TEMPORARY EMPLOYMENT, FERTILITY AND HEALTH AT BIRTH

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Abstract

We study the causal effect of temporary employment on fertility and infant health outcomes by exploiting exogenous variation in the availability of temporary contracts. The Spanish 1984 reform led to an extensive liberalisation in the use of fix-term contracts, increasing job insecurity and reducing the career prospects of those entering the labour market under this regime. Yet, the long-term effects of temporary employment on fertility and infant health remain poorly understood. Using administrative and survey data, we estimate a within-cohort difference-in-difference model comparing low-educated mothers entering the labour market before and after the reform. We find a reduction in the number of children by low-skilled affected mothers and a postponement in the timing of their first child. Regarding health at birth, we report a higher probability of preterm birth and a stronger incidence of low birth weight. We find two mechanisms driving our results: affected mothers are less likely to have a permanent job, and they have higher emancipation ages, delaying the age at which they become economically independent. Our results are the first to quantify the causal impacts of temporary contracts on fertility and birth outcomes in the long-term and highlight the role that job insecurity has in the reduction in fertility rates observed in most developed countries.

Keywords: temporary employment, job insecurity, fertility, infant health
JEL classification: J13, J18, J41

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1. INTRODUCTION

Temporary contracts are widely used in many European countries. In 2020, around 14% of employees were on temporary employment in Europe (OECD, 2021). At 24.1%, Spain has one of the highest of these, which reaches the level of 25.7% for the case of women and 66.4% among young Spanish adults (16 to 24 years old) (INE, 2020). The literature has proven that temporary employment reduces low-skilled workers' long-run employment and earnings prospects (Blanchard et al., 2002; Oreopoulos et al., 2012; García-Pérez et al., 2018). This increased job insecurity and reduced career prospects can, in turn, potentially impact fertility decisions. Yet, little is known about the causal relationship between temporary employment and lifetime fertility behaviour.

This is important in light of the very low fertility rates, under the replacement population level, observed in most advanced economies. In Spain, the fertility rate has rapidly decreased from 2.77 birth per woman in 1976 to 1.18 births per woman in 2020. Following the opposite trend, female labour force participation has risen in recent years from under 30% in 1976 to around 54% in 2021. This rise is even higher among young female adults (25-34 years old), whose labour force participation increased from 30% in 1976 to 84% in 2021. Since temporary employment is primarily concentrated among young female adults in their early career ages, this may have important implications on career progression and family formation. Although extensive literature has focused on the long-run impacts of temporary employment on earning and labour market status (David et al., 2010; Bruno et al., 2013; García-Pérez et al., 2018), less attention has been paid to the role of temporary employment in shaping fertility decisions which is precisely the aim of this paper.

Spain represents an ideal setting because temporary contracts were liberalised in a new labour market legislation in 1984. Consequently, temporary employment increased rapidly, while the unemployment rate remained steady , keeping labour market conditions stable around this time. In this paper, we exploit the 1984 labour market reform as a natural experiment that created an exogenous variation in the availability of temporary contracts at the time of labour market entry. We compare cohorts of low-skilled mothers who enter the labour market before and after the reform so that they experienced similar labour market conditions, except that some entered in a situation with a tight regulation on the use of temporary contracts while others entered in a laxer regime. We define as affected by the reform the group of low-skilled mothers, as their probability of having a temporary contract in their first labour market experience is higher after the liberalisation in the use of temporary contracts. We estimate a cohort difference-in-difference design (Oreopoulos et al., 2012), using the low-skilled mothers and high-skilled mothers as a treated and control group, respectively (following García-Pérez et al., 2018). Importantly, our setting ensures that both treated and control groups are as exposed to the same labour market conditions.

We use both administrative (from all births in Spain) as well as survey data (Spanish Fertility Survey) to estimate the impact of temporary employment on fertility and infant health at birth, as well as the mechanisms driving the results. Our results show that low-skilled mothers who enter the labour market after the introduction of the reform have significantly fewer children. We find that affected mothers postpone the fertility decision and have their first child around 1 year later. Moreover, higher economic instability and higher levels of economic stress can lead to worse infant health among children of affected mothers (Bridges and Disney, 2016). Previous research has shown that a higher risk of having a poor pregnancy (measured as risk of preterm birth, low birth weight, and small for gestational age) is associated with several factors of the mother's socioeconomic status, such as occupation and educational level (Conde-Agudelo et al., 2006). Our results are consistent with this previous evidence as we report higher probabilities of preterm birth and stronger incidence of low birth weight for low-skilled mothers exposed to the reform.

We explore the mechanisms that can explain the results. Previous literature finds that workers exposed to greater availability of temporary contracts at the beginning of their careers are less likely to be promoted to permanent jobs, leading to a less stable career (Güell and Petrolongolo, 2007). We check this channel within our data, finding that low-skilled affected mothers are less likely to have a permanent job than high-skilled mothers. Importantly, our results indicate that the labour market reform did not affect the extensive employment margin as affected mothers do not have a significantly different probability of experiencing long-term unemployment than unaffected mothers. As a result of the job instability that they face, we also find that low-skilled mothers become economically independent of their parents at significantly older ages after the reform compared to their high-skilled counterparts.

Our findings suggest that job insecurity is an important channel through which temporary employment affects lower-skilled mothers' fertility and induces them to postpone motherhood and to have, on average, fewer children. One important element is the extent to which delayed fertility translates into reduced total fertility and how these changes affect the probability of achieving your desired fertility level. We provide evidence that this is the case in our setting, as low-skilled women are less likely to reach their desired number of children.

We believe this paper offers several contributions to the previous literature. Unlike previous studies (Adsera, 2004; Rica and Iza, 2005; Auer et al., 2016), our paper provides causal estimates of the impact of temporary employment on fertility behaviour by exploiting a labour market reform that exogenously increased the use of temporary contracts. This is unlikely to be correlated with unobserved determinants of individuals' fertility decisions. Moreover, we can distinguish between the effects on the delay in maternity, using the time of first birth *("tempo effect")* and the effects on the number of children (*"quantum effect"*) as measures of fertility. Using rich administrative and survey data, we examine the channels through which temporary employment affects fertility by exploiting a set of socioeconomic

characteristics. Finally, we find intergenerational spillover effects as the health of the babies born from low-skilled mothers are also negatively affected by the job instability induced by the increase in the use of temporary contracts. Our findings are relevant when evaluating the costs and benefits of any new labour market legislation that affects the composition of the workforce in terms of employment security.

