Labor Market Institutions and Fertility

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Abstract

Among high-income countries, fertility rates differ significantly, with some experiencing total fertility rates as low as 1 to 1.3 children per woman. However, the reasons behind low fertility rates are not well understood. We show that uncertainty created by dual labor markets, the coexistence of temporary and open-ended contracts, and the inflexibility of work schedules are crucial to understanding low fertility. Using rich administrative data from the Spanish Social Security records, we document that temporary contracts are associated with a lower probability of first birth. With Time Use data, we also show that women with children are less likely to work in jobs with split-shift schedules. Such jobs have a long break in the middle of the day, and present a concrete example of inflexible work arrangements and fixed time cost of work. We then build a life-cycle model in which married women decide whether to work, how many children to have, and when to have them. Reforms that eliminate duality or split-shift schedules increase women's labor force participation and reduce the employment gap between mothers and non-mothers. They also increase fertility for women who are employed. Reforming these labor market institutions and providing childcare subsidies would increase the completed fertility of married women to 1.8 children.

Key Words: Fertility; Labor Market Institutions; Temporary Contracts; Split-Shift Schedules, Childcare Subsidies

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1 Introduction

The total fertility rate (TFR) has been falling everywhere in the world. It is 1.8 in the US, 1.6 in Germany, and 1.4 in Japan, well below the replacement rate of 2.1 children per woman.[1] The TFR in some European countries, such as Greece, Italy, Portugal, and Spain, is even lower, around 1.3 children, what demographers call the lowest-low fertility (Kohler, Billari, and Ortega 2002). Yet, the desired number of children by females in these countries remains about 2, much higher than the observed TFR.

Population aging, low fertility coupled with high life expectancy, have been associated with a host of economic woes: low-interest rates, low economic growth, and growing deficits of social security systems around the world (see, among others, Krueger and Ludwig 2007, Aksoy et al. 2019, and Jones 2019). These concerns make it essential to understand why women choose such low fertility rates.

A key factor behind low fertility is the difficulty of combining work with childbearing. Goldin (2014) emphasizes that labor market inflexibility, measured as requirements to work long and particular hours, reduces the female labor supply and increases the gender wage gap, particularly for skilled occupations. Evidence from surveys and experiments suggests that women have a stronger preference for greater work flexibility and job stability (Mas and Pallais 2017, Wiswall and Zafar 2018). Ciasullo and Uccioli (2022) show that regular work schedules are associated with a lower child penalty on women's earnings. Commuting costs also matter significantly for women's labor force participation and the types of jobs they accept (see Petrongolo and Ronchi 2020 for the UK and Farre, Jofre, and Torrecillas 2020 for Spain). One way women can cope with inflexibility in the labor market is to have fewer children. Across the OECD countries, higher flexibility (measured as women's ability to adjust their working hours) is associated with higher fertility (Figure A1 in Appendix B1).

Another reason for low fertility is economic uncertainty, and women's inability to start and establish stable labor market careers delays and lowers fertility. High unemployment is associated with low fertility (Adsera 2011, Ahn and Mira 2001, and Currie and Schwandt 2014), and higher gender gaps in employment and unemployment are associated with lower fertility across countries (Figure A2 in Appendix B1). Job displacements reduce fertility (Del Bono, Weber, and Winter-Ebmer 2012, 2015), and the effect is more substantial for women in skilled occupations.[2] In many European countries, dual labor markets contribute significantly to economic uncertainty for women in their childbearing years. In a dual labor market, young workers hold temporary jobs that can last up to a couple of years and then move to another temporary position until they settle on an open-ended (permanent) contract. Fertility and the fraction of women who work with a temporary contract are negatively correlated across OECD countries (Figure A3 in Appendix B1), and, using individual-level data, several empirical studies show that temporary jobs are negatively correlated with

[1] See: OECD Family Database, Tables SF2.1.A, SF2.3.B, SF2.2.A, http://www.oecd.org/els/family/database.htm.

[2] Wars, which are marked by heightened economic uncertainty, also lead to the postponement of fertility (Vandenbroucke 2014, Chábe-Ferret and Gobbi 2018). During the last two recessions in the US, fertility started to fall several quarters before economic downturns (Buckles, Hungerman, and Lugauer 2020, Coskun and Dalgic 2020).

fertility (see De La Rica and Iza 2005 for Spain, Auer and Danzer 2016 for Germany, Landaud 2021 for France, and Lopes 2019 for Portugal).

In this paper, we study how labor market inflexibility and uncertainty affect fertility decisions in Spain. Even among high-income countries with low fertility rates, Spain stands out as the country with the highest incidence of childlessness and the lowest share of women with two or more children (Figure A4 in Appendix B). Spain is also an ideal case to understand the effects of labor market institutions on fertility. It has one of the highest fraction of workers with temporary contracts in Europe. In 2018, about 28% of women worked with a temporary contract. But the incidence is much higher among the young; 72% of women between 15 and 24 worked with a temporary contract in 2018.[3] The temporary contracts were introduced in 1984. They have a much lower firing cost than permanent contracts and can last up to 2 to 4 year.[4] In practice, temporary contracts are often much shorter, and the conversion rate of temporary contracts to permanent ones is very low, about 6% per year. As a result, a significant fraction of the labor force faces very uncertain labor market prospects as they move from one temporary job to the next. The gender gaps in employment and unemployment rates are also high in Spain. For ages 25 to 54, the gender gap in the employment-to-population ratio was 12.2 percentage points in 2018, while the gap was 9.1, 8.4, and 4.6 percentage points in France, Germany, and Sweden, respectively. For the same age group, women's unemployment rate was 3.5 percentage points higher in 2018, while in France, Germany, and Sweden, the gender unemployment gap was either zero or negative, i.e., women had a lower unemployment rate.

Furthermore, the organization of the workday is unusual in Spain. Many jobs have long lunch breaks that create split-shift work schedules. Figure 1 shows the fraction of employees at work during different times of the day in Norway, Spain, and the UK. By 6.00 pm, less than 20% of workers are at work in Norway and the UK. In contrast, 50% of them are still at work in Spain. The split-shift schedules, which make combining work and childcare difficult, present a concrete example of inflexible work arrangements and fixed time cost of work for women. Available evidence suggests that women are constrained in their work schedules, and there are no compensating wage differentials for having a split-shift schedule (Amuedo-Dorantes and De la Rica 2009).

[3] See: OECD Labor Force Statistics, https://stats.oecd.org/Index.aspx?DataSetCode=TEMP_I.

[4] Workers with permanent contracts are entitled to severance pay of 20 days' wages per year of service (up to a maximum of 12 months' wages) in fair dismissals and 45 days' (up to a maximum of 42 months') wages in unfair dismissals. Firing costs for temporary contracts were introduced in 2001. It was 8 days' wages per year of service, but have gradually increased up to 12 days.

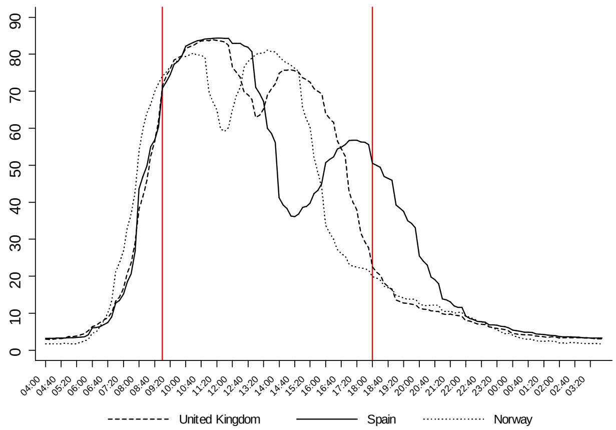

Figure 1. Fraction of People at Work

Source: Harmonized European Time Use Surveys (HETUS) database, www.tus.scb.se (accessed on 8/11/2018). Note: The sample is restricted to 25-54 years old employees who filled the diary on an ordinary working day. The figure shows the fraction who reports employment as the main activity (main or second job and activities related to employment) at different hours of the day. The vertical lines mark 9am and 6pm.

We first use administrative data from the Spanish Social Security Records to study the relationship between temporary contracts and fertility. For women with a college degree, employment with a temporary contract reduces the odds of having a first birth by 28%, while for women without a college degree, by 25%. The impact of temporary contracts on fertility accumulates over the life cycle. Women who spend at least 50% of their working life with a temporary contract have fewer children at age 40 and are more likely to be childless, compared to women who spend less than 50% of their working life with a temporary contract. Women with higher exposure to temporary contracts also have lower earnings at age 40. Using data from the Spanish Time Use Survey, we also show that women with children are less likely to work in jobs with split-shift schedules compared to men or women without children. For college-graduate women, the children reduce the odds of working with a split-shift job by about 57%. The figure for non-college graduates is about 47%.

Next, we build a life-cycle model in which married women decide whether or not to participate in the labor market, how many children to have, and when to have them. Married women differ in educational attainment; they can be college graduates or have less than a college degree. Jobs can be temporary or permanent. Temporary jobs have a higher separation rate and are stochastically converted to permanent ones with lower separation rates. Jobs can also have a regular or split-shift schedule. The fraction of women who work with a split-shift schedule is endogenous since women can choose not to accept such contracts. Having a child is costly, both in terms of time and money. Women are employed, unemployed, or out of labor each period. As women work, they accumulate human capital, which is faster for younger women. But women's ability to have children declines with age, so they face a trade-off between establishing their careers (having more labor market experience and obtaining a permanent contract) and risking not having any children. Husbands do not make any decisions; their employment and wages evolve stochastically and affect household resources. There are two sources of unobserved heterogeneity in the model. First, women differ in their preferences for early or late childbearing. Second, they differ in their access to informal childcare, which allows employed mothers to avoid the monetary cost of childcare.

The model is utilized to measure the impact of labor market uncertainty, inflexibility, and childcare costs on fertility. In the model, married women are ex-ante heterogeneous along several dimensions, such as education, age, own ability, and husbands' ability. There is also unobserved heterogeneity in fertility preferences and access to informal childcare. As the life cycle progresses, husbands' labor market status also undergoes exogenous changes, resulting in further diversity among household types. This heterogeneity and the endogeneity of key decisions are vital for addressing the question at hand, which would be challenging to answer with a less structural approach. We show that estimates from a reduced form regression would underestimate the effect of temporary contracts on first births due to unobserved heterogeneity in fertility preferences or access to informal childcare. Additionally, the model economy serves as a quantitative laboratory that allows us to unravel the different mechanisms at play. We explore not only fertility but also other margins of adjustment, such as participation, employment, types of contracts, and working schedules.

The model economy is calibrated to match inequality, employment, and fertility outcomes for a particular cohort of women in the data, married women born between 1966 and 1971 who were between 39 to 44 years old in 2010. Model parameters are allowed to differ between women with and without a college degree. Three counterfactual policies are considered. First, we eliminate labor market duality and move to a single-contract economy. In the benchmark economy, 5.5% of college-graduate women with a temporary contract become unemployed each quarter, while the rate is only 0.65% for those with a permanent one. For non-college graduates, the separation rates are 17% and 1.7% with temporary and permanent contracts, respectively. In a single-contract economy, we impose the separation rates of permanent contracts for everyone. Next, we eliminate split-shift contracts, which save about two hours of fixed-cost of work for women. Finally, we lower the childcare costs by 35%, which would extend an existing 100-euros-a-month subsidy to working mothers with children below age 3 to all working mothers.

When implemented together, the impact of these reforms on fertility is significant. The number of children at age 44 increases from 1.60 children to 1.96 for college graduates and from 1.58 increases to 1.74 for women without a college degree. The average completed fertility of married women in the new economy is 1.8 children. With these reforms, women's labor force participation increases significantly, and the employment gap between women with and without children disappears. Together with these three reforms, if we also extend single contracts to husbands, there is almost no additional effect on the fertility of college-educated women; completed fertility increases from 1.96 to 1.98. But for women without a college degree, the completed fertility increases from 1.74 to 1.85 since husbands' economic resources are more critical for them. The average completed fertility is then 1.87 children.

If we only eliminate labor market duality, the fertility of women with a college degree increases from 1.60 to 1.68. In a single-contract economy, jobs last longer, and women enjoy higher and less risky incomes. There is also no reason to wait to obtain a permanent job first and then have a child. Our results show the rise in fertility is mainly due to higher and less risky incomes. We also find that in a single-contract economy, women wait to obtain regular-schedule jobs. Almost all mothers work with a regular-schedule job, and split-shift jobs disappear endogenously. The results for non-college women are different. For them, the average fertility declines. In a single contract economy, women's labor force participation increases for both education groups, but the increase is much more substantial for non-college women (57% to 81%). As a result, while a single contract makes having children more attractive for those already working, fertility declines for those who enter the labor force, and for non-college women the second effect dominates. This is not the case for college women since the increase in labor force participation is smaller, from 85% to 94%.

When we only eliminate split-shift contracts, fertility increases to 1.69 children for women with a college degree, a rise similar to the one we obtain in a single-contract economy. For non-college women, fertility does not change. Again for both groups, labor force participation increases. Finally, lower childcare cost alone significantly increases fertility for both groups; fertility rises to 1.86 for college graduates and 1.79 for non-college. Childcare subsidies also increase the employment rate of mothers, from 72% to 76%, and mothers with babies (children who are less than 2 years old), from 70% to 74%.

The paper contributes to the structural labor and macro literatures that study the labor force participation and fertility decisions of women.[5] Within this literature, Sommer (2016) emphasizes the importance of income uncertainty (wage shocks). Our focus is on the uncertainty that emerges from labor market transitions. The effect of labor market transitions on fertility was studied by Da Rocha and Fuster (2006), focusing on US-Spain differences in job-finding rates. Another related paper is Lopes (2019), who studies the effects of temporary contracts on fertility in Portugal. We disentangle the role of duality from uncertainty and explore the interactions between dual labor markets and flexibility. She models temporary contracts in greater detail, but her analysis abstracts from labor force participation decisions. Our analysis shows that the entry of women into the labor force is critical to understanding how labor market institutions affect fertility. The effects of childcare costs on female labor supply have been studied, among others, by Attanasio, Low, and Sanchez-Marcos (2008) and Guner, Kaygusuz, and Ventura (2020) for the US, and by Bick (2016) who studies the impact of childcare subsidy expansions on female labor supply and fertility in Germany.[6]

Our second contribution is to introduce labor market flexibility into a life-cycle model of fertility. Del Boca and Sauer (2008) is one of the first papers highlighting the importance of aggregate measures of labor market flexibility and childcare availability for differences in labor force participation and fertility across Italy, Spain, and France. Cortes and Pan (2016, 2019), Erosa, Fuster, Kambourov and Rogerson (2021), and Cubas, Juhn and Silos (2023) show that a substantial fraction of the observed gender wage gap is due to women's occupational choice and labor supply decision. Flabbi and Moro (2012), who estimate a search model with an explicit role for working hours flexibility, find that women with a

[5] Dynamic models of fertility and labor supply decisions go back to Heckman and Willis (1976) and Heckman and MaCurdy (1980). For recent papers that model joint labor supply and fertility decisions, see, among others, Francesconi (2002), Caucutt, Guner and Knowles (2002), Erosa, Fuster and Restuccia (2010), and Eckstein, Keane and Lifshitz (2019).

[6] Other potential drivers of the low fertility in developed countries have also been considered, such as allocation of household work between husbands and wives (Feyrer, Sacerdote, and Stern 2008, de Laat and Sevilla-Sanz 2011, Doepke and Kindermann 2019), and parental incentives to invest in children's education (Kim, Tertilt and Yum 2019).

college degree value flexibility more than women with only a high school degree. These papers, however, abstract from fertility decisions. Adda, Dustmann and Stevens (2017) build a model with endogenous fertility and occupational choice to study how children affect career choices of women in Germany. In their model, females choose between low-wage-growth occupations that are more child-friendly and high-wage-growth occupations that carry a penalty for career breaks. Our focus is on low fertility as a mechanism to cope with inflexibility.

