251
2019	4342.809	1156.459	3.76	0.000	2075.869	6609.748
_cons	7280.048	1427.611	5.10	0.000	4481.584	10078.51

TABLE A3: Regression for earnings of mothers with tertiary education

Linear regression	Number of obs	=	3,311
	F(36, 3274)	=	68.26
	Prob > F	=	0.0000
	R-squared	=	0.1204
	Root MSE	=	11241

earnings	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
_Ieventtime_1	-2066.25	965.3801	-2.14	0.032	-3959.06	-173.4405
_Ieventtime_2	-682.8742	803.6764	-0.85	0.396	-2258.634	892.8851
_Ieventtime_4	-699.9919	822.5712	-0.85	0.395	-2312.798	912.8142
_Ieventtime_5	-1769.814	1015.33	-1.74	0.081	-3760.56	220.9315
_Ieventtime_6	-163.6969	1219.076	-0.13	0.893	-2553.925	2226.532
_Ieventtime_7	-37.54731	1416.4	-0.03	0.979	-2814.666	2739.572
age_p						
29	7818.398	2093.405	3.73	0.000	3713.882	11922.91
30	14247.2	2113.825	6.74	0.000	10102.65	18391.76
31	16675.29	1733.018	9.62	0.000	13277.38	20073.2
32	20377.98	1182.5	17.23	0.000	18059.46	22696.49
33	18974.32	1218.421	15.57	0.000	16585.37	21363.26
34	19930.46	1311.514	15.20	0.000	17358.99	22501.93
35	20132.11	891.8537	22.57	0.000	18383.46	21880.75
36	20282.12	901.4359	22.50	0.000	18514.69	22049.56
37	22061.84	913.2964	24.16	0.000	20271.15	23852.53
38	23174.58	944.6354	24.53	0.000	21322.44	25026.71
39	23068.86	790.1662	29.19	0.000	21519.59	24618.13
40	23454.96	826.6867	28.37	0.000	21834.08	25075.83
41	26691.85	863.6019	30.91	0.000	24998.59	28385.1
42	25393.65	994.8111	25.53	0.000	23443.14	27344.17
43	24946.79	913.7462	27.30	0.000	23155.22	26738.36
44	28632.9	1042.745	27.46	0.000	26588.41	30677.4
45	30236.26	1016.781	29.74	0.000	28242.67	32229.85
46	35927.48	1251.184	28.71	0.000	33474.29	38380.66
47	28710.68	1495.698	19.20	0.000	25778.08	31643.28
48	21337.71	1818.821	11.73	0.000	17771.57	24903.85
49	30499.93	2551.28	11.95	0.000	25497.67	35502.2
50	18869.16	4006.959	4.71	0.000	11012.76	26725.56
year_cotiz						
2012	-1286.815	1080.449	-1.19	0.234	-3405.238	831.6089
2013	-1657.122	1095.087	-1.51	0.130	-3804.246	490.0022
2014	-1172.05	1287.896	-0.91	0.363	-3697.213	1353.113
2015	-1085.456	1429.178	-0.76	0.448	-3887.629	1716.718
2016	-1292.277	1581.696	-0.82	0.414	-4393.491	1808.938
2017	-606.3723	1720.572	-0.35	0.725	-3979.878	2767.134
2018	245.8534	1867.16	0.13	0.895	-3415.066	3906.773
2019	1085.596	2142.946	0.51	0.612	-3116.054	5287.246
_cons	2162.425	1471.58	1.47	0.142	-722.8851	5047.735

TABLE A4: Regression for earnings of mothers without tertiary education

Linear regression	Number of obs	=	5,250
	F(40, 5209)	=	26.79
	Prob > F	=	0.0000
	R-squared	=	0.1451
	Root MSE	=	7374.8