2. BACKGROUND

2.1. Literature review

Previous studies linking economic uncertainty and fertility have reported mixed results. One strand of the literature finds that economic uncertainty delays motherhood (Del Bono et al., 2012; Prifti and Vuri, 2013; Clark and Lepinteur, 2022), while other studies find no effects (or even positive ones) of uncertainties affecting women's employment careers and fertility decisions (Kreyenfeld, 2009; Santarelli, 2011).

Ranjan (1999) and Sommer (2016) offer a theoretical framework that shows how an increase in job and income insecurity is associated with the postponement of childbearing and fertility decline. Yet, fewer career prospects and job insecurity lead to two types of effect: an income effect that reduces intra-household resources to have children (Becker, 1960; 1965; Borg, 1989; Black et al., 2013), but also a substitution effect that reduces the value of working relative to spending time with children, which may raise fertility (Becker, 1965; Schultz, 1985; Hotz and Miller, 1988). Consequently, job insecurity's impact on fertility decisions is ambiguous.

One important element consistent in the literature is the presence of heterogeneous effects by the type of economic uncertainty. Bhaumik and Nugent (2011) find that employment-related uncertainty, rather than financial/economic one, decreases the likelihood of childbirth. Kind and Kleibrink (2013) show that uncertainty at the individual level (rather than at the macroeconomic level) is more likely to change fertility decisions. This last result is consistent with Scherer (2009) reporting fertility drops due to individual subjective measures of insecurity (such as perceived job security) and uncertainties about the individual's economic situation (Kreyenfeld, 2009).

The impact of job stability on fertility decisions is also different by gender and educational attainment. In the event of career advancement for men, fertility increases, but when job progression affects women, fertility reduces (Hotz and Miller, 1988; Heckman and Walker, 1990; Schaller, 2016; Dorn et al., 2019). Hanappi et al. (2017) examine differences in these associations by educational level and show that employment uncertainty hampers childbearing intentions only among the highly educated population. Yet, highly educated women generally have more economic resources to avoid the negative consequences of job instability, and they usually return to the labour market quicker after childbirth (Liefbroer and Corijn, 1999; Adsera, 2011).

Several papers have focused on the role temporary contracts play in shaping fertility decisions, showing a negative association between temporary employment and fertility (Adsera, 2004; Gutierrez-Domenech, 2008, Modena et al., 2014; Vignoli, Mencarini, and Alderotti, 2020). In Finland, Sutela (2012) reports that holding a temporary contract in a given year leads to a drop in first child fertility among 20- to 44-year-old employees (both men and women). In Germany, Auer and Danzer (2015) find that temporary contracts are associated with postponing first birth and reducing the number of children in the first 10 years after graduation. In Spain, Ahn and Mira (2003) find small and/or no significant associations between joblessness and part-time work on fertility behaviour. In contrast, Rica and Iza (2005) show that temporary female employment is associated with delays in entry into motherhood compared to those with a permanent job. As causal evidence is scarce, the potential effects on fertility and infant health of policies limiting the use of temporary employment, as the recent labour market reform introduced by the Spanish government in 2022, is still unclear.[1]

2.2. The Spanish labour market

During the Franco dictatorship (1939-1975), the Spanish labour market was heavily regulated and founded on two fundamental pillars. First, the Vertical Labour Union (1940-1970) was the single legal trade union to which workers and employers bargained and joining was compulsory. Second, a strong labour regulation in which strikes were banned and firing a worker was almost impossible.

After Franco died in 1975, the Spanish government announced the Workers' Statue regulation in 1980. This new labour market legislation introduced an intense modernisation of the labour relations system.[2] Fundamentally, this law considered the use of permanent contracts as the universal contracting framework. Therefore, temporary contracts were very restrictive and only allowed for those jobs with a clear seasonal component.

In view of providing additional flexibility in the labour market, the government decided to introduce a new reform passed on August 2nd, 1984, and came into effect in October 1984. This reform aimed to liberalise the use of temporary labour contracts, removing its link to seasonal jobs so that temporary contracts would be allowed for all regular job activities. These contracts were expected to provide firms with the additional flexibility needed to cope with higher demand uncertainty. As the 1984 reform did not modify the conditions associated with permanent contracts, it caused a strong and immediate substitution from permanent to temporary contracts (Aguirregabiria et al., 2014).

[1] From 30th March 2022, every job contract is permanent unless it is signed for a structural temporary/seasonal activity eliminating the most used temporary contracts. This reform has the potential to prompt a significant reduction in the use of temporary contracts, although it is still early to evaluate the impact empirically.
[2] More information related to Law 8/1980 *"Estatuto de los Trabajadores"* (ET), from 10th of March, of Workers' Statue could be found here: https://www.boe.es/buscar/doc.php?id=BOE-A-1980-5683.

Table A1 reports the percentage of temporary employment between 1983 and 2018, i.e., before and after the 1984 reform was implemented (October 1984).[3] The proportion of temporary employees as a percentage of total employment increased from 5.2% in 1983 to around 33% in the late 1990s. While the 1984 reform led to a quick rise in the temporary employment rate, the unemployment rate followed a steady trend with high levels of unemployment across the same period (see Figure A1). The highest percentage of temporary employment is concentrated among young individuals, aged between 16 and 24, which reached the impressive level of 73% in 1998.

3. DATA

3.1. Data and sample construction

We rely on two different data sources. First, a large administrative dataset from the Childbirth Statistics Bulletin that includes the universe of all births in Spain. This dataset allows us to estimate the short- and long-term effects of temporary employment on fertility and infant health at birth. Second, we use survey data from the 2018 Spanish Fertility Survey, which includes the complete fertility history of each interviewed women as well as a large number of socio-demographic characteristics, to study fertility behaviour as well as labour market outcomes.

The Childbirth Statistics Bulletin is provided, on an annual basis, by the Spanish National Statistics Office from 1980 to 2017. This is an administrative dataset of the universe of births in Spain and it includes information on the characteristics of the birth, child's health at birth and parents' socio-demographic characteristics. The information comes from the Civil Registry through a compulsory document filled out by parents (or relatives) to legally declare the birth.[4]

The 2018 Fertility Survey is answered by a representative sample of the Spanish population of women and is available from the Spanish National Statistical Institute. The survey includes retrospective information on each women's fertility history, allowing us to construct fertility trajectories for a representative sample of Spanish women. We also have detailed socioeconomic and demographic information that we use to explore the potential mechanisms driving the relationship between temporary employment and fertility.