2 Facts

In this section, we document how temporary contracts and split-shift schedules are related to fertility decisions of married women in Spain. Our primary data source is the 2005-2010 Continuous Sample of Working Lives (Muestra Continua de Vidas Laborales con Datos Fiscales, MCVL). The MCVL is a 4% random sample of individuals registered to the Spanish Social Security during a reference year. Starting from a reference year, e.g. 2010, and going back, the MCVL traces the social security records of individuals up to their first employment (or up to 1980 for the older cohorts). At any moment, a working-age individual can have a social security record if she is employed or is receiving unemployment benefits.

The unit of observation in the MCVL is an individual labor market spell, which can be employment with a particular contract (a job spell) or unemployment (an unemployment spell). Each spell is characterized by a start date, an end date, and a firm identifier. For each job spell, the MCVL provides information on part-time or full-time status, sector of employment (public or private), industry, occupation, and type of contract (temporary or permanent). MCVL also includes information on basic personal characteristics such as gender, date of birth (which we use to generate age), and nationality. The MCVL can be matched with the municipality records, which provide additional information, such as education for the reference person, and basic information on other household members including gender and date of birth. We infer marital status, the number of children, and new births using information on age and gender of all household members from the municipal records. As such, the sample of individuals, which we refer as married, includes individuals who are legally married or cohabiting.[7] Based on labor market spells, we construct a quarterly panel. The analysis is restricted to native married women born between 1966Q1 and 1971Q4, who were between 39 to 44 years old in 2010. Further details on the construction of the quarterly panel are provided in Appendix A.

While the MCVL is an excellent data source to capture the relation between temporary contracts and fertility, it also has shortcomings. First, the demographic characteristics of households are obtained by merging the MCVL with the municipal records, and, as a result, information on the number of children is restricted to children at home. Thus, we complement the MCVL with the 2018 Spanish Fertility Survey (FS), which provides detailed information on completed fertility, age at first births, and childcare costs.

In the FS, we can calculate the completed fertility of women in our cohort who are

[7]In 2010, 35.5% of births in Spain were to unmarried mothers. But only for 1.9% of births, the father's age is missing in birth records, which can be a more accurate indication of single-motherhood. This fraction was slightly higher, 2.5%, in 2018. See: The National Statistical Institute, https://bit.ly/2SXzutq.

employed at around age 49. College-educated women have 1.60 children (17% are childless, while 21% have only one child). The age at first birth is around 32 years, with only 36% of women having a first birth below age 30. How does the level of fertility from the FS compare with the one we obtain in the MCVL? College-educated women in our MCVL sample who are 44 years old and employed have 1.51 children, which is close to the number we calculate from the FS. In contrast, the MCVL does a worse job capturing the fertility rate of women without a college-degree. For non-college native women in our cohort, the completed fertility of women employed at age 49 is 1.51 in the FS but only 0.94 at age 44 in the MCVL. A possible reason for the gap between the FS and the MCVL for the less educated women is that we do not observe children if they are not co-residents. Since women with less education have children at a younger age, their children are more likely to leave parental home when women are 44 years old. Given this concern on the level of completed fertility, whenever feasible we construct all the targets on completed fertility and age at first birth for the quantitative analysis from the FS.

Second, the MCVL does not provide information on individuals who are out of the labor force. Therefore, we use the Spanish Labor Force Survey (LFS) and its rotating panel component (LFS-flows) to construct stocks of individuals who are employed, unemployed, or out of the labor force, and flows among these labor market states, respectively. For the particular cohort of married women that we study in the MCVL, in the LFS, 19% have at least a college degree, and the rest (81%) do not.

Third, it is not possible to match wives and husband in the MCVL and construct joint labor market transitions or total household earnings. The LFS does not contain any information on earnings, either. Therefore, we use the European Union Statistics on Income and Living Conditions (EU-SILC) to construct household-level income measures.

Finally, we use the Spanish Time Use Survey (STUS) to obtain information on workers with split-shift and regular work schedules. In all datasets, we try to keep the sample as comparable as possible to the one from the MCVL (further details on different datasets used in the analysis and corresponding sample restrictions are provided in Appendix A).

Two facts emerge from our data analysis:

1. **Temporary Contracts are Associated with Lower Fertility:**

We first look at the relationship between temporary contracts and fertility. In the MCVL sample, a childless college graduate married woman with a permanent contract today has a 3.4% probability of giving birth in a year. The probability is much lower for a woman with a temporary contract, only 2.3%. For women without a college degree, the gap is smaller, 2.7% versus 2.1%. In Table 1, we study whether this unconditional gap is robust to controls by reporting the odds ratio estimates from the following model

$$\Pr(y_{it} = 1 | y_{it-1} = 0, e_{ijt-4} = 1, T_{ijt-4}, \mathbf{x}_{it}, \mathbf{z}_{ijt-4}, \varphi_t) = L(\alpha + \beta T_{ijt-4} + \mathbf{x}_{it}\boldsymbol{\theta} + \mathbf{z}_{ijt-4}\boldsymbol{\eta} + \varphi_t), \quad (1)$$

where L is the standard logistic function and the outcome variable y_{it} takes the value of 1 if woman i has a first birth at a specific quarter t, given that she did not have a (first) child in previous quarter ($y_{it-1} = 0$) and was employed in firm j ($e_{ijt-4} = 1$) in the preceding year.[8]

[8] Women drop out of the sample if they have a first child. Otherwise, they are in the sample for the following quarter. Each additional quarter is considered an independent observation, but the standard errors are clustered at individual level for the possible intra-group correlations.

The coefficient of interest, β, is on the binary indicator of working with a temporary contract in the preceding year T_{ijt-4}. The vector $\mathbf{x}_{it}$ includes other personal characteristics (at quarter t), age in this specification, and the vector $\mathbf{z}_{ijt-4}$ contains work-related characteristics (in the preceding year), such as firm tenure, full-time employment, an indicator for public sector employment, occupation, and industry. In addition to individual and work-related characteristics, the model also controls for year fixed-effects φ_t.

Table 1 shows the odds ratio estimates. Column 1 presents the results where we only control for the temporary contract indicator. In the following three columns, we gradually add personal and work-related characteristics. In the final column, where we control for all covariates together with year fixed-effects, the odds of having a (first) child is 28% less for childless college-graduate women who are employed with a temporary contract than for childless women who are employed with a permanent contract. The impact on non-college women is smaller, having a temporary contract reduces the odds of a first birth by 25%.

Table 1. Temporary Contracts and the First Birth Probability

	(1)	(2)	(3)	(4)
College				
$\text{Temporary}_{\mathbf{t-4}}$	0.633^{***}	0.672^{***}	0.661^{***}	0.723^{***}
	(0.031)	(0.035)	(0.053)	(0.059)
Number of observations	66,286	66,286	37,581	37,581
Non-College				
$\text{Temporary}_{\mathbf{t-4}}$	0.700^{***}	0.647^{***}	0.718^{***}	0.750^{***}
	(0.024)	(0.022)	(0.038)	(0.040)
Number of observations	197,513	197,513	106,274	106,274
Personal characteristics	no	yes	yes	yes
Work-related characteristics	no	no	yes	yes
Year fixed effects	no	no	no	yes

Notes: (i) Reported are the odds ratio with individual level clustered standard errors in parentheses. (ii) Personal characteristics include age. Work-related characteristics are firm tenure (in quarters), a binary indicator for public sector, a binary indicator for full-time, occupation dummies (ten social security categories) and NACE one-digit industry dummies (nine categories). All models include a constant term. (iii) *$p < 0.10$,**$p < 0.05$, ***$p < 0.01$.

Table 1 shows that women with temporary contracts are less likely to have children at a point in time. These women might still reach the same completed fertility as those with a permanent contract but have their children later. In Table 2, we show that this is not the case, by splitting the sample of women into two groups: those who spent less than 50% of their working life with a temporary contract between ages 25 and 44 and those who spent 50% or more. We then compare the number of children these women have at different ages. For each outcome in Table 2, we also report the gap between those with higher and lower exposure to temporary contracts (indicated by Δ) and whether these gaps significantly differ from zero.

A college-graduate woman who worked in a temporary contract for 50% or more of her employed life has about 1.27 kids by age 44. The number of children is higher, about 1.53, for women who spend less time on temporary contracts. The difference between these two groups opens up early; at age 35, there is a difference of about 0.14 children, and the gap does close as they age. Women who spend a larger fraction of their working life with temporary contracts are also more likely to be childless at age 44. As we have pointed out above, the MCVL does a poor job of capturing fertility levels at older ages, particularly for women without a college-degree. Thus, for them, in Table 2, we only report outcomes for ages 35 and 40. While the fertility level at age 40 is clearly low, the gaps between those who spend more or less than 50% of their working life with temporary contracts follow the same pattern. Women with more extended exposure to temporary contracts have fewer children at ages 35 and 40 and are more likely to be childless.

Table 2 also reports the impact of extended exposure to temporary contracts on earnings at different ages. At age 40, college women who spend 50% or more of their working life with temporary contracts earn about 5 euros less per day than those whose exposure was less than 50%; this is about 6% of the earnings of women with higher exposure to temporary contracts.[9] The gap is close to 15% at age 44. For non-college women, the gap is also significant, about 10.5% at age 44. On the one hand, these earnings differences might reflect differential returns to experience accumulated with temporary and permanent contracts, as documented by Garcia-Louzao, Hospido, and Ruggieri (2023). On the other hand, the gap might also reflect a larger destruction rate for temporary contracts, which results in more frequent spells of unemployment and human capital depreciation.

Table 2. Fertility and Earnings Statistics by Time Spent on Temporary Contracts, aged 25-44

	Number of children			% childless			Daily earnings		
	<50%	≥50%	Δ	<50%	≥50%	Δ	<50%	≥50%	Δ
College									
Married at age 35	1.01	0.87	0.14***	35.42	40.19	-4.77**	73.89	73.29	0.60
Married at age 40	1.53	1.37	0.16***	19.18	22.06	-2.87	81.61	76.73	4.87**
Married at age 44	1.53	1.27	0.26*	20.00	21.67	-1.67	86.12	74.74	11.39**
Non-College									
Married at age 35	1.02	0.99	0.03	31.60	34.33	-2.73**	51.99	46.42	5.56***
Married at age 40	1.22	1.08	0.14***	25.33	29.58	-4.24***	55.48	50.22	5.26***

Notes: (i) We further restrict our sample of women to those who were employed at least 50% of the time between 1996Q1 and 2010Q4. (ii) Within each panel Δ denotes the difference between columns <50% and ≥50%. (iii) ***, **, and * indicate that the difference is statistically significant at the 0.01, 0.05 and 0.10 level, respectively.

In Tables A1 and A2 in Appendix B2, we document the impact of temporary contracts on fertility for men.[10] We find that temporary contracts also reduce the odds of having a

[9]The MCVL data do not contain information on hours worked to construct hourly wages.

[10]Since it is not possible to match husbands and wives in the MCVL, we reproduce Tables 1 and 2 for married men two years older than married women in the cohort we study (who would be the potential husbands). The median age difference between husbands and wives is about two years for this sample of women in the EPA.

first child for men, and these effects accumulate over the life cycle. Since the probability of working with a temporary contract within a household is likely to be correlated, the results in Tables 1 and 2 for wives and the ones for husbands in the Appendix capture, to a certain extent, the combined effect of one or more members in a household working with a temporary contract.

2. **Mothers are Less Likely to Work in Split-Shift Schedule Jobs:**

Next, we document the relationship between split-shift schedule jobs and fertility. In the STUS 2009-2010, about 28.36% of all employed women aged 25 to 44 worked with a split-shift schedule. For employed mothers, the fraction is smaller, about 25.15%, and is quite similar for those with and without a college degree, 25.80% and 24.76%, respectively. This difference can reflect the extra cost split-shift schedules entail for women with children. To assess this cost, we calculate the time interval between the first and last times a female worker indicates that she works in a day. This interval is 6.68 hours with a regular contract and 8.69 hours with a split-shift contract, representing a potential fixed cost of 2 hours.

What are the origins of split-shift schedules? One potential factor was Franco's decision to adopt Central European Time in 1942 to align Spanish time with Germany. Lunch and dinner times were adjusted to follow the actual sun time and shift an hour. Another factor was the scarcity of jobs after the Civil War. Many men had to work two jobs (one before lunch from 8am to 2pm, the other after lunch from 4pm to 8pm) to be able to bring enough income to the household (Vilar-Rodríguez 2006). Despite attempts by different governments to align Spanish working hours with the rest of Europe, such schedules persist due to coordination failures, as it is costly for individual companies to adopt a regular work schedule. As such, split-shift schedules are prevalent across different industries, occupations and regions (see Table A3 in Appendix B).

There is a negative correlation between the fraction of women working with split-shift schedules and the completed fertility across occupations and regions (see Figure A5 in Appendix B). To investigate the relationship between motherhood and the probability of working with a split-shift schedule further, we once again run a logistic regression

$$\Pr(y_i = 1|, F_i, P_i, F_iP_i, \mathbf{x}_i, I_i, \mathbf{z}_i) = L(\alpha + \beta F_i + \gamma P_i + \delta F_i P_i + \mathbf{x}_i\boldsymbol{\theta} + \lambda I_i + \mathbf{z}_i\boldsymbol{\eta}), \qquad (2)$$

where outcome variable y_i takes the value of 1 if individual i works with a split-shift schedule and 0 otherwise. The set of predictors include a binary gender indicator (F_i), a binary indicator for presence of own children in the household (P_i) and the interaction between them (F_iP_i). The vector $\mathbf{x}_i$ includes personal characteristics, such as age and region, and I_i is the household income. The vector $\mathbf{z}_i$ contains work-related characteristics, such as full-time employment, temporary contract, occupation, and industry, as well as indicators for having a second job and whether the respondent states to have flexible working hours.

In Table 3, column 1 shows the odds ratio estimates when we only include a gender indicator. In column 2, we only control for an indicator for the presence of own children in the household (i.e., being a parent). In column 3, we control for both gender and the presence of children and their interaction. The results show that children affect men and women differently. While we do not observe a significant difference between childless men and women in the odds of working with a split-shift job, children have a significant negative impact on females but not on males. The odds of working with a split-shift schedule is 57% less for college-graduate mothers than for men and women without children. As we move across columns from left to right, we gradually add personal characteristics, household income, and work-related characteristics, and the odds ratio remains significant and similar in magnitude. The results are very similar for non-college women; based on the estimates in column 6, the odds of working with a split-shift schedule is 47% less for them compared to men and women without children.

Table 3. Motherhood and the Probability of Working with a Split-Shift Schedule

	(1)	(2)	(3)	(4)	(5)	(6)
Men and College Women						
Female	0.446***	-	0.843	0.746	0.806	1.097
	(0.060)		(0.236)	(0.214)	(0.234)	(0.363)
Parent	-	0.818	1.017	1.182	1.163	1.181
		(0.120)	(0.181)	(0.219)	(0.217)	(0.235)
Female × Parent	-	-	0.431***	0.453**	0.457**	0.428**
			(0.139)	(0.149)	(0.150)	(0.152)
Number of observations	1,174	1,174	1,174	1,174	1,174	1,174
Men and Non-College Women						
Female	0.407***	-	0.765	0.736	0.726	1.046
	(0.049)		(0.204)	(0.200)	(0.198)	(0.315)
Parent	-	0.763*	1.017	1.130	1.121	1.141
		(0.108)	(0.181)	(0.208)	(0.207)	(0.226)
Female × Parent	-	-	0.459***	0.464**	0.471**	0.531*
			(0.137)	(0.141)	(0.143)	(0.176)
Number of observations	1,355	1,355	1,355	1,355	1,355	1,355
Personal characteristics	no	no	no	yes	yes	yes
Household income	no	no	no	no	yes	yes
Work-related characteristics	no	no	no	no	no	yes

Notes: (i) Reported are odds ratios with robust standard errors in parantheses. (ii) Personal characteristics include age and regional dummies (seven categories). Household income is net average monthly household income (four categories <1,200 euros, between 1,201 and 2,000 euros, between 2,001 and 3,000 euros, and >3,000 euros). Work-related characteristics include a binary indicator for full-time employment, National Classification of Occupations (CNO) one-digit occupation dummies (regrouped, five categories), National Classification of Economic Activities (CNAE) one digit industry dummies (regrouped, nine categories), a binary indicator for having a second job, a binary indicator for having flexible working hours, and a binary indicator for having a temporary contract. All models include a constant term. (iii) *p < 0.10,**p < 0.05, ***p < 0.01.