earnings	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
_Ieventtime_1	-166.2016	513.3568	-0.32	0.746	-1172.596	840.1931
_Ieventtime_2	-219.3157	424.2569	-0.52	0.605	-1051.037	612.4058
_Ieventtime_4	-1537.315	437.8679	-3.51	0.000	-2395.72	-678.9103
_Ieventtime_5	-2649.149	528.4651	-5.01	0.000	-3685.162	-1613.135
_Ieventtime_6	-2354.35	635.1083	-3.71	0.000	-3599.428	-1109.271
_Ieventtime_7	-2937.843	729.5332	-4.03	0.000	-4368.034	-1507.652
age_p						
25	-629.7262	1735.249	-0.36	0.717	-4031.543	2772.091
26	318.2215	1580.638	0.20	0.840	-2780.492	3416.935
27	1389.924	1342.066	1.04	0.300	-1241.089	4020.937
28	2159.904	1344.471	1.61	0.108	-475.8225	4795.631
29	2149.001	1360.587	1.58	0.114	-518.3198	4816.323
30	3426.232	1322.41	2.59	0.010	833.7526	6018.711
31	5849.494	1324.644	4.42	0.000	3252.636	8446.353
32	4804.398	1311.728	3.66	0.000	2232.861	7375.934
33	5494.975	1303.267	4.22	0.000	2940.024	8049.926
34	5684.431	1302.171	4.37	0.000	3131.63	8237.232
35	6579.567	1309.621	5.02	0.000	4012.161	9146.973
36	8015.533	1316.982	6.09	0.000	5433.696	10597.37
37	8764.647	1341.569	6.53	0.000	6134.609	11394.68
38	10077.68	1324.584	7.61	0.000	7480.943	12674.42
39	9773.523	1332.483	7.33	0.000	7161.296	12385.75
40	8639.611	1376.605	6.28	0.000	5940.888	11338.33
41	11067.78	1393.999	7.94	0.000	8334.957	13800.6
42	11401.81	1395.781	8.17	0.000	8665.496	14138.13
43	9184.31	1433.25	6.41	0.000	6374.538	11994.08
44	10609.19	1536.141	6.91	0.000	7597.704	13620.67
45	12224.73	1448.712	8.44	0.000	9384.643	15064.81
46	6228.602	1381.802	4.51	0.000	3519.691	8937.513
47	16013.34	1753.085	9.13	0.000	12576.55	19450.12
48	9038.16	2526.071	3.58	0.000	4086.001	13990.32
49	9649.751	1487.762	6.49	0.000	6733.114	12566.39
50	7194.663	1882.215	3.82	0.000	3504.731	10884.59
year_cotiz						
2012	142.4798	564.85	0.25	0.801	-964.8631	1249.823
2013	15.70461	573.4892	0.03	0.978	-1108.575	1139.984
2014	883.6924	680.6658	1.30	0.194	-450.6981	2218.083
2015	1556.266	755.413	2.06	0.039	75.33912	3037.192
2016	2109.871	829.0559	2.54	0.011	484.5736	3735.168
2017	3131.186	904.0283	3.46	0.001	1358.911	4903.46
2018	4337.199	977.6822	4.44	0.000	2420.532	6253.867
2019	5844.184	1113.315	5.25	0.000	3661.62	8026.748
_cons	6554.963	1454.881	4.51	0.000	3702.785	9407.141

TABLE A5: Regression for earnings of fathers with tertiary education

Linear regression

Number of obs	=	903
F(32, 870)	=	7.40
Prob > F	=	0.0000
R-squared	=	0.1389
Root MSE	=	11008

earnings	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
_Ieventtime_1	3708.962	1842.953	2.01	0.044	91.80858	7326.116
_Ieventtime_2	2781.761	1538.942	1.81	0.071	-238.7112	5802.234
_Ieventtime_4	-1910.622	1651.573	-1.16	0.248	-5152.156	1330.912
_Ieventtime_5	-3415.294	2042.723	-1.67	0.095	-7424.535	593.9484
_Ieventtime_6	-5316.264	2512.214	-2.12	0.035	-10246.97	-385.5566
_Ieventtime_7	-6112.706	2926.101	-2.09	0.037	-11855.75	-369.6626
age_p						
31	4390.392	3092.654	1.42	0.156	-1679.543	10460.33
32	374.4324	2760.435	0.14	0.892	-5043.459	5792.324
33	9200.079	3434.743	2.68	0.008	2458.728	15941.43
35	12449.42	2385.924	5.22	0.000	7766.578	17132.26
36	10522.24	2537.401	4.15	0.000	5542.098	15502.38
37	9234.157	2306.593	4.00	0.000	4707.019	13761.3
38	297.8001	2581.675	0.12	0.908	-4769.24	5364.84
39	12318.6	2394.38	5.14	0.000	7619.165	17018.04
40	10590.2	2314.09	4.58	0.000	6048.348	15132.05
41	11476.3	2292.298	5.01	0.000	6977.224	15975.39
42	7308.213	2784.977	2.62	0.009	1842.153	12774.27
43	8531.811	2247.312	3.80	0.000	4121.024	12942.6
44	16483.87	2272.564	7.25	0.000	12023.52	20944.22
45	15271.71	2427.855	6.29	0.000	10506.57	20036.84
46	5693.1	2792.116	2.04	0.042	213.0297	11173.17
47	11134.07	2422.664	4.60	0.000	6379.115	15889.01
48	5574.011	2022.271	2.76	0.006	1604.912	9543.111
49	7777.464	2860.623	2.72	0.007	2162.936	13391.99
year_cotiz						
2012	2198.771	1845.426	1.19	0.234	-1423.236	5820.779
2013	3747.249	1955.71	1.92	0.056	-91.21306	7585.711
2014	6726.361	2428.438	2.77	0.006	1960.079	11492.64
2015	9671.747	2798.221	3.46	0.001	4179.694	15163.8
2016	12036.71	3154.28	3.82	0.000	5845.821	18227.6
2017	14878.17	3502.382	4.25	0.000	8004.069	21752.28
2018	17512.6	3854.069	4.54	0.000	9948.236	25076.96
2019	18955.2	4428.596	4.28	0.000	10263.22	27647.18
_cons	11217.29	2803.514	4.00	0.000	5714.849	16719.73