In terms of sample selection, we include native mothers born between 1962 and 1972 so that they are aged 43-53 in 2018 and we can observe their completed fertility history.[5] We exclude those women

[3] The Spanish Labour Force Survey (LFS) only reports figures on the number of employees by type of contracts from the second trimester of 1987 onwards.

[4] This cross-sectional data are easily accessible online as a micro-data file and available to download via the following link: http://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736177007&menu=ultiDatos&idp=1254735573002.

[5] Children from immigrant mothers have notorious differences not only in origin, lifestyles, reproductive behaviour, and birth outcome, but they also have a more interrupted and discontinuous labour market pathways compared to Spanish women

who became first time mothers before the reform. We classify women into high and low skilled mothers in both datasets.[6]

We determine the trimester of labour market entry and, thus, their treatment status, depending on the skill level and year of birth of each woman. For low-skilled women, we determine their trimester of labour market entry as their trimester and year of birth plus 16, as the minimum working age in Spain is set at 16.[7] Therefore, for low-skilled women we include the cohorts born in the first trimester of 1965 and the fourth trimester of 1972 so that they turn 16 years old between 1981 and 1988. We consider the cohort that turns 16 in the third trimester of 1984 (those born in the third trimester of 1968) as the first affected cohort as they enter the labour market with a loosen regulation of temporary contracts.

For high-skilled women we consider their labour market entry age to be, at least, 18 years old, which is the age in which one graduates from high school. Therefore, we include cohorts of women born between 1962 and 1969 so that they turn 18 years old between 1980 and 1987. The first cohort affected by the reform is the one born in the first trimester of 1966 (the date of school entry is September) as they will reach 18 years old (and will graduate from high school) in the summer of 1984 at the earliest.

Therefore, our analysis exploits different timings of labour market entry (according to skill level and cohort) which imply differential exposure to the 1984 labour market reform in order to assess the impact of temporary employment on fertility and health outcomes at birth.

3.2. Outcome variables and summary statistics

Using the birth records dataset, we create two variables for each trimester-cohort and skill group of women: the number of children and mother's age at first birth. To do so, we first collapse the individual data at the level of trimester of birth cohort, province and skill level. Then, we calculate the accumulated number of children and mean age at first birth by trimester of birth cohort. We apply logarithms to the number of births by cohort.

Using data from the Fertility Survey, we can create the same variables but at the individual (instead of cohort) level: the average number of children and mothers' age at first birth. We interpret the number of children as the *"quantum effect"* of temporary employment on fertility, while age at first birth

[6] In the administrative data, we classify as skilled women the following categories: professionals, technicians and similar professionals; senior management of public administration institutions and private companies; administrative professionals and similar; and students. The low-skilled women are: small traders and shopkeepers; workers with services jobs; farmers, plant breeders, fishermen and hunters; production workers and assimilates groups, driver teams, and pawns; professional members of the armed forces; and persons dedicated to housework. Observations from retired workers, pensioners and retired independent and non-classified persons have been excluded. In the survey data, low-skilled women are defined as high-school dropouts and high-skilled women are those that have (at least) a high school diploma.

[7] The minimum legal age in Spain for working individuals was 14 before 1980 and 16 since then. However, as we can see in García-Pérez et al., 2018, in 1977, there was already effective legislation that increased the age to 16 years old so that 16 was the binding minimum working age since 1977 in Spain.

captures the *"tempo effect"* and allows us to understand whether there is a postponement on the decision of having a first birth.

Next, we explore the impacts of temporary employment on infant health at birth. Using the birth records dataset, we focus on birth weight (in grams) and gestational age (in weeks). Furthermore, using birth weight at each gestational age, we create a proxy for small for gestational age that takes the value of 1 if the baby has a weight under the 10^{th} percentile of his/her gestational age, and 0 otherwise. We also include dummy variables for low birth weight (one if the child's weight is less than 2,500 grams), preterm birth (one if the child is born before week 37 of gestation) and gender (one if the child is a girl).

Using the Fertility Survey, we construct a set of variables to capture socio-demographic characteristics, such as marital status (1 if currently married, 0 otherwise) or labour market status. We try to include as many employment dimensions as possible: defining a variable that takes the value of 1 if the women has a permanent contract, a dummy equal to 1 if she has been unemployed (at least once) in the last 6 months, a continuous variable for the number of times she has been unemployed in the last 6 months, a continuous variable for the age at first job and a continuous variable for the age of becoming economically independent from the parents. We also include two additional variables to proxy for economic instability and health: a dummy for having difficulties making ends meet and a dummy for suffering from one or more disabilities or long-term illness. Finally, one important element in our analysis is to understand whether any changes in fertility are desired or undesired. Therefore, we create a dummy variable that takes the value of 1 if the number of children that each respondent has equals her stated desired number of children.

Table A2 shows descriptive statistics for fertility and infant health outcomes as well as a set of socioeconomic characteristics by mothers' skill level. On average, low-skilled women have their first child younger than high-skilled women. Consistent with the aggregate data on temporary contracts shown above, in our sample we observe that low-skilled women have worse career paths with lower probabilities of having a permanent contract and a higher likelihood of being unemployed and having difficulties getting to the end of the month. In contrast, these women start working and are economically independent of their parents at younger ages compared to high-skilled women.

We can get a graphical preview of our results in Figure 1 which plots average age at first birth and the mean number of children by trimester cohort and skill level of women. The vertical line marks the first trimester cohort of women affected by the reform (as defined in the previous section). We can observe that both high and low skilled women had similar trends in both outcomes before the introduction of the reform. However, there is a clear increase in the age of first birth and a clear drop in the mean number of children that affects only low-skilled women that enter the labour market during the trimester of the reform. There is no change in trend in any of the two outcomes for high skilled women that enter the labour market during the trimester of implementation of the reform.