3 Model

We next build a life-cycle model where married females make labor force participation, fertility, and savings decisions. The model economy is populated by married households. Each married household consists of two potential earners, a male (m) and a female (f). Individuals are born married and do not experience marital transitions. Husbands and wives age together. Individuals, men or women, differ by their abilities, denoted by a. The abilities of a couple come from a joint distribution, $F(a_f, a_m)$, at the start of life and remain constant afterward. Beyond innate ability, the model has two sources of unobserved heterogeneity. First, females differ in their preferences for having children earlier or later along the life cycle. Second, couples differ in their access to informal care, which affects the monetary cost of having children.

Demographics A model period is a quarter. We focus on the behavior of women between ages 25 ($j = 1$) and 54 ($J = 54 \times 4$). Fertility decisions are uncertain; even if a woman wants to have a child, she may not get pregnant. Fertility opportunities decrease with a woman's age, and α_j denotes the probability that an age-j female gets pregnant, conditional on her decision to have a baby.

Once children are born, they age stochastically. There are three age groups for children: less than 2 years old (babies), between 3 and 14 (school-age), and 15 or older (young adults). Each period a baby becomes a school-aged child with probability $\delta_b = 1/8$. After age 3, school-age children face a probability δ_c of becoming a young adult each period. We set $\delta_c = 1/52$, so on average school-age years last 13 years and young adulthood starts at age 15.

Keeping track of distribution of children across ages would be computationally very costly. To capture costs and benefits of children in a minimally realistic way, we make assumptions so that the total number of children and their age group are sufficient to define a household's demographics, denoted by (n, i) for $n \in \{0, 1, 2, ...\}$ and $i \in \{1, 2, 3\}$, respectively. To this end, we first assume that as long as a female has a baby at home, she cannot have another one. Second, when a new baby arrives, all existing children (school-age or young adults) become babies. These assumptions imply that in a household, there can be only babies, only children, or only young adults at a point in time.

Let $b \in \{0, 1\}$ indicate whether or not a household decides to have a baby. Then, for a household of age j, the number of children and their age groups evolve as follows:

$$(n', i') = \begin{cases} (n, 2) \text{ with prob. } \delta_b \text{ if } i = 1 \\ (n, 1) \text{ with prob. } (1 - \delta_b) \text{ if } i = 1 \\ (n + 1, 1) \text{ with prob. } \alpha_j \text{ if } i \neq 1 \text{ and } b = 1 \\ (n, 3) \text{ with prob. } [b(1 - \alpha_j) + 1 - b]\delta_c \text{ if } i = 2 \text{ and } b = 0, 1 \\ (n, 2) \text{ with prob. } [b(1 - \alpha_j) + 1 - b](1 - \delta_c) \text{ if } i = 2 \text{ and } b = 0, 1 \\ (n, 3) \text{ with prob. } [b(1 - \alpha_j) + 1 - b] \text{ if } i = 3 \text{ and } b = 0, 1 \end{cases} . \quad (3)$$

The first two lines in equation (3) indicate a situation when a household already has a baby ($i = 1$), so they can't have a new one, and the ones at home age stochastically to become school-age children. The next is the case when the household can have a baby ($i \neq 1$) and decides to have one. With probability α_j, the couple has a new baby, so the total number of babies in the household is $n+1$ since all the children at home become babies. The following two lines show the situation when the family has school-age children ($i = 2$). If they decide to have a new baby ($b = 1$) but are not successful (with probability $1 - \alpha_j$) or they do not try to have new baby ($b = 0$), the school-age children age stochastically and become young adults. Finally, if $i = 3$, number of children and their age do not change as long as the household does not or can't have a new baby. Below, when we define the value function for household decisions, we represent equation (3) by $\Gamma_j(n', i'|n,i, b)$.

Preferences Each period, a married female decides whether or not to work, how much to consume, how much to save, and, if feasible, whether or not to have another child. Each female has one unit of time endowment each period. Her preferences are given by

$$u(c, n, i, \ell, j) = \log\left(\frac{c}{\Omega(n, i)}\right) + \gamma_1 \frac{exp(j-\gamma_3)}{1+exp(j-\gamma_3)}(\overline{n}+n)^{\gamma_2} + \chi \log(\ell), \tag{4}$$

where c is consumption, $\Omega(n, i)$ is the household equivalence scale, and ℓ is leisure. In this formulation $\overline{n}$ denotes an exogenously given number of children from which parents get utility, independent of the number of children they have. This is a rather standard feature that allows us to pin down the fraction of childless females.

We also assume that utility that parents get from children is increasing in parents' age, given by $\frac{exp(j-\gamma_3)}{1+exp(j-\gamma_3)}$. This term captures other factors that might push parents to delay their fertility, such as housing or other high fixed-cost investments for households. Females are heterogeneous in γ_3, and a higher value for γ_3 imply a stronger preferences to have children early in the life cycle.

Labor Market - Females A married women can be in one of three labor market states: *employed, unemployed or out-of-labor force.* We assume that all jobs are full-time and imply a time cost of l. Each period, with probability ϕ, an unemployed female receives a job offer. If she accepts the offer, she starts working next period. If she rejects the offer, she decides whether to continue to be unemployed or move out of the labor force. Only unemployed workers can get job offers. They have to incur, however, a participation cost in terms of leisure, denoted by ξ. Females who are out of the labor force do not incur this cost, but do not receive job offers. To receive job offers, a female, who is out of the labor force, has to enter first the labor force as unemployed.

There are two types of jobs: temporary and permanent, denoted by indicator $P = 0$ and $P = 1$, respectively. Jobs also differ by the type of work schedule they offer. They can have a split-shift or a regular work schedule, denoted by indicator $S = 1$ and $S = 0$, respectively. Split contracts have a fixed time cost denoted by κ. As a result, total working hours for a split-shift contract is $l+\kappa$, while the worker only receives a wage for l hours. We assume that a fraction ψ of all new job offers (temporary or permanent) have a split-shift schedule. All new jobs start as temporary. A female with a temporary contract is promoted to a permanent job with probability π and stays with the temporary with $1- \pi$. Each period jobs can be destroyed with probability δ_P. Temporary contracts have a higher probability of being destroyed, i.e. $\delta_0 > \delta_1$, so they last shorter.

Females accumulate human capital, h, as they work. Each female starts her life with $h = 1$, and if she works in age j, then her next period human capital is given by

$$\ln(h') = \ln h + \ln(1 + \eta_1^P + \eta_2^P j). \tag{5}$$

Each extra quarter of work on a job is associated with a η_1^P percent growth in wages. The growth rate, however, declines with age if $\eta_2^P < 0$. Returns to experience can differ between temporary ($P = 0$) and permanent jobs ($P = 1$). If a woman is unemployed or out of the labor force, her human capital depreciates at rate δ_h.

The earnings of a female depends on her ability, human capital, and contract type, and is given by

$$w_f(a, h, P) = \zeta_P a h, \tag{6}$$

where $\zeta_1 = 1$, and $\zeta_0 < 1$ is the earnings penalty for temporary contracts.[11]

Child Care Costs Each period, a working female with babies or school-age children pays childcare costs, denoted by d_1 and d_2.[12] We assume that childcare costs are independent of the number of children in the household. We also assume that not all households pay childcare costs. A household can have access to informal childcare (e.g. grandparents), denoted by $g \in \{0, 1\}$. If $g = 1$, a household has access to grandparents (or other relatives) and does not pay any childcare cost. We assume that $g = 1$ for a fraction φ of all households.

The childcare costs also depend on whether a female works with a split-shift or regular contract and are given by

$$D(i,g,l,S) = \begin{cases} \left(1 + \frac{\kappa S}{l}\right)\left[d_1 \mathcal{J}(i=1) + d_2 \mathcal{J}(i=2)\right] \text{ if } g = 0 \\ 0, \text{ if } g = 1 \end{cases}, \tag{7}$$

where $\mathcal{J}(x)$ is an indicator function with $\mathcal{J}(x) = 1$ if x is true, and $\mathcal{J}(x) = 0$, otherwise. If a household has access to informal care, then they do not incur any childcare costs. Otherwise, they pay d_1 if they have babies and d_2 if they have children. If the mother works with a split-shift contract, i.e. $S = 1$, then her childcare costs increased by κ/l, the fixed time cost of split-shift contracts. Besides monetary costs, babies (0 to 2 years old children) also imply a fixed time cost for their mothers, denoted by ι.[13] Young adults do not imply any direct monetary or time cost for parents.

The parsimonious stochastic structure for children's ages allows us to capture two key aspects of fertility decisions. First, parents will choose to have their first babies early or late. Fertility timing will depend on household income, childcare costs, and, as we detail

[11] Note that gender differences in the mean abilities of men (a_m) and women (a_f), are isomorphic to a direct gender penalty, $\zeta_f < 1$, in $w_f(a, h, P) = \zeta_f \zeta_P a h$.

[12] We do not model maternity leave. In Spain, mothers have 16 weeks of maternity leave (see: https://ec.europa.eu/social/main.jsp?catId=1129&langId=en&intPageId=4789). This is little more than a quarter, the model period. We could allow women to keep their current jobs and income without any extra childcare payments for one model period. This would create another state variable, whether women is on leave or not, and the effects are likely to be small.

[13] While fathers' income helps the household to cope with the monetary cost of children, fathers do not share the time cost of children in the model. Childcare time by fathers is very small in Spain (de Laat and Sevilla-Sanz 2011).

below, parents' preferences. Second, having another baby implies incurring childcare costs for a more extended period, as all children in a household become babies. Again, childcare costs and household income will determine the distribution of the number of children across households in the economy.

Labor Market - Males All males are in the labor force. They do not make any decisions and their labor market status changes exogenously. Males can be in three different labor market states: employed with a temporary contract, employed with a permanent contract, or unemployed. Let $\lambda_m \in \{0, 1, u\}$ denote these labor market states, and $\pi_j^m(x, x')$, for $x, x' \in \{0, 1, u\}$, be the associated transition probabilities from employment state x to x' at a given age j.

Earnings for an employed male of age-j depend on his ability and type-of contract, and given by

$$w_m(a, j, P) = a \exp(\omega_0^P + \omega_1^P j + \omega_2^P j^2). \tag{8}$$

Note that as a husband moves between a temporary and permanent contract, his earnings change stochastically as well.

Government There is a government that taxes individuals and uses the tax revenue to provide means-tested transfers, unemployment benefits, and to finance government consumption. Let $G(I)$ denote any means-tested transfers from the government to the household where I is the total household income. Let $T(I)$ be the taxes that an individual with income level I pays. We assume that unemployed individuals get a $\theta \in (0, 1)$ fraction of average household income in the economy as unemployment benefits.

3.1 Household Problems

To define the household problem in a recursive formulation, let $\boldsymbol{s} = (a_f, a_m, g)$ be the permanent characteristics of a household.

3.1.1 Value Function of Employed

Suppose the wife has a type-(P, S) job, her human capital level is h, the labor market status of her husband is λ_m, and household assets are given by k. Then, the problem of an employed age-j female with n, age-i children is given by

$$\begin{aligned} V_j^e(\boldsymbol{s}, k, n, i, P, S, h, \lambda_m) \;=\; & \max_{c,k',b} u(c, n, i, \ell, j) \\ & +\beta(1-\delta_P)\mathbb{E}W_{j+1}^o(\boldsymbol{s}, k', n', i', P', S, h', \lambda_m' | P, \lambda_m, n, i, b) \\ & +\beta\delta_P \mathbb{E}W_{j+1}^{no}(\boldsymbol{s}, k', n', i', h', \lambda_m' | \lambda_m, n, i, b), \end{aligned}$$

subject to

$$c + k' + D(i,g,l,S)\mathcal{J}(n>0) = I_m + I_f + k(1+r) + G(I) - T(I_f + \frac{kr}{2}) - T(I_m + \frac{kr}{2}), \text{ with } k' > 0,$$

$$\ln(h') = \ln h + \ln(1 + \eta_1^P + \eta_2^P j),$$

where

$$\ell = 1 - l - \iota \mathcal{J}(i=1) - \kappa S,$$

and

$$I_m = \begin{cases} w_m(a, j, \lambda_m) \text{ if } \lambda_m \in \{0,1\} \\ \theta_m \overline{I} \text{ if } \lambda_m = u. \end{cases}, \quad I_f = \zeta_P a h,$$

where $\overline{I}$ is the average labor income in the economy and $\theta_m \overline{I}$ is the unemployment payment for an unemployed husband. As it will become clear below, the expectations in $\mathbb{E}W_{j+1}^o$ is defined over $(n', i', P', h', \lambda_m')$ and for $\mathbb{E}W_{j+1}^{no}$ over (n', i', h', λ_m'). Recall thar temporary and permanent jobs are denoted by indicator $P = 0$ and $P = 1$.

A female has earnings given by $\zeta_P a h$, which are increasing in her human capital. Recall that $\zeta_1 = 1$, and $\zeta_0 < 1$ is the earnings penalty for temporary contracts. Given her husband's earnings (I_m), which depend on whether he is employed or unemployed, a married female decides how much to consume (c), how much to save (k'), and whether to have a baby (b). She enjoys $\ell = 1 - l - \iota \mathcal{J}(i=1) - \kappa S$ units of leisure, which reflects the time cost of work (l), child care time for babies (ι), and the fixed cost of work associated with split-shift jobs (κ). Household income net of taxes and transfers are used for consumption savings and childcare expenses.

If an employed female does not loose her job, which happens with probability $1 - \delta_P$, then the expected value of having the opportunity to work next period is given by

$$\begin{aligned} & \mathbb{E}W_{j+1}^o(\boldsymbol{s}, k', n', i', P', S, h', \lambda_m' | P, \lambda_m, n, i, b) \\ = & \sum_{\lambda_m'} \sum_{P'} \sum_{n', i'} \max\{V_{j+1}^e(\boldsymbol{s}, k', n', i', P', S, h', \lambda_m'), V_{j+1}^u(\boldsymbol{s}, k', n', i', h', \lambda_m'), V_{j+1}^{np}(\boldsymbol{s}, k', n', i', h', \lambda_m')\} \\ & \times \pi_j^m(\lambda_m, \lambda_m') \times \pi_{P,P'} \times \Gamma_j(n', i' | n, i, b), \end{aligned}$$

where $\pi_{\lambda_m, \lambda_m'}^m$ is the exogenous transition probabilities on husband's labor market status, $\pi_{P,P'}$ is probability of moving from type P to type P' contract, and $\Gamma_j(n', i'|n, i, b)$ are the transition probabilities for fertility, defined in equation (3). The transition probability $\pi_{P,P'}$ takes a simple form with $\pi_{0,1} = \pi$, $\pi_{0,0} = 1 - \pi$, $\pi_{1,1} = 1$, and $\pi_{1,0} = 0$. In this expression $\mathbb{E}$ represents expectations over (n', i', P', λ_m') conditional on (P, λ_m, n, i, b). We do not indicate this explicitly here or in the following expressions for brevity of exposition.