TABLE A6: Regression for earnings of fathers without tertiary education

Linear regression

Number of obs	=	2,037
F(37, 1999)	=	7.77
Prob > F	=	0.0000
R-squared	=	0.0779
Root MSE	=	9868.2

earnings	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
_Ieventtime_1	-466.6257	1134.43	-0.41	0.681	-2691.415	1758.164
_Ieventtime_2	2.433305	950.14	0.00	0.998	-1860.935	1865.802
_Ieventtime_4	297.1527	944.3179	0.31	0.753	-1554.798	2149.103
_Ieventtime_5	-52.80381	1142.893	-0.05	0.963	-2294.189	2188.582
_Ieventtime_6	372.2487	1375.089	0.27	0.787	-2324.508	3069.006
_Ieventtime_7	395.1698	1594.058	0.25	0.804	-2731.018	3521.358
age_p						
28	-3878.185	4002.133	-0.97	0.333	-11726.97	3970.603
29	1256.128	6025.117	0.21	0.835	-10560.04	13072.3
30	-7051.613	4080.42	-1.73	0.084	-15053.94	950.7088
31	-2695.364	4057.144	-0.66	0.507	-10652.04	5261.309
32	-1698.82	4059.549	-0.42	0.676	-9660.211	6262.571
33	1004	4344.491	0.23	0.817	-7516.204	9524.205
34	2201.973	4097.619	0.54	0.591	-5834.078	10238.02
35	757.4781	4087.011	0.19	0.853	-7257.77	8772.726
36	12.3491	4046.586	0.00	0.998	-7923.619	7948.317
37	5503.33	4038.37	1.36	0.173	-2416.526	13423.19
38	450.1639	3976.395	0.11	0.910	-7348.148	8248.476
39	3569.736	4109.681	0.87	0.385	-4489.97	11629.44
40	2215.593	3992.387	0.55	0.579	-5614.084	10045.27
41	3110.792	4034.466	0.77	0.441	-4801.408	11022.99
42	4299.374	4043.427	1.06	0.288	-3630.399	12229.15
43	3737.285	4041.092	0.92	0.355	-4187.908	11662.48
44	4339.623	4018.945	1.08	0.280	-3542.137	12221.38
45	-596.5045	4034.119	-0.15	0.882	-8508.022	7315.013
46	4200.947	4096.039	1.03	0.305	-3832.006	12233.9
47	860.0926	4283.989	0.20	0.841	-7541.458	9261.643
48	507.5207	4300.251	0.12	0.906	-7925.923	8940.964
49	-4929.194	4333.362	-1.14	0.255	-13427.57	3569.185
50	452.7474	4143.322	0.11	0.913	-7672.935	8578.43
year_cotiz						
2012	149.5745	1218.218	0.12	0.902	-2239.535	2538.683
2013	-433.4743	1212.814	-0.36	0.721	-2811.987	1945.038
2014	215.0874	1461.775	0.15	0.883	-2651.675	3081.85
2015	971.1397	1626.373	0.60	0.550	-2218.423	4160.703
2016	1456.549	1799.451	0.81	0.418	-2072.446	4985.544
2017	2586.081	1962.076	1.32	0.188	-1261.847	6434.008
2018	3091.18	2142.822	1.44	0.149	-1111.218	7293.577
2019	4074.834	2483.1	1.64	0.101	-794.9001	8944.569
_cons	15957.43	4220.792	3.78	0.000	7679.817	24235.04

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