[Insert Figure 1 around here]

Figure 2 shows the average probability of having a permanent employment, the probability of achieving the desired fertility and the mean age at becoming economically independent from the parents, by trimester cohort and skill level. We can see that low-skilled women born in cohorts affected by the reform at labour market entry have a lower probability of having a permanent contract and they are less likely of achieving their desired fertility level. Likewise, they are older when they become economically independent from their parents. As expected, we do not observe any change in these outcomes' trends for the control group of high skilled women after the introduction of the 1984 labour market reform.

[Insert Figure 2 around here]

4. EMPIRICAL STRATEGY

To identify the effect of temporary contracts on fertility behaviour and infant health outcomes, we exploit exogenous variation changing incentives to use temporary contracts introduced by the 1984 labour market reform in Spain.

As the use of temporary contracts is much more salient in the group of low-skilled workers (Dolado et al., 2013), we compare cohorts of low-skilled women that can enter the labour market before as opposed to after the liberalization of the use of fix-term contracts vis-à-vis high-skilled women of the same cohorts. Therefore, our analysis exploits different timings of labour market entry (according to skill level and cohort) which imply differential exposure to the 1984 labour market reform in order to assess the impact of temporary employment on fertility and health outcomes at birth.

As explained above, we assign the trimester of labour market entry and, thus, treatment status, depending on the skill level and trimester/year of birth of each mother. For low-skilled women, we include the cohorts born in the first trimester of 1965 and the fourth trimester of 1972 and consider the cohort that turns 16 in the third trimester of 1984 (those born in the third trimester of 1968) as the first affected cohort as they enter the labour market with the new legislation in place.

For high-skilled women we include cohorts of women born between 1962 and 1969 and the first cohort affected by the reform is the one born in the first trimester of 1966 as they will turn 18 years old (and will graduate from high school) in the summer of 1984 at the earliest.

As a result of the different nature of our two datasets, administrative and survey data, we implement a slightly different econometric specification for each of them. For the birth records, we aggregate our sample at the level of *trimester-cohort of birth (c)*, *province (p)* and *skill level (s)* – following

Oreopoulos et al. (2012).[8] Therefore, we collapse the data by province, cohort of birth and skill level to create a set of fertility and infant health outcomes for each of these cells.

We apply a within-cohort difference-in-difference model (weighing by cell size) to estimate the causal effects of temporary employment on fertility and infant health outcomes, where treated and control individuals differ only in their trimester of birth:

$$y_{cps} = \alpha + \beta_1(BirthTrim_c - C_s) + \beta_2(BirthTrim_c - C_s)Post_{cs} + \beta_3 Post_{cs} + \beta_4 Treated_s + \beta_5 Treated_s * Post_{cs} + \eta_p + \delta_c + e_{cps} \quad (1)$$

where the fertility outcomes of interest are the natural logarithm of the number of children and mother's age at first birth per trimester-cohort (c), province (p), and skill level (s). Next, we estimate the same model using a set of infant health outcomes, as explained above. The cut-off C_s is specific to each skill level, i.e., low-skilled mothers' trimester of birth cut-off is the cohort born in the last trimester of 1968, while high-skilled mothers have a cut-off defined for the cohort born in the first trimester of 1966 (to get a tailored proxy of labour market entry depending on the time finishing their highest educational degree). The model includes a linear cohort trend calculated as the birth year cut-off (C) subtracted from the cohort's birth trimester $(BirthTrim_c - C_s)$.[9] This trend is then interacted with th reform indicator $Post_{cs}$ to allow for a change in trend for the post-reform cohorts. We define $Post_{cs}$ as a post-reform cohort indicator that is also specific to each skill level. $Treated_s$ is a dummy variable that takes 1 for low-skilled mothers, and 0 otherwise. We also include mothers' trimester of birth cohort (δ_c) fixed effects, and province (η_p) fixed effects that captures regional time-invariant characteristics. Finally, e_{cps} is a cohort, skill and regional-level error term. We use robust standard errors clustered at the trimester of birth level. The coefficient of interest, β_5, shows whether the liberalisation in the use of temporary contract led to change sin fertlity behaviour for low-skilled affected mothers.

When using the fertility survey dataset, we run a similar baseline regression, but we keep the data at the individual-level, i.e., without collapsing our observations. We estimate the following model:

$$y_{irs} = \alpha + \beta_1(BirthTrim_i - C_s) + \beta_2(BirthTrim_i - C_s)Post_{is} + \beta_3 Post_{is} + \beta_4 Treated_s + \beta_5 Treated_s * Post_{is} + \eta_r + \delta_c + e_{irs} \quad (2)$$

where the fertility outcomes of interest are the number of children per women and mother's age at first birth for each *woman (i)*, who lives in *region (r)*, and with skill level status *(s)*.[10] We use the same trimester of birth cohort cut-off as before for low-skilled (fourth trimester of 1968) and high-skilled

[8] Province includes the 52 Spanish provinces.
[9] This is the variable named "*trend*" in the tables of results.
[10] In this dataset, province is not available so that we use as region the 19 Autonomous Communities (ACs): Andalucía, Aragón, Asturias, Balears, Canarias, Cantabria, Castilla y León, Castilla-La Mancha, Catalunya, Comunitat Valenciana, Extremadura, Galicia, Madrid, Murcia, Navarra, País Vasco, Rioja, Ceuta, Melilla.

women (first trimester of 1966). $Post_{is}$ is a dummy variable that takes the value of 1 for women born in a trimester-cohort affected by the reform (which is specific for each skill level). $Treated_s$ is 1 for low-skilled mothers and 0 otherwise. We also include mothers' trimester of birth cohort (δ_c) fixed effects, and region (η_r) fixed effects. Finally, e_{irs} is an individual, skill level and regional error term. We use robust standard errors clustered at the trimester of birth level.

There are two elements worth mentioning in relation to our identification strategy. First, the labour market reform could have affected not only the type of job (temporary/permanent contract) but also the probability of getting a job which, in turn, could have an impact on fertility decisions and infant health outcomes. We will test for that channel, and we show that, in our data, there are no differences in the probability of having a job as a result of the reform. Therefore, all the impacts are attributable to changes in the type of contracts prompted by the reform. Second, we can rule out any anticipation effects of the reform as it was processed in a really fast track, being approved in August 1984 and being fully implemented in October 1984.

5. RESULTS

5.1. Fertility outcomes

Table 1 shows the main results of the effects of temporary employment on fertility using our two datasets: in Panel A we include the results from the birth records while Panel B reports the results of the fertility survey.