Similarly, $\mathbb{E}W_{j+1}^{no}$ is the expected value for a woman who does not have an offer, and hence decides whether to search (be unemployed) or move out of labor market and reads as

$$\begin{aligned} & \mathbb{E}W_{j+1}^{no}(\boldsymbol{s}, k', n', i', h', \lambda_m' | \lambda_m, n, i, b) = \\ & \sum_{\lambda_m'} \sum_{n', i'} \max\{V_{j+1}^u(\boldsymbol{s}, k', n', i', h', \lambda_m'), V_{j+1}^{np}(\boldsymbol{s}, k', n', i', h', \lambda_m')\} \\ & \times \pi_j^m(\lambda_m, \lambda_m') \times \Gamma_j(n', i' | n, i, b). \end{aligned}$$

To save on computational time, we set $V_{J+1}^e(\boldsymbol{s}, k, n, i, P, S, h, \lambda_m)$, the end-of-life value functions as follows: we assume that both the husband and the wife keep their last period's (period $J's$) labor market income for 10 more years (i.e. from ages 55 to 64), at age 65 they retire, and live for 10 more periods. During retirement, they only have asset income. After age 54, they get utility from the number of children they had at age 54 until age 75, but do not incur any cost associated to children (in terms of time, childcare costs or consumption congestion). Hence, after age 54, households solve a simple consumption savings problem with a constant labor income for 10 years, and no labor income for another 10.[14]

3.1.2 Value Function of Unemployed

An unemployed woman receives unemployment benefits, which are a fraction θ_f of the average household income in the economy ($\overline{I}$). The household income is then given by the sum of $\theta_f \overline{I}$ and the earnings of the husband. Like a woman who is employed, an unemployed woman decides how much to consume and how much to save and whether to have a new baby. In contrast to a working woman, her human capital depreciates, i.e., $h' = (1-\delta_h)h$. Her problem is given by

$$\begin{aligned} & V_j^u(\mathbf{s}, k, n, i, h, \lambda_m) \\ = \; & \max_{c,k',b} u(c, n, i, 1-\xi-\iota\mathcal{J}(i=1), j) + \beta\phi\mathbb{E}W_{j+1}^o(\boldsymbol{s}, k', n', i', P'=0, S', h', \lambda_m'|\lambda_m, n, i, b) \\ & \beta(1-\phi)\mathbb{E}W_{j+1}^{no}(\boldsymbol{s}, k', n', i', h', \lambda_m'|\lambda_m, n, i, b) \end{aligned}$$

subject to

$$c + k' = I_m + I_f + k(1+r) + G(I) - T(I_f + \frac{kr}{2}) - T(I_m + \frac{kr}{2}), \text{ with } k' > 0,$$

where

$$I_f = \theta_f \overline{I} \text{ and } I_m = \begin{cases} w_m(a, j, \lambda_m) \text{ if } \lambda_m \in \{0,1\} \\ \theta_m \overline{I} \;\; \text{if } \lambda_m = u \end{cases}.$$

If she has an opportunity to work, $W_{j+1}^o(\boldsymbol{s}, k', n', i', P'=0, S', h', \lambda_m'|\lambda_m, n, i, b)$ captures the expectations over an unconditional distribution over S' (whether her new job has a split-shift or regular schedule) as well as children:

$$\begin{aligned} & \mathbb{E}W_{j+1}^o(\boldsymbol{s}, k', n', i', P'=0, S', h', \lambda_m'|\lambda_m, n, i, b) \\ = \; & \sum_{\lambda_m'}\sum_{S'}\sum_{n',i'} \max\{V_{j+1}^e(\boldsymbol{s}, k', n', i', 0, S', h', \lambda_m'), V_{j+1}^u(\boldsymbol{s}, k', n', i', h', \lambda_m'), V_{j+1}^{np}(\boldsymbol{s}, k', n', i', h', \lambda_m')\} \\ & \times\pi_j^m(\lambda_m, \lambda_m') \times \Phi(S') \times \Gamma_j(n', i'|n, i, b), \end{aligned}$$

where again $\pi_{\lambda_m'\lambda_m}$ is the exogenous transition probabilities on husband's labor market status, and $\Gamma_j(n', i'|n, i, b)$ are the transition probabilities for fertility. Here $\Phi(S')$ is the distribution of temporary jobs with respect to the work schedules. Note that all new jobs start as temporary ($P=0$).

[14] This approach is common in structural model of life-cycle decisions, see e.g. Eckstein et al. (2019).

Similarly, if a female does not have a job offer, her expected value for the next period is given by

$$\begin{aligned}&\mathbb{E}W^{no}_{j+1}(\boldsymbol{s},k',n',i',h',\lambda'_m|\lambda_m,n,i,b) = \\ &\sum_{\lambda'_m}\sum_{n',i'}\max\{V^u_{j+1}(\boldsymbol{s},k',n',i',h',\lambda'_m),V^{np}_{j+1}(\boldsymbol{s},k',n',i',h',\lambda'_m)\} \\ &\times\pi^m_j(\lambda_m,\lambda'_m)\times\Gamma_j(n',i'|n,i,b).\end{aligned}$$

3.1.3 Value Function of Non-participants

Finally, the problem of a j-years old female who is out of labor force is given by

$$V^{np}_j(\boldsymbol{s},k,n,i,h,\lambda_m) = \max_{c,k',b} u(c,n,i,1-\iota\mathcal{J}(i=1),j) + \beta EW^{no}_{j+1}(\boldsymbol{s},k',n',i',h',\lambda'_m|\lambda_m,n,i,b)$$

subject to

$$c+k' = I_m + I_f + k(1+r) + G(I) - T(I_f+\frac{kr}{2}) - T(I_m+\frac{kr}{2}), \text{ with } k'>0,$$

$$I_f = 0 \text{ and } I_m = \begin{cases} w_m(a,j,\lambda_m) \text{ if } \lambda_m\in\{0,1\} \\ \theta_m\overline{I} \text{ if } \lambda_m = u\end{cases},$$

and

$$\begin{aligned}&EW^{no}_{j+1}(\boldsymbol{s},k',n',i',h',\lambda'_m|\lambda_m,n,i,b) \\ =\ &\sum_{\lambda'_m}\sum_{n',i'}\max\{V^u_{j+1}(\boldsymbol{s},k',n',i',h',\lambda'_m),V^{np}_{j+1}(\boldsymbol{s},k',n',i',h',\lambda'_m)\} \\ &\times\pi^m_j(\lambda_m,\lambda'_m)\times\Gamma_j(n',i'|n,i,b),\end{aligned}$$

where again $h'=(1-\delta_h)h$ due to human capital depreciation.

4 The Benchmark Economy

We solve the model economy for two groups of married women, those with and without a college degree. Among the cohort of married women that we focus on in this paper, 19% have a college degree, and the remaining 81% are high school graduates (Table A5 in Appendix B5). This section presents the calibration strategy for women with a college degree, with details delegated to Appendix C. The calibration for women without a college degree, which follows similar steps, is provided in Appendix D. The calibration proceeds in two steps. First, we set several parameters to their data counterparts or choose them based on a priori information. In the second stage, we calibrate the remaining parameters to match a set of targets.

4.1 Parameters Chosen a Priori

The parameters that are chosen without simulating the model are listed in Table 4. In recent decades, the average long-term real interest rates in Spain were around 1.6%, while the average real deposit rates were close to zero. We set $r = 0.8\%$ as an intermediate value. We adopt the modified OECD household equivalence scale and set $\Omega(n, i) = 1 + 0.5 + 0.3n\mathcal{J}(i \neq 3)$, i.e., the second adult counts 50% of the first adult while each baby or school-age child counts as 30% of the first adult. The average time cost of a regular (non-split) contract, l, is set to 0.4. We take α_j values, which determine the probability that an age-j woman might get pregnant upon trying, from Sommer (2016, Figure 1).[15] These parameters are identical for college and non-college women.

Next, we select the parameters of the earnings process for husbands - equation (8). To this end, we construct age-earnings profiles for an average husband who is married to a college-educated woman. To do so, we use the earnings information from the social security records (MCVL) and the education distribution of couples from the LFS.[16] Recall that married women in the data are natives born between 1966 and 1971. In the LFS sample, 49% of college-educated women in this cohort are married to a college-educated husband, and 51% are married to a non-college-educated one (Table A5 in Appendix B5). Married men are, on average, 2 years older than their wives. So, we use age-earnings profiles of native, married men born between 1964 and 1969, weighting the profiles for non-college-educated and college-educated by fractions of college-graduate women married to husbands with each education level. Figure 2 (left panel) shows the resulting log-earnings for husbands with temporary and permanent contracts. There is about a 20% earnings gap between permanent and temporary jobs, which is fairly stable along the life cycle.[17] A similar procedure is used to create the labor market outcomes along the life cycle for an average husband – Figure 2 (right panel). Around 90% of men are employed at the start of the life cycle, which increases quickly to 95% by age 30. Around half of those employed work with a temporary contract at age 25. The share declines quickly for older ages, and is around 10% after age 35.

In the model, when males enter the labor market at age 25, there is an initial distribution across different labor market states. This initial distribution and the subsequent transitions between non-employment, temporary and permanent contracts, $\pi_j^m(\lambda_m, \lambda'_m)$, are chosen to match the labor market outcomes along the life-cycle (the right hand panel in Figure 2). Labor market transitions, together with parameters ω_0^P, ω_1^P, and ω_2^P, determine the age-earnings profiles (the left-hand panel in Figure 2). To reduce the number of parameters, we assume that transitions are same for three broad age groups, 25-34, 35-44, and 45-54, which are reported in Table A12 in Appendix C.

[15] Probability of not being able to conceive is 8% at age 20, increases slowly to 23% by age 30, and then rapidly to 57.5% at age 40 and 95% at age 45.

[16] The main reason to do this is that the earnings information is from the social security records (MCVL), where we can't match couples. We use LFS data on couples' educational distribution to construct these profiles.

[17] In the simulations, earnings for a husband with a permanent contract who is married to a college woman of age 25 is normalized to 1 (or 0 in logs). As a result, we also transform the data by normalizing it by the earnings of a husband married to a college woman with a permanent contract at 27 (her wife would be 25).

The transfer function $G(I)$ takes the following form

$$\frac{G(I)}{\overline{I}} = \begin{cases} g_0 \text{ if } I = 0 \\ \left[g_1 + g_2(I/\overline{I})\right] \text{ if } I > 0 \end{cases},$$

where $\overline{I}$ is the mean household income. We estimate g_0, g_1 and g_2 using EU-SILC data on transfer incomes. We find that a household with no income receives a transfer that is about 5% of the mean annual household income in the economy. The transfers decline as a household gets richer and become zero around 2.4 times the mean household income.

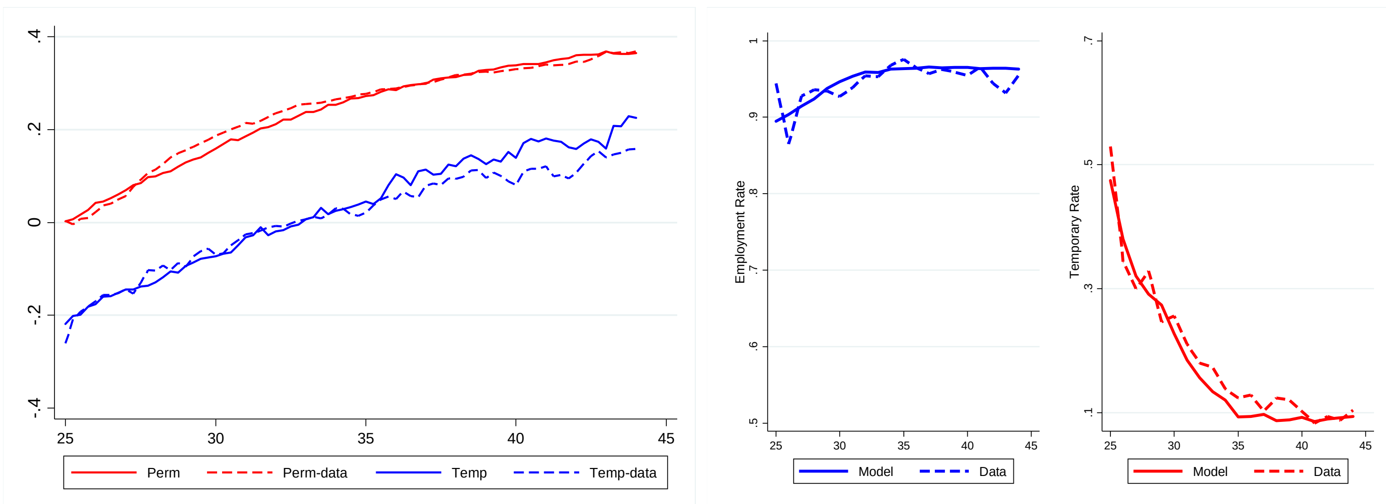

Figure 2. Age-Earnings Profiles (left) and Labor Market Outcomes (right), Males, model vs. data

Notes: Right panel sample includes husbands of 25-44 years old, native, married women with at least a college education born between 1966 and 1971 (from the LFS, 1987-2010). Left panel is based in authors' calculation from the sample of 1964-1969 born, native and married men (from MCVL 2005-2010) weighted by the couple´s education distribution (from the LFS, 1987-2010).

The tax function, $T(I)$, is given by

$$T(I) = \begin{cases} 0, \text{ if } I \leq \widetilde{I} \\ I \times \max\{1 - \tau_0(I/\overline{I})^{-\tau_1}, 0\} \text{ if } I > \widetilde{I} \end{cases},$$

where again $\overline{I}$ is the mean household income. Households do not pay any taxes if their income is below a certain threshold $\widetilde{I}$. Beyond $\widetilde{I}$, households face progressive tax schedule. We take estimates of $\tau_0 = 0.904$, $\tau_1 = 0.134$, and $\widetilde{I} = 0.47\overline{I}$ from García-Miralles, Guner, and Ramos (2019). Households whose income is below 47% of the mean household income do not pay taxes. The parameter $1 - \tau_0 = 1 - 0.904 = 0.096$ gives the average tax rate for a household with mean income and parameter τ_1 determines the progressivity of taxes.

For unemployment benefits, we also use EU-SILC and calculate the average income of unemployed individuals from unemployment benefits (which might be zero if an unemployed individual does not receive any unemployment insurance) as a fraction of the average household income. For college-educated women, we find $\theta_f = 0.044$, while for their husbands, $\theta_m = 0.090$.[18]

Table 4: Parameter Values
(based on a priori information)

Description	Parameters Values	Comments
Time on Regular Contracts	$l = 0.4$	Standard
Interest Rate (annual)	$r = 0.8\%$	OECD, Bank of Spain
Fecundity	α_j	Sommer (2016)
Equivalence of Scale	$\Omega(n,i) = 1 + 0.5 + 0.3n\mathcal{J}(i \neq 3)$	OECD Modified Scale
Male Wage Profiles	ω_0^P, ω_1^P, ω_2^P	Figure 2
Male Employment Transitions	$\pi_j^m(\lambda_m, \lambda_m')$	Figure 2
Unemployment Benefits	$\theta_f = 0.058$, $\theta_m = 0.095$	The EU-SILC
Transfers	$g_0 = 0.049$, $g_1 = 0.031$, $g_2 = -0.01$	The EU-SILC
Taxes	$\tau_0 = 0.904$, $\tau_1 = 0.134$, $\widetilde{I} = 0.47\overline{I}$	García-Miralles et al (2019)

Finally, some 25 years old married women in the data already have children. In the 2018 Spanish FS, 4% of native college-educated women in our cohort already have a child by age 25; 51% of these children are babies, and the rest are school-aged children. Therefore, we assume that the same fraction of women at age 25 in the model have babies or school-aged children.

4.2 Calibrated Parameters

To calibrate the remaining parameters, we first assume that the ability distribution, $F(a_f, a_m)$, is jointly normal with parameters $(\mu_{a_f}, \mu_{a_m}, \sigma_{a_f}, \sigma_{a_m}, \rho)$, where ρ is the correlation coefficient, and normalize $\mu_{a_m} = 1$. For the initial, i.e., age 25, labor market states of females, we assume that a fraction ϕ_{25} of them have an employment opportunity while remaining $1 - \phi_{25}$ do not. Among those with a job opportunity, a fraction $\phi_{25,P=1}$ can start their lives with a permanent contract, and the rest with a temporary one. Given these job opportunities at age 25, women decide whether take jobs that they are offered. These are 29 parameters to be calibrated:

$$\{\underbrace{\mu_{a_f}, \sigma_{a_f}, \sigma_{a_m}, \rho}_{\text{ability}}, \underbrace{\eta_1^P, \eta_2^P, \zeta_0, \delta_h, \phi_{25}, \phi_{25,P=1}, \phi, \pi, \delta_P}_{\text{human capital/labor market transitions}}, \underbrace{\beta, \gamma_1, \gamma_2, \gamma_3, \overline{n}, \chi, \xi}_{\text{preferences}}, \underbrace{\psi, \kappa}_{\text{inflexibility}}, \underbrace{\varphi, \iota, d_1, d_2}_{\text{childcare}}\}.$$

We organize the moments that we use to discipline these parameters into three groups: inequality (Table 5), labor market outcomes (Table 6), and fertility (Table 7).

The first block of targets in Table 5 determine the parameters of the ability distribution. Mean female ability, μ_{a_f}, maps into gender wage gap (recall that $\mu_{a_m} = 1$), while σ_{a_f} and

[18] In the simulations, $\overline{I}$ is the average of incomes in households with and without college-educated wives.