In both panels we observe a significant increase in age at first birth for low-skilled mothers entering the labour market after the reform. More specifically, in Panel A we estimate a postponement of motherhood by 0.306 years (around 4 months) and, as the average age at first birth is 28.09 in that sample, the reform increased age at first birth by 1.1% for low-skilled mothers. These results are confirmed in Panel B with very similar coefficients when using the Fertility Survey sample.

[Insert Table 1 around here]

Consistent with the increase in age at first birth, we also show that low-skilled mothers affected by the reform reduce the average number of children that they have by 14.9 percentage points. The results obtained with the Fertility Survey are pointing to the same direction: affected mothers decrease the number of children by 38.8% (considering that the average number of children is 1.969 for this subgroup of mothers).

Columns 2 to 5 show results from estimating the average number of children per woman by cohort at different age thresholds: 18, 21, 34 and 44. We observe a negative coefficient at all ages that becomes larger and more significant as women approach their completed fertility and women in the control group are progressively having their children. By the end of their completed fertility, affected women have a significantly lower number of children which is in line with the reduced probability of having a first

child reported in the same table. Again, these results are extremely consistent in the two datasets used in this paper and are in line with previous literature showing associations between job insecurity/temporary employment and fertility decisions (Adsera, 2004; Gutierrez-Domenech, 2008, Modena et al., 2014).

5.2. Infant health outcomes

We next turn to study the impact of temporary contracts on infant health outcomes. Using the birth records dataset, we estimate the same baseline regression from Equation (1) for a set of health at birth outcomes.

Temporary employment and its inherent job insecurity and lower career prospects (e.g., lower wages, income volatility, future unemployment risk) may result in worse health outcomes for babies born from affected mothers, i.e., low-skilled mothers who entered the labour market in a laxer temporary contract regime. This is confirmed by the results reported in Table 2 where we find that treated women have babies with an average birth weight of 6.40 grams less. Furthermore, the probability of having a baby with low birth weight increases by 0.2 percentage points, and the probability of having a preterm delivery increases by 0.3 percentage points. These results are consistent with previous literature showing negative associations between job insecurity and worse health outcomes at birth (Schetter et al., 2012; Lean et al., 2017).

[Insert Table 2 around here]

5.3. Potential mechanisms

In this section we explore a set of potential mechanisms that could be driving the effects of temporary employment on fertility and infant health outcomes. In Table 3 we include the results of the same baseline model using as outcome variables a number of proxies reflecting job insecurity, career prospects and financial independence.

The first thing to note is the striking reduction in the probability of having a permanent contract for our treated group. More specifically, we estimate that lower-skilled women exposed to a lax fixed-term contract regulation at labour market entry decreases their probability of working under a permanent contract by 30.2 percentage points. This result is in line with previous research finding strong effects of temporary contracts for low-skilled workers in Spain, an increase in the use of this type of contracts prompted by the 1984 reform and a low transition rate from temporary to permanent employment in Spain (Güell et al., 2007; García-Pérez et al., 2011; de Graaf-Zijl et al., 2011).

Yet, we do not find that the labour market reform had an impact on the extensive margin of employment; that is, the probability of being unemployed is unaffected by the reform. Similarly, the probability of having difficulties of getting to the end of the month is also unaffected. This suggests that the reform

did not have an impact on the probability of leaving the labour force or being jobless for low-skilled women entering the labour market under the new regime and that only the type of contract was effectively affected.

The employment instability generated by the reform is translated into a significant delay in the age of becoming economically independent from their parents for affected women. Plausibly, this might act as an important determinant of fertility and family formation decisions.

[Insert Table 3 around here]

Finally, our findings suggest that low-skilled women who enter the labour market after the reform have a lower probability of achieving their desired number of children, which is significantly more different than their actual number of children. Therefore, a change in fertility preferences does not seem to be driving the reduction in fertility observed in the data, as affected women would still be willing to have more children than the actual number of children that they managed to have.

6. CONCLUSIONS

This paper provides causal evidence on the effects of temporary employment on fertility and infant health outcomes. We exploit the exogenous shock imposed by the 1984 Spanish labour market reform, which increased the availability of temporary contracts, particularly for low-skilled young females.

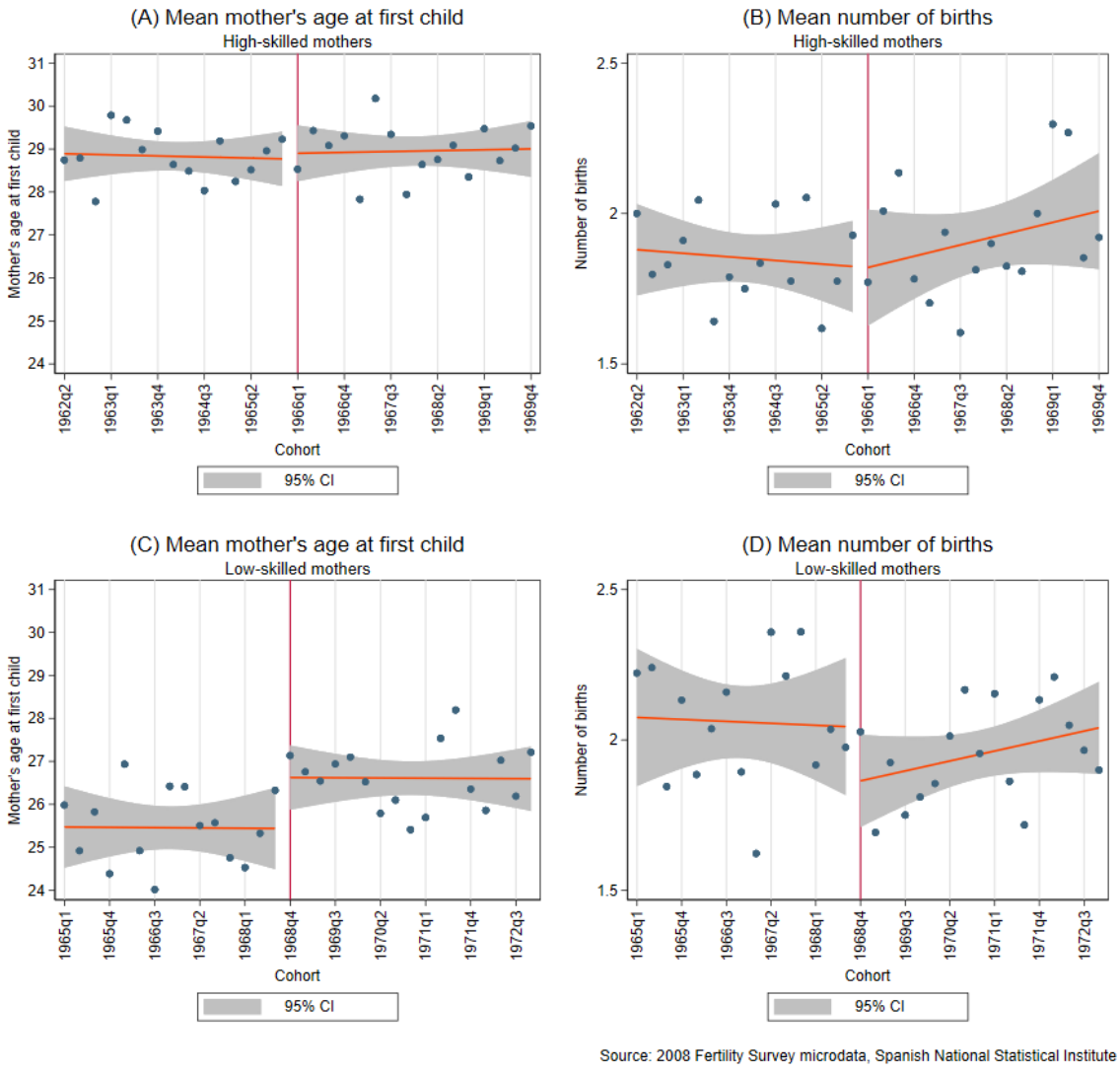
Using administrative and survey data, we find that low-skilled women affected by the reform postpone motherhood and have fewer children compared to high-skilled women less exposed to the reform. We find significant reductions in the number of children by ages 34 and 44, suggesting that temporary employment affects completed fertility. In terms of infant health, our results show that low-skilled affected mothers have higher probabilities of having babies with low birth weight and experiencing a preterm birth. This suggests that the stress and anxiety caused by the economic instability embedded in temporary employment have intergenerational impacts (Schetter et al., 2012; Lean et al., 2017).

We explore the mechanisms driving this relationship. We test whether low-skilled women who enter the labour market with a temporary contract have a worse career path, following previous literature (Blanchard et al., 2002; Oreopoulos et al., 2012; García-Pérez et al., 2018). Accordingly, we find that affected women are less likely to have a permanent job after the reform and less likely to become economically independent from their parents. Our results align with previous literature on temporary contracts, job insecurity and reduced career prospects (Blanchard et al., 2002; D'Addio et al., 2005; Kahn, 2010). Importantly, we show that low-skilled women who enter the labour market after the reform are not able to achieve their desired number of children. Therefore, the delay and reduction in fertility do not correspond to a change in preferences but rather to the increased restrictions on childbearing imposed by the employment instability situation.

Our paper has several implications for public policies as they highlight and quantify the effects of changes in employment security legislation on short- and long-term fertility decisions and infant health. As shown, temporary contracts have far-reached consequences that go well beyond the labour market and impose a strong penalty on workers' personal area by altering some of the most important decisions in life, such as fertility. Promoting employment stability may incentivise fertility and ease some of the pressures on public finances derived from the slowdown in population growth.