σ_{a_m} into variances of male and female log hourly wages. The correlation between spousal correlation for log-hourly wages in the data (0.44) determines ρ.

The next block of targets in Table 5 helps us to pin down the parameters for female human capital accumulation. Recall that when a woman works, her human capital grows according to $\ln(h') = \ln h + \ln(1 + \eta_1^P + \eta_2^P j)$, and her earnings are given by $w_f(a, h, P) = \zeta_P a h$ with $\zeta_0 < \zeta_1 = 1$. When she is unemployed or out-of-the labor force, her human capital depreciates at rate δ_h. To select these parameters, we proceed as follows. We first choose η_1^P and η_2^P for permanent workers ($P = 1$) to match the age-earnings profile for college-educated women with a permanent job (Figure 3).

Garcia-Louzao, Hospido, and Ruggieri (2023) estimate how accumulated experience in temporary and permanent jobs affects wages in Spain. In a Mincerian regression for females, they find that each extra year of experience in a permanent job increases current wages by 3.85%, while the increase for each extra year of experience in a temporary job is 2.32% (see their Appendix Table A8). The same regression also implies that a current temporary job is associated with a 3% earnings penalty.[19] To determine η_1^P and η_2^P for temporary workers ($P = 0$), we assume that $\eta_2^1 = \eta_2^0$, and select η_1^0 and ζ_0 so that when we run a regression with the simulated data, we reproduce the same gap in returns to experience and the current wage penalty for a temporary job.

We select δ_h so that a married woman who spends more than 50% of her working life in permanent contracts has about 15% higher earnings at age 44 compared to a woman who spends less than 50% (as documented in Table 2 in Section 2). Since temporary contracts are less stable in the model, they are associated with more frequent spells of non-employment. Hence the impact of employment history on earnings at age 44 provides a natural target to discipline δ_h. Figure 3 shows the resulting age-earnings profiles for women in permanent and temporary contracts.

Finally, to calibrate the discount factor, β, we target the median wealth-to-income ratio for households with a college-educated wife who is between ages 35 and 44. We calculate wealth-to-income ratio using data from the Spanish Survey of Household Finances (Encuesta Financiera de las Familias, EFF).

[19] Table A8 in Garcia-Louzano, Hospido, and Ruggieri (2022) do not report all of the estimated coefficients. We are grateful to the authors who provided us with full set of estimates.

Table 5: The Model vs. Data – Inequality

	Model	Data	Source
Variance of Wife Log Earnings	0.15	0.21	Table A7
Variance of Husband Log Earnings	0.17	0.21	Table A7
Husband and Wife Earnings Correlation	0.49	0.44	Table A7
Hourly Wage Gender Gap	0.91	0.92	Table A7
Female Wage Growth (permanent)	Figure 3		MCVL
The Gap in Returns, Perm. vs. Temp.	17%	15%	Garcia-Louzano et al. (2022)
Temp. Cont. Wage Penalty	-3.0%	-3.0%	Garcia-Louzano et al. (2022)
Av. Earn. at 44, $\lesseqgtr$ 50% in perm. contracts	1.13	1.15	Table 2
Median Wealth to Income Ratio, hholds, 35-44	2.40	2.60	The EFF

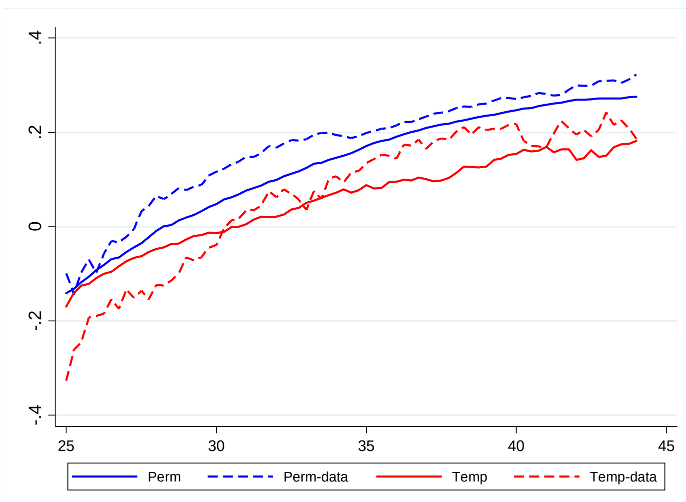

Figure 3. Age-Earnings Profiles, Females, model vs. data

Source: The MCVL, 2005-2010.

Sample: Native, married women with at least a college education born between 1966Q1 and 1971Q4.

The next set of targets pertains to labor market outcomes (Table 6). Again, the mapping between some parameters and targets is straightforward. In the model, an unemployed female receives a job offer with probability ϕ. She can accept the offer and start working next period, or decline it. If she declines the offer, she decides whether to continue to be unemployed or move out of the labor force. The parameter ϕ is chosen so that the model an 8% unemployment rate for women between ages 25-44. The parameter ϕ_{25} (fraction of women of age 25 who have an opportunity to work) is calibrated to match the fraction of unemployed women between ages 25 and 27 in the data, and the parameter $\phi_{25,P=1}$ (fraction of jobs that are permanent for women of age 25 who have an opportunity to work) determines the share of women who are employed in permanent contracts at age 25.

In the model, a fraction ψ of jobs have split-shift schedules and they have a time cost of κ. These parameters help us to match the fraction of regular (non-split) contracts among mothers and non-mothers. In the benchmark economy 60% of jobs have a regular schedule ($\psi = 0.4$). But the share of mothers with a regular-schedule contract is higher, 71%, since mothers are more likely to decline an offer with a split-shift schedule. Other targets in Table 6 (participation, employment and unemployment outcomes among women with or without children) determine preferences for leisure (χ), time cost of children (ι), and the time cost of participation (ξ).

Table 6: The Model vs. Data – Labor Market, Females

	Model	Data	Source
Unemployment/Population, 25-27	0.20	0.22	Figure 5
Permanent/Employed, 25-27	0.46	0.45	Figure 5
Unemployment/Population, 25–44	0.08	0.08	Table A6a
Out of Labor Force/Population, 25-44	0.15	0.15	Table A6a
Fraction Temporary, Female Workers, 25–44	0.26	0.25	Table A6a
Employment/Population, 25-44, Mothers	0.72	0.76	Table A6a
Employment/Population, 25-44, Mothers with Babies	0.70	0.71	Table A6a
(Employment/Population, 25-44, Non-Mothers)	0.81	0.81	Table A6a
Trans prob. Temporary to Unemployment, 30–34	5.30	5.37	Table A8a
Trans prob. Permanent to Unemployment, 30–34	0.53	0.55	Table A8a
Fraction of Non-mothers on Regular Contracts	0.57	0.56	Section 2
Fraction of Mothers on Regular Contracts	0.70	0.74	Section 2

Finally, the fraction of female workers with a temporary contract and transitions from temporary and permanent contracts to unemployment identify the promotion probability (π), and destruction rates for temporary and permanent jobs (δ_0 and δ_1). Each temporary (or permanent) job has an exogenous destruction rate in the model. But the transitions to unemployment, and as a result, job durations, are endogenously determined since they depend on whether women choose to stay unemployed or leave the labor force upon the termination of their jobs. Employed women can also quit and move to unemployment or out-of-the-labor force. In the model, women are less likely to be promoted to a permanent position than men. In the LFS-flows sample, where we can calculate transitions among employment, unemployment and out-of-labor force, and promotions from temporary to permanent contracts, for ages between 30 and 34, each quarter, about 6.4% of college-educated women are promoted from a temporary to a permanent contract. For married men with a college education, the transition rate is 8.8%, or 2.4 percentage points higher. The difference can be due to selection if men and women with temporary contracts have different characteristics, such as the sector of employment, occupation, and tenure. Lower promotion rates of women might also reflect statistical discrimination by employers in the presence of more frequent career interruptions. In Appendix B, Table A4 shows that college-graduate women are 20% less likely to be promoted than men, even after controlling for observable characteristics.

The last set of targets pertains to fertility and childcare (Table 7). First, we target the level and timing of fertility. Figure 4 shows the fraction of women who had their first child below a certain age in the data and the model. The other fertility targets include the fractions of childless women and those with 1 and 2 or more children. We also report, in parenthesis, the average age at first birth and the completed fertility outcomes closely associated with these moments. These targets determine parameters that govern how much households value children ($\gamma_1, \gamma_2, \gamma_3$ and $\overline{n}$). In particular, while $\overline{n}$ helps us to match the fraction of childless women, γ_1 and γ_2 determine the level of fertility. The heterogeneity in γ_3, on the other hand, influences the dispersion in the timing of first births (Figure 4).

Second, we target the fraction of household income spent on childcare to pin down d_i ($i = 1, 2$), and the fraction of employed mothers with babies who use informal care to discipline the share of women with access to informal care (φ). Recall that in the model economy, an exogenous φ fraction of households have informal care and do not pay any childcare costs, while others pay a fixed childcare cost. In the benchmark economy, $\varphi = 0.216$ fraction of households has access to informal care. Since informal care lowers childcare costs, informal care use among employed mothers with babies in the model is higher (32%). We calculate the childcare costs from the FS. Independent of whether they make any payment, the median spending on childcare for employed mothers with babies (ages 0-2) is about 5% of household income. For employed mothers with school-age children (ages 3-14), the same figure is 3%.[20] Childcare costs, d_1 and d_2, are chosen to replicate these targets.

Table 8 shows the calibrated parameters. Few parameters in Table 8 can be compared directly with their data counterparts. The calibrated value of $\kappa = 0.138$ implies that fixed time cost of a split-shift job is about 1.98 hours more per day (assuming 100 available hours per week). This is very close to 2 hours fixed-cost for split-shift contracts that we calculate from the STUS data in Section 2. The model implies a large value of time cost associated with looking for a job, $\xi = 0.79$, which is necessary to generate the participation rate in the data.

[20] In the FS, we only observe the childcare costs in 2018. So the sample is not restricted to the particular cohort we study in the paper, and includes all employed native married women with a college degree.

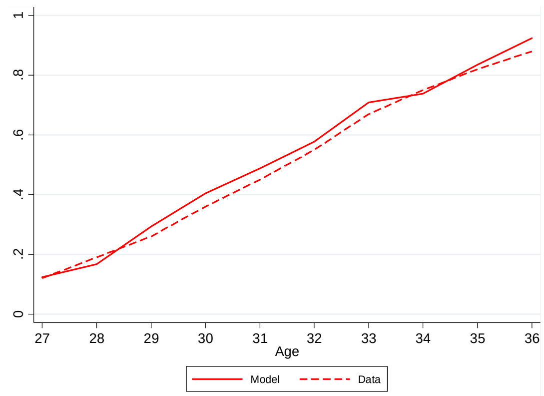

Figure 4. Fraction of Women with a First Births Below a Certain Age

Source: The FS, 2018.

Sample: Married native women with at least a college education born between 1966 and 1971.

Table 7: The Model vs. Data – Fertility

	Model	Data	Source
Fertility timing	Figure 4		The FS
(Average Age at First Birth)	31.6	32.0	The FS
Fraction childless	0.18	0.17	The FS
Fraction with 1 Child	0.15	0.21	The FS
Fraction with 2 Children	0.56	0.49	The FS
(Fraction with 3 or More Children)	0.11	0.11	The FS
(Number of Children)	1.60	1.62	The FS
Median Childcare Costs/Household Income, $i = 1$	0.05	0.05	The FS
Median Childcare Costs/Household Income, $i = 2$	0.03	0.03	The FS
Informal Child Care, Mothers with Babies, Employed	0.31	0.31	Table A9

Finally, we comment on $\frac{exp(j-\gamma_3)}{1+exp(j-\gamma_3)}$ term in the utility function. In the simulations, γ_3 takes three values with equal probabilities: $\gamma_3^{high} = 49.5$, $\gamma_3^{med} = 37.5$, and $\gamma_3^{low} = 24.0$. Given our estimated value for γ_3^{high}, the utility from children is almost zero for a 25-years old woman, and remains very low all along a woman's life-cycle. For women with γ_3^{low}, on the other hand, while utility from having children is already high at age 25 and picks quickly around early 30s. As a result, this heterogeneity helps us to push women away from having their first child at very young (25 to 28) ages in the model and allows us to generate a realistic distribution of age at first births.

4.3 Non-Targeted Moments

In this section we present several non-targeted moments from the model and their data counterparts. Figure 5 shows the fraction of employed women with a temporary contract (left panel) and share of women who are unemployed (right panel), where initial, i.e. the average values for ages between 25 and 27, are targeted moments. Both in the model and in the data, most women start their career with temporary jobs, i.e. at around age 25 close to 60% of women work with a temporary contract. Between ages 25 to 44, the fraction of women with a temporary contract is about 25%. The fraction declines smoothly as women age, although by age 40 about 15% of women still work with a temporary contract. The unemployment rate is high for young women, around 30%. It then falls quickly between ages 25 and 30, and by age 40, about 5% of women are unemployed. Model does an excellent job generating these patterns.

Table 8: Calibrated Parameters

Parameter	Description
Ability Distribution	
$\mu_{a_f} = 0.87, \sigma_{a_f} = 0.41, \sigma_{a_m} = 0.44, \rho = 0.27$	Joint Log Normal Distribution
Preferences	
$\beta = 0.9993$ (quarterly)	Discount Factor
$\gamma_1 = 0.40$, $\gamma_2 = 0.442$, $\overline{n} = 2.40$	Preferences for Children
$\gamma_3^{high} = 24.0$ $\gamma_3^{med} = 37.5$, $\gamma_3^{low} = 49.5$	Preferences for Children
$\chi = 0.745$	Preferences for Leisure
Cost of Children	
$d_1 = 0.14$	Childcare Cost, Youngest is a Baby
$d_2 = 0.10$	Childcare Cost, Youngest is a School-age Child
$\varphi = 0.216$	Frac. of Households with Informal Care
$\iota = 0.105$	Time Cost of Babies
Female Wages	
$\eta_1^P = 0.0214$, $\eta_2^P = -0.00045$, $\eta_1^T = 0.0198$	Human Capital Accumulation
$\zeta_0 = 0.972$	Temporary Contract Wage Penalty
$\delta_h = 0.006$ (quarterly)	Depreciation Rate
Labor Market	
$\xi = 0.79$	Time Cost of Participation
$\pi = 0.047$	Promotion Probability
$\phi = 0.23$, $\phi_{25} = 0.53$	Job Finding Rate
$\delta^1 = 0.0065$, $\delta^0 = 0.055$	Job Destruction Rate
$\kappa = 0.138$	Time Cost of Split Jobs
$\psi = 0.40$	Frac. of Split-Schedule Jobs

Table 9 shows the model's performance on several other dimensions that are not directly targeted in the calibration. First, the model captures labor market dynamics in the data. In the model, jobs last around 7 quarters, close to what we observe in the data. Second, the model replicates the positive correlation between female employment and household income. The employment-to-population ratio increases from 60% for households in the bottom tercile of the household income distribution to 90% for those at the top tercile.

Third, we present additional moments on fertility. Both in the model and the data, fertility is increasing in female earnings and total household income. The fertility gap at age 44 between a woman at the bottom tercile of the earnings distribution and the one at the top is about 0.4, which the model captures well.

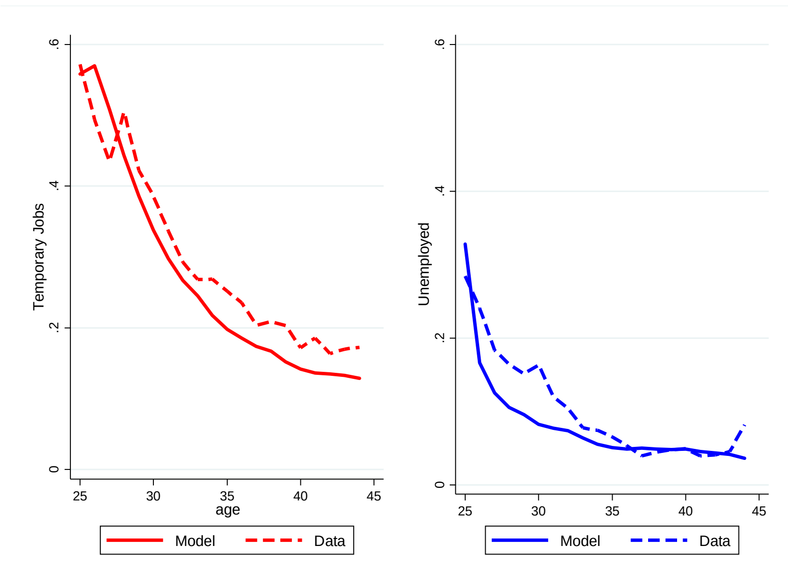

Figure 5. Workers with a Temp. Contract (left), Frac. Unemployed (right), Females, model vs. data

Source: The LFS, 1987-2010.

Sample: Native, married women with at least a college education, born between 1966 and 1971.

Finally, the model replicates the effects of temporary contract on fertility. A childless female who has a temporary contract at $t-4$ (four quarters ago) has a much smaller chance of becoming a mother; 2.3% in the model and 1.8% in the data. In contrast, the probability of a new birth for women with permanent contracts are 3.4% in the data and 2.1% in the model. Furthermore, these short-run effects have a cumulative impact along the life cycle. A female who spends more than 50% of her working life with a temporary contract has 1.31 children in the model, while one who spends less than 50% of her working life has 1.46 children. The gap is slightly larger in the data, 1.27 vs. 1.53 children.

4.4 Unobserved Heterogeneity and Selection

The model economy features two sources of unobserved heterogeneity. First, women differ in their preferences for the timing for children, captured by heterogeneity in parameter γ_3 in the utility function (equation 4). Women with a higher γ_3 parameter prefer to have their children later in their life cycle. Second, women differ in whether they have access to informal care, which affects childcare costs (equation 7). How does unobserved heterogeneity affect fertility decisions?

To answer this question, we focus on the impact of temporary contracts on first births, and reproduce regression model specified in equation (1) with the simulated data. Table 10 shows the results. The results in Table 1 in Section 2 show that for childless women, being employed with a temporary contract reduces their odds of having a (first) child by 28%. In the model, the odds for women with a temporary contract are 16% lower than the odds for those with a permanent contract.[21]

Table 9: Non-Targeted Moments

	Model	Data	Source
Average Job Tenure, Temporary Contracts	8.17	6.95	MCVL
Employment/Pop., Females, 25-44, hhold inc., 1st tercile	0.54	0.58	Table A10
Employment/Pop., Females, 25-44, hhold inc., 2nd tercile	0.94	0.83	Table A10
Employment/Pop., Females, 25-44, hhold inc., 3rd tercile	0.84	0.93	Table A10
Number of children at 44, female earnings, 1st tercile	1.19	1.35	Table A11
Number of children at 44, female earnings, 2nd tercile	1.57	1.49	Table A11
Number of children at 44, female earnings, 3rd tercile	1.67	1.72	Table A11
Number of children at 44, hhold inc., 1st tercile	1.50	1.43	Table A11
Number of children at 44, hhold inc., 2nd tercile	1.49	1.64	Table A11
Number of children at 44, hhold inc., 3rd tercile	1.81	1.83	Table A11
Prob. of a birth, conditional contract type at $t-4$, %			
Permanent	2.3	3.4	Section 2
Temporary	1.8	2.1	Section 2
Average number of children at 44			
on temp. contracts, ages 25-44 $<50\%$	1.46	1.53	Table 2
on temp. contracts, ages 25-44 $\geq 50\%$	1.31	1.27	Table 2
Fraction of Childless at 44			
on temp. contracts, ages 25-44 $<50\%$	0.22	0.20	Table 2
on temp. contracts, ages 25-44 $\geq 50\%$	0.24	0.22	Table 2

In Table 10, we also show what happens to the effect of temporary contracts on first births when we control for unobserved heterogeneity. In the model, childless women who prefer to have their children later (those with higher γ_3) are more likely to have permanent

[21] There are other features of permanent contracts that make them easier to combine with fertility, such as the possibility of reduced hours with job security (Fernández-Kranz and Rodríguez-Planas 2021).

contracts. Since these women delay fertility, they are more likely to be childless when they are promoted to a permanent job. Since women with high γ_3 are less likely to end up having children, this non-random selection will downward bias the impact of temporary contracts on first births. This is exactly what we find. Once we control for fertility preferences, the impact of temporary contracts on the odds of having a newborn is more significant: the odds of having a first birth are 24% lower for women with a temporary contract. Similarly, childless women with permanent contracts are also more likely to be the ones without access to informal care (again they are more likely to wait for a permanent contact before having children). Such non-random selection will also downward bias the impact of temporary contracts on first births. In Table 10, when we also control for whether a woman has access to informal childcare, the impact of temporary contracts increase to 29%, which is almost twice as large as the effect we obtain from a regression that omits unobserved heterogeneity.

Table 10: Effect of Temporary Contracts on First Births, Odds Ratio

Specification	Estimate
Baseline	0.84
With Fertility Preference Controls	0.76
With Preference and Child Care Access Controls	0.71

Next, we examine the significance of endogenous selection of women into permanent and split-shift schedule jobs. While the model incorporates an exogenous probability for transitions into permanent ones, the pool of women who ultimately secure permanent jobs is not random. Since labor force participation is a choice within the model, women with lower abilities are more inclined to leave the labor force. Consequently, those women who remain attached to the labor force and eventually obtain permanent positions tend to possess higher ability levels. This finding is demonstrated in Table 11.[22] Women with the highest ability level have a 7% points greater likelihood of securing permanent contracts compared to those with the lowest ability.

The influence of ability becomes even more pronounced when considering selection into jobs with split-shift schedules. In the model, when an unemployed woman is offered a job, the job can have a regular schedule or a split-shift schedule. At this juncture, women have the option to accept the job and commence working, decline it and wait for a new opportunity, or decline it and exit the labor force. Due to the higher childcare costs associated with split-shift contracts, women with lower abilities are less inclined to accept such jobs and instead opt to wait for positions with regular schedules. Consequently, higher-ability women in the model are more likely to occupy split-shift positions. Conversely, split-shift schedules are less burdensome for women who have access to informal care. As a result, they are more likely to remain in the labor force and accept split-shift jobs.

For women with the lowest ability levels, access to informal care increases the probability of securing a split-shift schedule job by 3 percentage points (Table 11). Similarly, women who exhibit stronger preferences for delaying childbirth and, consequently, have fewer children, are also more likely to work with split-shift schedules. Among women with the lowest

[22] In the simulations, the ability distribution of females is approximated using four grid points (ranging from 1 lowest ability to 4 highest ability), and the one for males by three grid points (low, medium, and high).

ability, those with the highest value of γ_3, which takes three values in the simulations, have a 6 percentage points higher likelihood of working in a split-shift schedule job compared to those with the lowest γ_3 value.

Table 11: Married Women's Labor Market Outcomes at Age 44

Ability	Permanent Jobs	Split-Shift Schedules Without Access to Informal Care	With Access to Informal Care	Fertility Preferences (γ_3) 1	2	3
1	0.62	0.26	0.29	0.23	0.28	0.29
2	0.69	0.39	0.38	0.39	0.36	0.41
3	0.67	0.35	0.39	0.35	0.35	0.38
4	0.69	0.40	0.40	0.40	0.40	0.40

Finally, we present our findings regarding the impact of spouses' ability levels on the labor market and fertility outcomes throughout the life cycle. The left panels in Figure 6 illustrate the labor force participation (upper-left panel) and fertility decisions (lower-left panel) of women with the lowest and highest ability levels, where each line is conditional on husbands' ability levels, indicated as low, medium, and high in the figure.[23]

For low-ability women matched with low-ability husbands, the labor force participation is very high and constant. However, if a low-ability woman is matched with a medium-ability husband, her participation gradually declines from approximately 80% to 20% throughout the life cycle. The labor force participation pattern is similar for women with higher ability. When high-ability women are matched with high-ability husbands, their participation also declines gradually, although their participation rates are always higher than those of lower-ability women. Low-ability households consistently have fewer children, and the number of children for women who do not fully participate in the labor force mirrors the decline in labor force participation.

Moving to the right panel of Figure 6, we examine the distribution of women working with permanent contracts (upper-left panel) and split-shift schedules (lower-right panel). When a low-ability woman (type 1) is matched with a low-ability husband, she is less likely to have a permanent contract than a low-ability woman matched with a medium-ability husband. A low-ability woman matched with a relatively high-ability husband remains in the labor force only if she can secure a permanent job; otherwise, she tends to exit the labor force. Similarly, women whose husbands have relatively high ability are less likely to have split-shift schedule jobs, given their labor force participation. This pattern also holds for women with a higher ability, where having a high-ability husband allows them to be more selective and stay in the labor force only if they have permanent or regular-schedule jobs.

[23]There is positive assortative mating in the model, so women with ability level 1 (the lowest level) are matched with either low or medium ability husbands, and women with ability level 4 (the highest) are matched with husband with medium and high abilities.

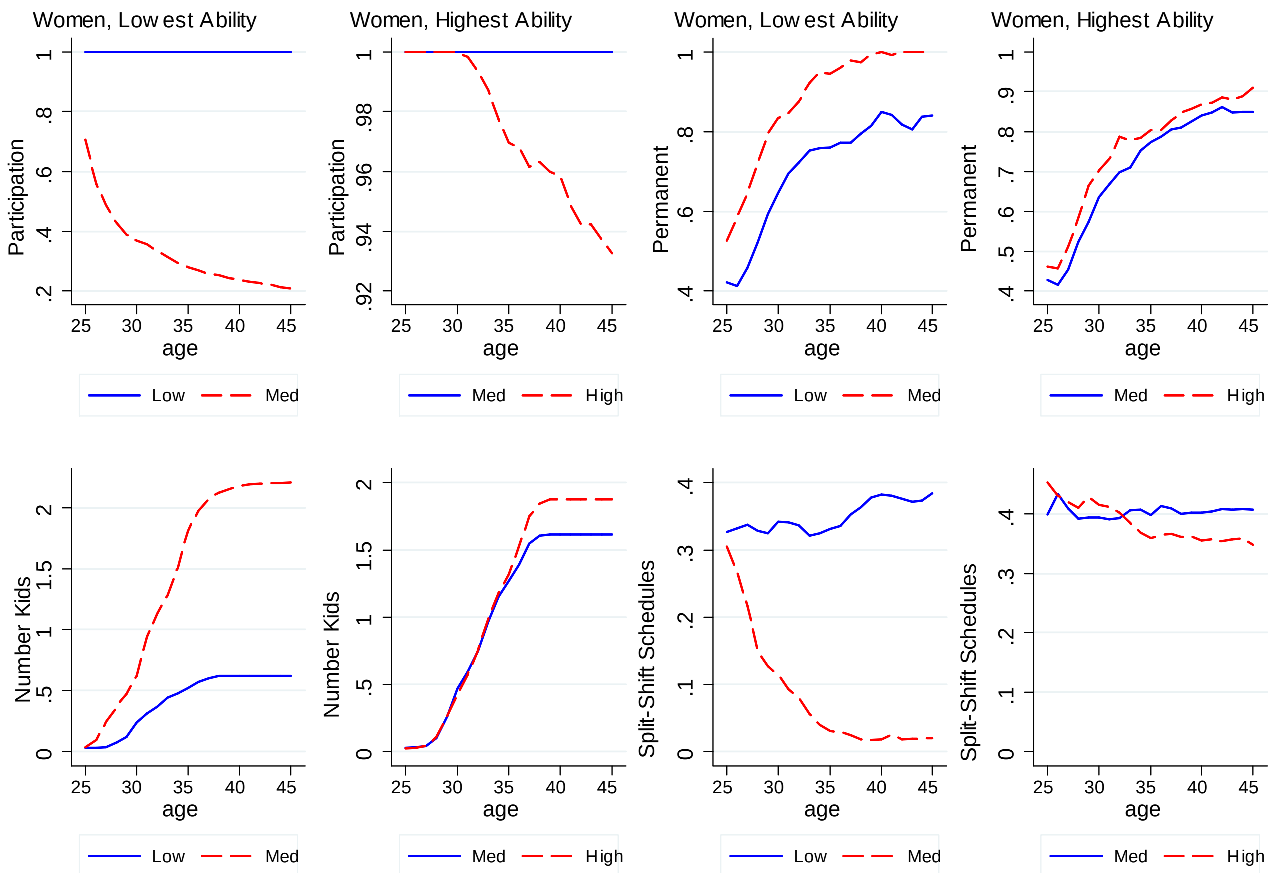

Figure 6. Participation and Fertility (left) and Permanent and Split-Shift Jobs (right)

Notes: The left panel shows the labor force participation and the number of children for women in the model with the lowest and highest ability level conditional on their husband's ability (low, medium, high). The right panel shows the share of with temporary and split-shift contracts in the model for women with the lowest and highest ability level conditional on their husband's ability (low, medium, high).

5 Understanding the Lowest Low Fertility

In the benchmark economy, temporary contracts have a higher separation rate than permanent contracts. Each quarter, 5.50% of college-graduate women with temporary contracts become unemployed, while the rate is only 0.65% for those with permanent contracts. Suppose that the separation rates are the same for both types of contracts and equal to the separation rate of permanent contracts, which is $\delta_0 = \delta_1 = 0.65\%$ per quarter. The separation rates for men remain unchanged from the benchmark values.

Table 12 presents the results for this scenario of a single contract with low separations (column i). In this economy, the TFR of college-educated women increases from 1.60 to 1.68, representing an increase of nearly 0.10 children per woman.[24] Childlessness declines from 18% to 12%, and more women have 2 or more children, which are, as we discuss in the introduction, two fertility measures for which Spain stands out among other high-income, low-fertility countries. Yet, the age at first birth does not change much. There are two forces in play. On the one hand, a single contract reduces income uncertainty for women, which increases incentives to have children. Given uncertain fecundity, more children imply a lower age at first births. On the other hand, women who decide to have more children under this scenario, those with fewer children in the benchmark, are more likely to be the ones with stronger preferences for late childbearing.

The higher fertility goes together with higher female labor force participation and employment – the participation rate for women between 25 and 44 increases from 85% to 95%, and the employment rate increases from 77% to 86%. The employment rate rises significantly for mothers and mothers with babies, and the employment gap between mothers and mothers with babies disappears. Finally, while more women enter the labor force and have babies, they wait to obtain regular-schedule jobs that are easier to combine with childbearing. Hence, almost all mothers work with a regular-schedule job. Therefore, eliminating dual labor markets reduces the prevalence of split-shift jobs endogenously. In the benchmark economy, split-shift contracts make high labor market turnover associated with temporary contracts more costly. Even if a woman finds a job quickly, she can end up with a split-shift schedule, making frequent unemployment spells more expensive.

Next, we study the role of inflexibility associated with split-shift schedules. We eliminate split-shift schedule jobs by setting $\kappa = 0$, which saves about two hours of fixed-cost of work. The TFR increases from 1.60 to 1.69, an increase as significant as the one we obtain in the single-contact economy (column ii in Table 12). There is again a substantial decline in childlessness and a rise in the number of women with 2 or more children. Since inflexibility, like duality, acts as a barrier to employment, both labor force participation and employment again increase, and the employment gap between mothers and non-mothers and between mothers with and without babies disappear. Therefore, the elimination of duality and split-shift schedule jobs makes Spain similar to other European countries not only in fertility but also in the employment-to-population ratio.

Finally, we lower the childcare cost, d, by 35% (column iii in Table 12). The choice of 35% is motivated by the existing childcare subsidies in Spain. Since 2003, working mothers with a child less than three years old receive 100 euros per month as a refundable tax credit.[25] The credit is about 35% of monthly spending on childcare by working mothers, 286 euros, in the FertilitySurvey (FS). The experiment in column iii expands this policy to all working mothers, independent of the child's age.

Lower childcare costs increase fertility from 1.60 to 1.86. Although there is no increase in overall participation and employment rates, there is an increase in the employment rate of mothers and mothers with babies of 4 and 6 percentage points, respectively.[26] With

[24] In this experiment, we do not eliminate the wage penalty for a temporary contract, i.e., keep $\zeta_0 = 0.972$. Setting $\zeta_0 = 0$ has no additional impact on fertility.