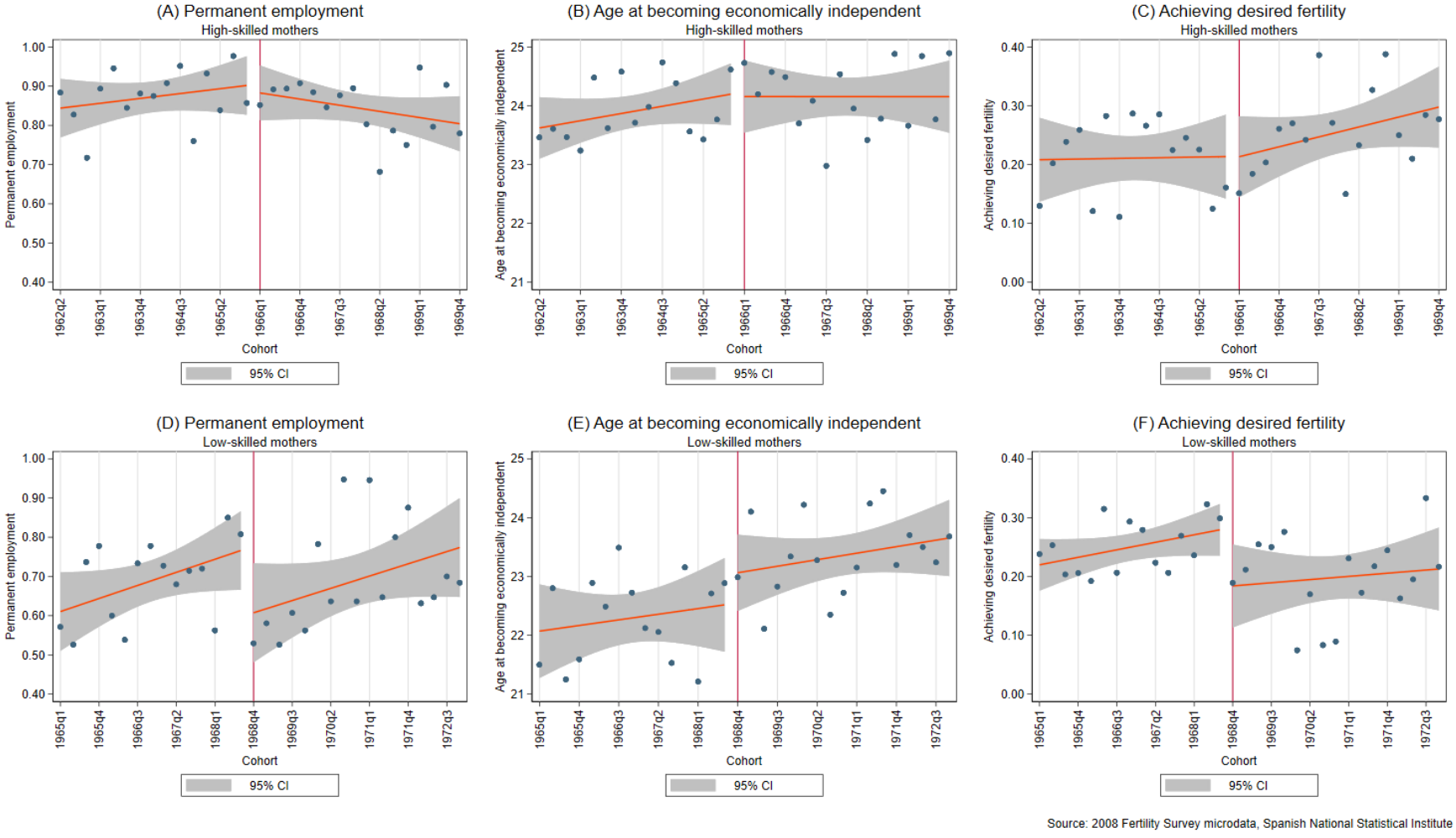
FIGURES & TABLES

Figure 1. Mean of mother's age at first birth and number of children by mother's trimester-cohort of birth and skill level status



Source: 2018 Spanish Fertility Survey. Sample of native mothers who are low-skilled (born between 1965 and 1972 and start working before age 20) or high-skilled (born between 1962 and 1969 and start working before age 22).

Figure 2. Mean of the main socioeconomic characteristics by mother's trimester-cohort of birth and skill level status



Notes: Panel (A) and (D) show the probability of having a permanent employment for high-skilled and low-skilled mothers, respectively. Panel (B) and (E) show the mean age at becoming economically independent from their parents for high-skilled and low-skilled mothers, respectively. Panel (C) and (F) show the probability of achieving the desired fertility for high-skilled and low-skilled mothers, respectively. *Source*: 2018 Spanish Fertility Survey. Sample of native mothers who are low-skilled (born between 1965 and 1972 and start working before age 20) or high-skilled (born between 1962 and 1969 and start working before age 22).

Table 1. Effects of temporary employment on fertility

	Average number of children	Average number of children by				Age at first birth
		Age 18	*Age 21*	*Age 34*	*Age 44*	
		PANEL A: Birth Records ‡				
After	0.091***	-0.153	0.180	0.041	0.045**	-0.288***
	(0.024)	(0.188)	(0.240)	(0.034)	(0.018)	(0.024)
Treat	0.384***	-1.077	-0.702**	0.657	0.674***	3.678***
	(0.037)	(0.544)	(0.221)	(0.028)	(0.013)	(0.018)
Trend	-0.043***	0.478***	0.644**	-0.194**	-0.085**	-0.004
	(0.003)	(0.094)	(0.078)	(0.008)	(0.002)	(0.004)
After x trend	0.039***	-0.562***	0.039***	-0.007	-0.009**	-0.011**
	(0.003)	(0.094)	(0.008)	(0.003)	(0.002)	(0.004)
After x treat	***-0.149******	***-1.863******	***-0.084***	***-0.076***	***-0.121****	***0.306******
	(0.042)	***(0.629)***	***(0.258)***	***(0.033)***	***(0.019)***	***(0.038)***
Mean dep. var.	7.31	5.66	6.60	7.94	7.95	28.085
Province FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Cohort FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
R squared	0.559	0.988	0.988	0.957	0.955	0.975
Observations	3,328	192	289	2,601	3,321	3,328
		PANEL B: Fertility Survey				
After	0.078	0.078	0.129	0.157	0.231	-0.081
	(0.149)	(1.163)	(0.464)	(0.174)	(0.181)	(0.658)
Treat	0.208*	22.64*	1.866	-1.795	-0.761	-3.203
	(0.124)	(10.55)	(1.865)	(0.370)	(0.399)	(0.505)
Trend	-0.088*	2.081*	0.143	-0.176***	-0.087**	2.347***
	(0.032)	(0.910)	(0.164)	(0.029)	(0.033)	(0.167)
After x trend	-0.031	-0.115	-0.047	-0.024	-0.030	-0.039
	(0.020)	(0.182)	(0.083)	(0.021)	(0.020)	(0.150)
After x treat	***-0.751****	***-0.143***	***-0.473***	***-0.606****	***-0.732****	***0.419****
	(0.273)	***(2.072)***	***(1.052)***	***(0.278)***	***(0.278)***	***(0.654)***
Mean dep. var.	1.969	2.127	2.193	2.000	1.976	27.594
Region FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Cohort FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
R squared	0.066	0.701	0.346	0.069	0.065	0.131
Observations	5,094	100	346	3,801	5,060	4,715

Notes: Panel (A) uses collapsed data by trimester-cohort of mother's birth. Robust standard errors clustered at the mother's cohort of birth level in parenthesis. ‡ Natural logarithm of average number of children by cohort. Significance levels: ***p<0.01; ** p<0.05; * p<0.1. *Source:* Childbirth Statistics Bulletin (1980-2017) provided by the Spanish National Statistics Office (INE) and 2018 Spanish Fertility Survey. Sample of native mothers who are low-skilled or (born between 1965 and 1972) or high-skilled (born between 1962 and 1969).

Table 2. Effects of temporary employment on perinatal outcomes

Birth Records Sample	Weight at birth (grams)	Gestational age (weeks)	Low birth weight (<2,500 grams)	Small Gestational Age	Risk of pre-term birth	Girl (gender)
After	0.231	0.005	-0.001	-0.001*	0.001	-0.001
	(1.357)	(0.010)	(0.001)	(0.001)	(0.002)	(0.001)
Treat	11.959***	-0.101	0.013	-0.001	-0.016***	-0.021**
	(1.803)	(0.015)	(0.001)	(0.001)	(0.001)	(0.001)
Trend	-5.142***	-0.017***	0.011	0.002***	-0.001	-0.001**
	(0.269)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
After x trend	-0.853**	0.007***	0.001	0.001**	-0.001	-0.001
	(0.268)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
After x treat	***-6.400****	***0.006***	***0.002****	***0.002***	***0.003****	***0.001***
	(3.663)	***(0.015)***	***(0.001)***	***(0.001)***	***(0.001)***	***(0.001)***
Mean dep. var.	3234.6	39.02	0.057	0.091	0.067	0.485
Province FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Cohort FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
R squared	0.768	0.618	0.599	0.723	0.723	0.035
Observations	3,328	3,328	3,328	3,328	3,328	3,328

Notes: Robust standard errors clustered at the cohort level in parenthesis. Significance levels: ***p<0.01; ** p<0.05; * p<0.1.
Source: Childbirth Statistics Bulletin (1980-2017) provided by the Spanish National Statistics Office (INE). Sample of native mothers who are low-skilled (born between 1965 and 1972) or high-skilled (born between 1962 and 1969).