[25] We do not model this policy in the benchmark. The women in our analysis were born in 1967-1971 and had their first child around 31. As a result, most of them did not benefit from it.

[26] The size of the increase in employment of mothers is consistent with the evidence provided by Sanchez-

lower childcare costs, the number of mothers increases. Since mothers are less likely to be employed to start with, even if the employment of mothers is larger, there is no effect on the overall employment rate. With the lower childcare costs, mothers are also more likely to accept split-schedule jobs, as reflected in the relatively lower incidence of regular jobs among mothers than in the benchmark.

Table 12: Counterfactual Economies I
(Women with a College Degree)

	BM	(i) Single Contract	(ii) All Regular Job	(iii) Lower Childcare Costs
Age at First Birth	31.6	31.7	31.8	31.9
Number of Children	1.60	1.68	1.69	1.86
Fraction Childless	0.18	0.12	0.11	0.03
Fraction with 1 kid	0.15	0.17	0.18	0.20
Fraction with ≥2 kids	0.67	0.71	0.71	0.77
Ages 25-44				
Partic./Pop	0.85	0.94	0.93	0.85
Emp./Pop	0.77	0.86	0.84	0.77
Emp./Pop., Non-mothers	0.81	0.83	0.84	0.79
Emp./Pop., Mothers	0.72	0.88	0.84	0.76
Emp./Pop., Mothers, with babies	0.70	0.89	0.84	0.74
Unem. Rate	0.093	0.091	0.095	0.095
Regular, Non-Mothers	0.57	0.95	1	0.60
Regular, Mothers	0.70	0.97	1	0.66
δ^0 (Separation, temporary)	0.055	0.0065	0.055	0.055
δ^1 (Separation, permanent)	0.0065	0.0065	0.0065	0.0065
d_1 (Childcare Costs)	0.14	0.14	0.14	0.09
d_2 (Childcare Costs)	0.10	0.10	0.10	0.07
κ	0.138	0.138	0	0.138

In the benchmark economy, households pay income taxes according to a progressive tax schedule. Tax revenue is used to finance means-tested transfers and unemployment benefits, and the rest is assumed to be used to finance exogenous government spending. When we introduce childcare subsidies, we do not establish a specific tax to fund the childcare subsidies. Subsidies become another expenditure financed by total tax revenue, which increases due to higher employment of women. The total cost of childcare subsidies is small, about 0.5% of the total income in the economy. Childcare subsidies increase transfers to poor households. For households at the bottom income decile, for example, the after-tax-transfer income in the benchmark economy is about 3% higher than their gross income, which reflects the means-tested transfers. In the economy with childcare subsidies, the after-tax-transfer income for

Mangas and Sanchez-Marcos (2008) and Azmat and Gonzalez (2010).

households in the bottom decile becomes 5.2% higher than their gross income.

In Table 13, we show the results when different reforms are implemented together. Eliminating duality and inflexibility together (column i) does not affect fertility beyond what we obtained when these reforms were considered in isolation. Without duality, women avoid split-shift contracts, so there is no additional impact. Next, we implement all three reforms together (column ii). The increase in fertility is substantial. Combing three changes increases the TFR for college-educated women to 1.96.

In column iii, we also extend the single contracts for husbands. The additional effect on fertility is small (1.98 vs. 1.96 children). As we show in Table A1 in Appendix B2, temporary contracts reduce the odds of having a first child for men by about 20%. If we run a regression with the simulated data, the temporary contracts lower the odds of a new birth by 35% in the model. Hence, even though the model is consistent with the evidence in Table A1, our simulations show that once there is a single contract for women and all jobs have regular schedules, eliminating labor market duality for husbands has a small marginal effect on fertility for women.

In Table 12, when we move to a single contract economy or eliminate split-shift schedule jobs, there is an increase in the participation rate, but the unemployment rate does not change (columns i and ii in Table 12). However, when we implement these two reforms together, there is a significant decline in the unemployment rate (columns i and ii in Table 13). With single contracts, the participation rate increases from 85% to 94%, but the unemployment rate is the same, about 9% in both the benchmark and the counterfactual. In a single-contract economy with a low separation rate, women are less likely to lose their jobs. But when they do, they still wait for a regular-schedule job, and the unemployment duration remains high. On the other hand, in an economy with only regular jobs, while women do not wait for flexible jobs, we still have a high separation rate for temporary contracts. Only when we combine two reforms we get a significant decline in unemployment.

To put these results in perspective, recall that three model features make children costly for women with a temporary contract. First, households with working mothers incur childcare costs. Childcare costs are more binding when household members are on temporary contracts since wages associated with temporary contracts are lower, and there is a higher risk of becoming unemployed. Second, women with babies incur a time cost. This cost is relatively more important for women entering the labor force as they have to bear the participation cost as well. Furthermore, even when a woman finds a job, it can have a split-shift schedule, which comes with a fixed-time cost. Again, having a temporary contract, which ends up in unemployment with a high probability, is riskier for women with children. Finally, women's human capital grows as they work, and the growth is more substantial for younger women, making temporary contracts costly.

5.1 The Role of Labor Market Duality

There are two forces at play when we move from a dual to a single-contract economy. On the one hand, the labor market is less risky for women. The jobs now last longer, and workers are less likely to keep moving between employment and unemployment. Women also enjoy higher incomes due to lower unemployment and more substantial human capital accumulation. On the other hand, there is no reason to wait to obtain a better (permanent) job first and then have a child. All jobs are the same.

Table 13: Counterfactual Economies II
(Women with a College Degree)

	BM	(i) Single Contract + All Regular	(ii) Single Contract + All Regular + Lower Cost	(iii) Single Contract for All + All Regular + Lower Cost
Age at First Birth	31.6	31.7	31.8	31.7
Number of Children	1.60	1.69	1.96	1.98
Fraction childless	0.18	0.11	0.01	0.01
Fraction with 1 kid	0.15	0.17	0.16	0.15
Fraction with ≥2 kids	0.67	0.72	0.83	0.84
Ages 25-44				
Partic./Pop	0.85	0.97	0.98	0.97
Emp./Pop	0.77	0.93	0.93	0.92
Emp./Pop., Non-mothers	0.81	0.91	0.90	0.90
Emp./Pop., Mothers	0.72	0.94	0.94	0.94
Emp./Pop., Mothers, with babies	0.70	0.94	0.95	0.94
Unem. Rate	0.093	0.049	0.049	0.050
Regular, Non-Mothers	0.57	1	1	1
Regular, Mothers	0.70	1	1	1
δ^0 (Separation, temporary)	0.055	0.0065	0.0065	0.055
δ^1 (Separation, permanent)	0.0065	0.0065	0.0065	0.0065
d_1 (Childcare Costs)	0.14	0.14	0.09	0.09
d_2 (Childcare Costs)	0.10	0.10	0.07	0.07
κ	0.138	0	0	0

In column ii of Table 14, we try to separate the first effect (higher income with less risk) from the second one (waiting for a better job). We move to a single-contract economy but reduce job stability (by choosing a higher δ) so that the labor force participation is the same as the benchmark economy (85%). This experiment, *single-contract with high separations*, brings back lower income and high risk into a single-contract economy. Now, fertility does not increase. A low job-finding rate can also discourage women from entering the labor force.

This experiment suggests that duality per se does not affect the fertility decision of women. The income uncertainty generated by long unemployment spells limits women's entry into the labor force and lowers fertility. According to our analysis, even in a single contract economy, a low job-finding rate or a high job-destruction rate that keeps the participation at its benchmark economy levels can result in low fertility. Finally, to emphasize the importance of labor market uncertainty, we again consider a single contract with a high separation rate economy but set the separation rate to the separation rate of temporary contracts in the benchmark economy (column iii). Now a female has a 5.5% chance of losing her job each quarter. When the labor market is very risky, women stay out of the labor force, and the participation rate declines from 85% to 56%. The fertility increases significantly from 1.60 to 1.87 as the women who drop out of the labor force choose to have children.

Table 14: The Role of Single Contracts
(Women with a College Degree)

	BM	(i) Single Contract Low Sep.	(ii) Single Contract High Sep.	(iii) Single Contract Very High Sep.
Age at First Birth	31.6	31.7	31.4	31.4
Number of Children	1.60	1.68	1.58	1.87
Fraction Childless	0.18	0.12	0.19	0.11
Fraction with 1 kid	0.15	0.17	0.15	0.13
Fraction with ≥2 kids	0.67	0.71	0.66	0.76
Ages 25-44				
Partic./Pop	0.85	0.94	0.85	0.56
Emp./Pop	0.77	0.86	0.78	0.46
Emp./Pop., Non-mothers	0.81	0.83	0.84	0.64
Emp./Pop., Mothers	0.72	0.88	0.72	0.32
Emp./Pop., Mothers, with babies	0.70	0.89	0.70	0.29
Unem. Rate	0.093	0.091	0.091	0.18
Regular, Non-Mothers	0.57	0.95	0.59	0.60
Regular, Mothers	0.70	0.97	0.71	0.66
δ^0 (Separation, temporary)	0.055	0.0065	0.017	0.055
δ^1 (Separation, permanent)	0.0065	0.0065	0.017	0.055
ϕ (Finding rate)	0.23	0.23	0.23	0.23
φ (Fraction Split)	0.40	0.40	0.40	0.40

5.2 Women with Less than College Education

We next conduct the same experiments for women with less than college education. The results are presented in Tables 15 and 16. In a single contract economy with low separations (column i in Table 15), the fertility of women without a college degree declines significantly, from 1.60 in the benchmark economy to 1.29. This is the opposite of what we found for college graduates. Why are the results different? A more stable labor market with a single contract makes labor force participation for college and non-college women more attractive. As a result, labor force participation increases for both groups. But the effect is much more substantial for non-college women; the labor force participation rises from 54% in the benchmark economy to 81% in the economy with a single contract.

Women who are not in the labor force in the benchmark economy have higher fertility than those in the labor force. A single contract increases the fertility of those already in the labor force. For college graduates, the first effect dominates, and there is an increase in fertility. For non-college women, the composition effect is significant and leads to lower fertility.

When we eliminate split-shift schedule jobs by setting $\kappa = 0$, fertility is not affected (column ii in Table 15). Again there are two forces. On the one hand, labor force participation increases, which tends to lower fertility. On the other hand, those already participating in the benchmark economy have more children since regular jobs are much easier to combine with childcare. Two effects compensate each other in this case. Column iii in Table 15 shows the results with lower childcare costs. In contrast to a single contract economy or one with all regular jobs, lower childcare costs do not affect participation (at least at the level of a 35% decline that we consider). Therefore, with lower childcare costs, those who already participate have more children, and fertility increases from 1.60 to 1.79.

Table 15: Counterfactual Economies I
(Women without a College Degree)

	BM	(i) Single Contract	(ii) All Regular Job	(iii) Lower Childcare Costs
Age at First Birth	28.0	27.4	27.9	28.0
Number of Children	1.60	1.29	1.60	1.79
Fraction Childless	0.17	0.32	0.16	0.07
Fraction with 1 kid	0.16	0.13	0.17	0.18
Fraction with ≥2 kids	0.67	0.55	0.67	0.75
Ages 25-44				
Partic./Pop	0.54	0.81	0.59	0.55
Emp./Pop	0.41	0.72	0.44	0.41
Emp./Pop., Non-mothers	0.62	0.84	0.62	0.56
Emp./Pop., Mothers	0.31	0.63	0.36	0.37
Emp./Pop., Mothers, with babies	0.24	0.55	0.30	0.32
Unem. Rate	0.25	0.11	0.25	0.25
Regular, Non-Mothers	0.59	0.58	1	0.56
Regular, Mothers	0.64	0.66	1	0.64
δ^0 (Separation, temporary)	0.17	0.017	0.17	0.17
δ^1 (Separation, permanent)	0.017	0.017	0.017	0.017
d_1 (Childcare Costs)	0.13	0.13	0.13	0.08
d_2 (Childcare Costs)	0.09	0.09	0.09	0.06
κ	0.138	0.138	0.0	0.138

Table 16 shows the results when we implement reforms together. In an economy with single contracts and all regular jobs (column i), fertility declines from 1.60 to 1.33, as the impact of single contracts on labor force participation dominates. As we also lower childcare costs, the picture looks different (column ii): fertility increases from 1.60 to 1.74. But the increase is less substantial than the one for college graduates, which was from 1.60 to 1.96. With these three reforms, the completed fertility of married women (college and non-college combined) would be 1.80 children.

Finally, in column iii of Table 16, we extend single contracts to husbands. Such an extension had almost no effect on the fertility of college-educated women (column iii of Table 13). Now the completed fertility increases from 1.74 to 1.85, which is substantial. Economic resources their husbands provide are more critical for women without a college degree. As a result, their fertility behavior is more sensitive to what happens to their husbands.

Table 16: Counterfactual Economies II
(Women without a College Degree)

	BM	(i) Single Contract + All Regular	(ii) Single Contract + All Regular + Lower Cost	(iii) Single Contract for All + All Regular + Lower Cost
Age at First Birth	28.0	27.4	28.0	28.1
Number of Children	1.60	1.33	1.74	1.85
Fraction childless	0.17	0.29	0.06	0.02
Fraction with 1 kid	0.16	0.14	0.18	0.17
Fraction with ≥2 kids	0.67	0.67	0.76	0.81
Ages 25-44				
Partic./Pop	0.54	0.87	0.88	0.82
Emp./Pop	0.41	0.78	0.79	0.73
Emp./Pop., Non-mothers	0.62	0.84	0.80	0.76
Emp./Pop., Mothers	0.31	0.73	0.78	0.72
Emp./Pop., Mothers, with babies	0.24	0.69	0.77	0.69
Unem. Rate	0.25	0.11	0.11	0.11
Regular, Non-Mothers	0.59	1	1	1
Regular, Mothers	0.64	1	1	1
δ^0 (Separation, temporary)	0.17	0.017	0.017	0.017
δ^1 (Separation, permanent)	0.017	0.017	0.017	0.017
d_1 (Childcare Costs)	0.13	0.13	0.08	0.08
d_2 (Childcare Costs)	0.09	0.09	0.06	0.06
κ	0.138	0	0	0

5.3 Results in Perspective

The benchmark economy focuses on labor supply, savings, and fertility decisions of married women. The model can be extended along several dimensions: First, the analysis abstracts from the household formation. Labor market uncertainty can affect incentives to get married. From a risk-sharing perspective, income uncertainty makes marriage an attractive option. On the other hand, if marriage implies higher costs of consumption adjustments due to, for example, children and other consumption commitments, a higher income risk can lead to lower marriages. Santos and Weiss (2016) show that the rising income uncertainty between 1970 and 2000 in the US reduced incentives to get married. A move to a single contract economy reduces labor market uncertainty and, as a result, can increase incentives to get married.

Second, since we are unable to link husbands and wives in our primary data source, we abstract from joint labor supply and childcare decisions. In the model economy, husbands contribute to household income but do not share any childcare burden. A natural extension would be to study how labor market policies affect couples' joint labor supply and childcare decisions. In the current framework, labor market uncertainty and inflexibility discourage women from participating in the labor market since they are the ones who incur the time cost of childcare. In an environment where couples jointly decide on childcare arrangements, improvements in labor market conditions for women can improve their bargaining power within couples and lead to a more balanced distribution of childcare allocations. This can lead to further increases in fertility, as emphasized, for example, by Doepke and Kindermann (2019).

Finally, the model can also allow for richer labor market decisions. To keep the analysis focused on temporary vs. permanent contracts, we abstract from part-time work. For our sample of married women, the share of part-time workers is about 23.5% (15.23% for those with a college education and 26.95% for those without a college degree). Part-time work is more common among married women with children (17.03% for those with a college degree and 29.83% for non-college). Still, the share of women working part-time in Spain is relatively lower than in other European countries; Germany (36.7%) and Italy (32.6%). Since part-time work provides some flexibility for women, we expect that when we eliminate duality or split-shift contracts in a model with part-time work, some women will switch from part-time to full-time jobs. As a result, the impact on participation might be smaller.