Table 3. Mechanisms driving the relationship between temporary employment and socio-demographic characteristics

Fertility Survey	Married	Permanent employment	Difficulties making ends meet	Number of times unemployed for at least 6 months	Likelihood of being unemployed for at least 6 months	Age at the first job	Age at becoming economically independent	Suffering any disabilities	Match desired fertility‡
After	0.027	0.021	0.004	-0.473	0.008	0.035	1.071	0.012	0.101
	(0.075)	(0.065)	(0.058)	(0.521)	(0.050)	(1.160)	(0.747)	(0.046)	(0.064)
Treat	0.732***	-0.223	2.017***	1.024**	-1.355***	-0.026	6.176***	1.677***	2.726***
	(0.110)	(0.373)	(0.123)	(0.378)	(0.179)	(1.002)	(1.353)	(0.075)	(0.118)
Trend	0.066***	0.003	0.168***	-0.688***	-0.130***	-2.388*	-0.493***	0.147***	0.238***
	(0.009)	(0.031)	(0.008)	(0.186)	(0.156)	(0.166)	(0.116)	(0.006)	(.009)
After x Trend	0.003	-0.025**	-0.012**	-0.121	0.002	0.041	-0.090	0.001	-0.016**
	(0.008)	(0.009)	(0.006)	(0.024)	(0.129)	(0.166)	(0.090)	(0.004)	(0.006)
After x treat	***-0.009***	***-0.302*** **	***-0.165***	***-1.297***	***0.079***	***0.892***	***1.498****	***0.014***	***-0.220*** **
	(0.107)	***(0.120)***	***(0.103)***	***(1.535)***	***(0.060)***	***(2.683)***	***(0.691)***	***(0.058)***	***(0.099)***
Mean dep. var	0.797	0.818	0.491	3.274	0.613	23.15	23.39	0.059	0.720
Region FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Cohort FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
R squared	*0.041*	*0.091*	*0.117*	*0.089*	*0.042*	*0.053*	*0.076*	*0.039*	*0.036*
Observations	5,094	5,094	5,094	5,094	5,094	4,647	4,435	5,094	5,094

Notes: ‡ Match the number of children you have with the number you would like to have. Robust standard errors clustered at the cohort level in parenthesis. Significance levels: ***p<0.01; ** p<0.05; * p<0.1. *Source*: 2018 Spanish Fertility Survey. Sample of native mothers who are low-skilled (born between 1965 and 1972) or High-skilled (born between 1962 and 1969).

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APPENDIX

Figure A1. Total share of temporary employment and unemployment in Spain (1983-2018)



Source: Own elaboration using data to construct the temporary employment share from Spanish Labour Force Survey (LFS) for the yeas between 1988-2018, and data from the Central Balance (Bank of Spain), Spanish Working Conditions Surveys (SWCS), Economy and Labour ministries survey for the years between 1983-1987. Unemployment rate data comes from the Spanish Chamber of Commerce. The vertical red line shows the year of the labour market reform in 1984.

Table A1. Total share of temporary employment (%) by educational level, age and gender in Spain

Years	**1983**	**1987**	**1990**	**1998**	**2007**	**2018**
Average	5.2	15.3	29.7	32.8	31.7	26.8
By educational level						
Primary or less	-	18.0	33.8	35.9	-	29.0
Secondary	-	33.3	39.1	35.5	-	27.5
University	-	19.9	20.3	22.9	-	24.0
By age						
16-24	-	35.6	65.4	73.0	62.5	73.2
25-39	-	13.7	27.9	35.3	35.1	28.3
40-59	-	8.5	14.9	16.8	20.5	14.3
By gender						
Males	-	14.2	27.1	31.9	27.8	25.5
Females	-	18.0	33.6	34.3	31.1	27.7

Source: Spanish Labour Force Survey (LFS) and Eurostat that start to collect data in 1987 by groups of population. 1983 information comes from the Central Balance (Bank of Spain). Information on temporary employment by subgroup of population started to be available from 1987 onwards. There are no data by educational attainment for the year 2007.

Table A2. Descriptive Statistics

Variables	Low-skilled mothers		High-skilled mothers	
	Mean	**S.D.**	**Mean**	**S.D.**
PANEL A: Birth Records sample (1980-2017)				
Age at first birth	26.01	5.622	28.89	4.462
Number of children	1.87	0.994	1.01	1.052
Weight at birth (grams)	3,219.4	514.9	3,200.9	508.7
Gestational age (weeks)	39	2.128	39.05	1.913
Likelihood of low birth weight (<2;500 grams)	0.0619	0.241	0.0661	0.248
Likelihood of Small gestational age	0.102	0.302	0.0917	0.289
Risk of pre-term birth	0.0753	0.264	0.0657	0.248
Girl birth	0.485	0.50	0.484	0.50
Observations	1,186,572		2,144,539	
PANEL B: Fertility Survey sample (2018)				
Age at first birth	26.03	5.331	28.91	4.985
Number of children	2.06	0.995	1.909	1.060
Married	0.776	0.417	0.811	0.392
Permanent employment	0.486	0.500	0.726	0.446
Difficulties to reach the end of the month	0.655	0.476	0.388	0.487
Number of times in unemployment for more than 6 months	3.911	5.808	2.801	3.444
Suffering from any disabilities	0.077	0.267	0.0481	0.214
Likelihood of being unemployment at least once	0.675	0.468	0.574	0.455
Age at first time starting to work	22.51	8.824	23.51	3.934
Age at becoming economically independent from your parents	22.32	4.484	24.03	3.934
Match desired fertility	0.771	0.420	0.688	0.420
Observations	1,974		3,120	

Note: Standard errors in brackets. *Source*: Birth Records (1980-2017) and 2018 Spanish Fertility Survey using individual level observations. Sample of native mothers who are low-skilled (born between 1965 and 1972) or high-skilled (born between 1962 and 1969).