The analysis shows that reforming labor market institutions and providing childcare subsidies would increase significantly the completed fertility of married women. How should we interpret these results? As a policy reform, the childcare subsidies are the easiest to understand and implement, and our counterfactual, a 35% subsidy, is based on an actual policy implemented in Spain. We view the elimination of split-shift work schedules as a move to regular working hours in Spain, a policy that has been on different governments' agendas for a long time. An economy where all contracts have a regular work schedule will overcome coordination failures that make such a change difficult without government intervention.

What about the implications of moving to a single contract economy? Our analysis provides insights into the impact of a dual labor market on fertility incentives and labor force participation. However, it's important to note that a shift to a single contract system would also affect firms, although we have not explicitly modeled this aspect. Nonetheless, it is conceivable that firms would respond to changes in labor market regulations, such as increased duration of temporary contracts or the implementation of a single contract. These changes may influence the economy's job finding or destruction rates. For instance, Fernández-Kranz and Rodríguez-Planas (2021) evaluated a 1999 Spanish reform that granted employment protection to workers with children under the age of 6 who requested a shorter workweek due to family responsibilities. Their findings indicated that the reform resulted in a decrease in the hiring of women and their promotion to permanent contracts. Therefore, in a model where firms can react to policy changes, it is reasonable to expect that the transition to a single contract economy may have more modest effects compared to our current analysis.

Since the analysis is partial equilibrium, we abstract from any explicit welfare calculations. Still, we can point to potential welfare gains associated with different reforms. First, there can be welfare gains from the elimination of split-shift schedules if they persist due to coordination failure. Second, childcare subsidies allow mothers to cover childcare expenses, work and build human capital. This can lead to welfare gains, as emphasized by Guner et al. (2020) in a general equilibrium analysis of childcare subsidies. Finally, greater attachment of women to the labor force in a single contract economy also increases human capital accumulation and can be welfare-enhancing. Furthermore, reduced income uncertainty in a single contract economy can be valued by households if existing transfer programs are inadequate.

6 Conclusions

In this paper, we examine the influence of labor market institutions on fertility decisions. Many European countries have a division between temporary jobs with low firing costs and permanent jobs with high firing costs. Young workers typically begin their careers with temporary jobs and transition to permanent positions after moving through various temporary positions. The uncertainty of income during childbearing years negatively impacts fertility rates. Additionally, women who work in inflexible jobs requiring long and specific hours face even greater challenges in balancing work and childbearing responsibilities. To gain a better understanding of these trade-offs, we construct and estimate a model that analyzes women's fertility choices and labor market decisions. Our focus is on Spain, which has the highest proportion of workers with temporary contracts in Europe. Spain also serves as a concrete example of inflexible working arrangements for women, such as split-shift schedules involving extended lunch breaks and late finishing times.

Our research investigates whether women would choose to have higher fertility rates under conditions that include a single contract system, the absence of split-shift jobs, and subsidized childcare. When these reforms are implemented collectively, they have a significant impact on fertility rates. The number of children at age 44 increases from 1.60 to 1.96 for college graduates and from 1.58 to 1.74 for women without a college degree. The average completed fertility rate for married women in the reformed economy reaches 1.80 children. Furthermore, these reforms lead to a substantial increase in women's labor force participation, and the employment gap between women with and without children decreases.

Additionally, if we extend the implementation of single contracts to husbands along with these three reforms, the effect on fertility for college-educated women is minimal, with completed fertility increasing only slightly from 1.96 to 1.98. However, for women without a college degree, completed fertility rises from 1.74 to 1.85, as husbands' economic resources play a more significant role for them. Consequently, the average completed fertility rate in this scenario becomes 1.87 children.

Two key messages emerge from our analysis. First, the combination of split-shift schedules and temporary jobs creates significant challenges for individuals who wish to have children. Second, adopting labor market institutions that resemble those of other European countries can lead to higher employment rates for mothers and increased fertility rates.

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ONLINE APPENDIX - NOT FOR PUBLICATION

Appendix A: Data

Spanish Social Security Records Our main data source is the 2005-2010 Continuous Sample of Working Lives (Muestra Continua de Vidas Laborales con Datos Fiscales, MCVL). The MCVL is a random sample of 4% of the population of the individuals registered to the Spanish Social Security during the reference year.[27] In a given year, a working age person can have a social security record if she is employed or is receiving unemployment benefits. Individuals without a relationship with the social security system at any time during the reference year are not included in that particular MCVL wave. Starting from the reference year and going back, the MCVL records all changes about the labor market history of individuals up to the date of first employment (or up to 1980 for older cohorts).

The unit of observation in the MCVL is an individual labor market spell, which can be employment with a particular contract (a job spell) or unemployment (an unemployment spell).[28] Each spell is characterized by a start date, an end date and a firm identifier. For each job spell, the MCVL provides information on part-time or full-time status, sector of employment (public or private), industry (at the NACE three-digit level), occupation (ten social security occupation categories), type of contract (temporary or permanent), and working hours expressed as a percentage of a full-time equivalent job.[29] The MCVL also contains monthly labor earnings (called the 'contribution basis') and the days worked in a particular month. Although the labor earnings are both top and bottom coded, this information allows us to calculate censored earnings for each job that an individual holds in a month.[30]

The MCVL also provides information on individual characteristics contained in social security records, such as age and gender but lacks information on other demographic characteristics such as education or marital status. However, it can be matched with the Continuous Municipal Registry (Padrón Continuo), which contains information on the country of birth, nationality, and educational attainment. The MCVL can also be matched with the Spanish Municipal Registry of Inhabitants (Padrón Municipal de Habitantes), which contains information on the household composition (date of birth and gender of each individual living in the household). These registries allow us to construct socioeconomic variables, such as marital status, number of children and new births. We count a woman as being married if there is a male household member in the household whose age difference with her is between

[27] The MCVL does not cover public sector employees who belong to a different social assistance system.

[28] The MCVL also includes information on self-employed. Since our focus on wage and salary earners, they are excluded from the sample.

[29] Part-time/full-time status can also be constructed using the working hours expressed as a percentage of a full-time equivalent job. Employers assign workers into one of ten social security occupation categories which proxy skills required by the job.

[30] In addition to censored earnings, uncensored earnings information is also available from income tax records for any job that was held between 2005 and 2010. However, as we describe later in more detail, we restrict the sample to women born between 1966-1971. Since uncensored earnings are only available when women in our sample are 35 to 44 years old, we use censored earnings in the analysis.

-2 and +10 years.[31] We determine mothers based on the presence of household members aged 0-16 year old. Since we determine marital and motherhood status of a woman based on her household members and their dates of birth, there is a possibility that a woman, a male, and a child who live in the same household are not related. To minimize this probability, we drop from the sample women who are living in households with more than one potential husband or with another potential mother.[32]

Based on labor market spells, we construct a quarterly panel data set on labor market transitions of women in the MCVL. We start to construct the quarterly panel using the individuals that were registered to social security in 2010. For these individuals we record the complete labor market history contained in this edition going back to their date of first employment (or to 1980 for the older cohorts) and use municipality records for their personal characteristics. For individuals who are not included in 2010, but appear in previous editions, we follow the same procedure. The resulting data set contains information for each individual in each quarter on type of employment contract, sector of employment, industry, occupation, earnings, country of birth, nationality, education, marital status, number of children and new-born children.

Note that constructing a quarterly panel from the individual-spell data requires assigning a single job to each individual in each quarter (the 'main job'). For individuals that only have a unique spell in a quarter, i.e. if they hold a single job or they are unemployed during an entire quarter, this procedure is straightforward. There can also be individuals who hold multiple jobs within a quarter.[33] For such cases, we follow a similar approach to De la Roca and Puga (2017) to determine the main job. In particular, if an individual has more than one spell *with the same firm* in a given quarter (around 10% of observation in each birth-year cohort), we select as the main the one with the longest duration (in days) in that quarter. If these multiple spells are of the same duration in that quarter (less than 1% of observations in each birth-year cohort), we compare the *entire* duration of spells and assign the main job as that with the longest total duration. If the total duration of these multiple spells is also the same (less than 0.5% in each birth year-cohort), we record the most recent one as the main job. At this stage, individuals may have more than one spell by quarter if they worked in more than one firm (or spent some time unemployed). For individuals who have more than one spell in a quarter *with multiple firms*, we select the main job as that with the highest labor earnings in that quarter. For individuals who hold at least one job but also experience a spell (or spells) of unemployment in a given quarter, we assign a main job, independent of the duration of unemployment spell, following the same criteria.

After determining the main job for each worker in each quarter, we express the quarterly earnings for the main job in 2000 euro using quarterly consumer price index. Then, we compute the daily earnings from the main job by dividing the quarterly real earnings by the

[31] In the LFS, for around 94% of women in our sample, age gap between them and their husbands is between -2 and 10, with a median age difference of 2.

[32] Any other male household member in the household whose age difference with her is between -2 and +10 years is considered as another potential husband. Similarly, any other 1966-1971 born women living in the same household can be another potential mother.

[33] If an individual changes job within a firm in a given quarter, we combine the consecutive employment spells into a single job spell for the purposes of constructing firm tenure, but otherwise treat them as separate spells with different job characteristics.

days worked in that quarter in that job. Finally, we adjust the real daily earnings from the main job by part-time work and calculate the full-time equivalent real daily earnings in euro for each quarter.[34]

Since the type of contract is a key variable in our analysis and the MCVL provides reliable information on the type of contract only after 1996, we restrict our sample to job spells from 1996 to 2010. We construct labor market experience and tenure variables, however, using all available information back to 1980. In the sample, there are temporary contracts that continue beyond the legal limit of 3 years (7% of the total temporary spells in our sample). Following Güell and Petrongolo (2007), we censor all temporary durations longer than 14 quarters at 14 quarters.

Our female sample is restricted to native, married women born between 1966Q1 and 1971Q4.[35] When we look at male earnings, we focus on married men born between 1964Q1 and 1969Q4 since the median age difference between husbands and wives is about 2 years for this sample of women in the Spanish Labor Force Survey (see below). As per females, we determine the marital status of a male based on his household members and their dates of birth. We count a man as being married if there is a female member in the household whose age difference with him is between -10 and +2 years and who is old enough to be his potential wife (at least 22 years old). We drop from the sample, men who are living in households with more than one potential wife or with another man from the same cohort.

Fertility Survey While the MCVL is an excellent data source to capture the relation between temporary contracts and fertility, as the demographic characteristics of households are obtained by merging the MCVL with the municipal records, information on the number of children is restricted to children at home. Therefore, we complement the MCVL with the 2018 Spanish Fertility Survey (FS) of the Instituto Nacional de Estadística (INE), the Spanish Statistical Institute, which collects information about fecundity for 14,556 women in Spain that were interviewed in 2018. The survey provides data of completed fertility for this group of women and therefore of the distribution of number of children, the distribution of age at first birth and the average number of children depending on female's current earnings, as well as childcare costs among other. We restrict the sample to married native women, born between 1967 and 1971. To maximize the sample size, the completed fertility of employed women in our cohort at around age 49 is calculated based on those between ages 46 to 52. The mean age in the sample is 49.

Spanish Labor Force Survey As a rich administrative data source, the MCVL provides an excellent picture of the Spanish labor market dynamics. The MCVL does not contain, however, any information on individuals who are out of the labor force. To be able

[34]The MCVL provides information on a part-time coefficient which identifies the working hours of a part-time worker in a company in proportion to the duration of normal working hours of a full-time worker in the same company. This allows us to build a measure of full-time equivalent (FTE) earnings that is what part-time workers could be expected to earn if they worked full-time.

[35]The country of birth and nationality information in the MCVL enables us to distinguish between natives and immigrants. Note that in our sample, women are 25 to 31 years old in 1996 and 39 to 45 years old in 2010. By this way, we ensure that childless women in our sample are unlikely to be mothers after 2010. Among native, married women who were born between 1966Q1 and 1971Q4, 18% are college educated.

to calculate the distribution of workers across different labor market states (employment, unemployment, and out-of-the-labor force), we use data from the Spanish Labor Force Survey (LFS) from 1987 to 2010.[36] These surveys are run by the INE, and constitute the Spanish part of Labor Force Statistics of the OECD. Each survey consists of a representative sample of about 60,000 households and provides detailed labor market information of all individuals who are older than 16 in each household. When we calculate the LFS statistics, we restrict the sample to heads of households and their partners or spouses, and following the same restriction as in the MCVL sample, focus on married native women, born between 1966 and 1971 and their husbands.

Since the second quarter of 1987, the LFS also has a rotating panel dimension (LFS-flows) that follows individuals up to six consecutive quarters. This enables us to calculate quarterly transition rates across the labor market states. We calculate the transition rates across different labor market states using 2000 wave of the LFS-flows. Since in the LFS-flows the age information is available only in 5-year intervals, we have to base the analysis on the 1966-1970 cohort of married women instead of the 1966-1971 cohort that we used in the MCVL.[37] The LFS-flows also do not provide information on nationality, and therefore, we consider all women instead of only native women. In contrast to the LFS, the LFS-flows do not allow us to link husbands and wives. Since the median age difference between husbands and wives is about 2 years for this cohort in the LFS sample and we only have the age information in 5-year intervals in the LFS-flows, thus, for men, we restrict the sample to the 1966-1970 cohort who are married.

European Union Statistics on Income and Living Conditions In the MCVL, it is not possible to match wives and husband and construct joint labor market transitions or total household earnings. The LFS does not contain any information on earnings, either. Therefore, we use the European Union Statistics on Income and Living Conditions (EU-SILC) 2004-2012, to construct household-level income measures as well as statistics in relation to unemployment benefits and transfers (see Appendix C). We restrict the sample to heads of households and their spouses and again focus on married native women, born between 1966 and 1971 and their husbands. To calculate earnings, we also restrict the sample to employees with non-missing wage and hours information. We also exploit the information on childcare arrangements that is available in the EU-SILC. For each child under age 12, the EU-SILC reports the number of hours of different forms of childcare, such as center-based care, baby-sitters or relatives, that a household uses. To calculate the share of women with access to informal care, we also restrict the sample to those who reported positive hours of education or childcare use in any of the childcare arrangement categories for at least one 0-12 years old child.[38]

[36] Since the particular cohort we are focusing is between 25-44 only in years 1991-2010, we are effectivity using data from the LFS from 1991 to 2010.

[37] The age is reported in 5 year intervals in LFS-flows, from 16-19 to $60-64$, and one age group for those who are older than 65. Consider 2000 LFS-flows, the 1966-1971 cohort were 29-34 years then. But the only category that overlaps with this groups is 30-34 which correspond to 1966-1970.

[38] The information on the number of hours in childcare in the EU-SILC is collected only for household members not over 12 years old.

Spanish Time Use Survey We calculate the fraction of mothers and non-mothers working with a split-shift contract from the 2009-2010 Spanish Time Use Survey (STUS). We restrict the sample to native, married, 25-44 years old women, but as the STUS sample size is small, we do not restrict the sample to a particular cohort of women. If a household member reports to be the child (son or daughter) of a female household member in the household roster, we consider that female as a mother. As this only identifies the motherhood status based on cohabiting children, then we use the respondent's answer to the STUS question: "Do you have children under 18 who do not live with you?" to determine mothers who have non-cohabiting children. The split vs. regular work schedule is a question in the STUS, stated as "Do you have a continuous or a split work schedule?". Therefore, the fraction of mothers and non-mothers who work with a split contract is simply the fraction of those who answer that their work schedule is a split one. We only consider employees who filled the diary in an ordinary/usual day in a regular working week and who worked that week. The STUS also includes time-diaries which provide information on whether the respondent is working or not within each 15-minute interval (from 6.00am-6.14am to 5.45am-5.59am) within 24 hours. Using this information, we construct the time interval between the first and last times a female worker indicates that she works in a day.

Survey of Household Finances To compute the wealth-to-income ratio of married couples (see Appendix C), we use the 2014 wave of the Survey of Household Finances (Encuesta Financiera de las Familias, EFF). The EFF is conducted by the Bank of Spain and collects information on socioeconomic characteristics, income, assets, and debt of around 6,000 households in each wave.

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Appendix B: Additional Tables and Figures

Appendix B1: Cross-Country Evidence

In this Appendix, we present cross-country data on the relationship between flexible work arrangements and TFR (Figure A1), the gender employment and unemployment gaps and TFR (Figure A2), the share of temporary contracts and TFR (Figure A3), and cross-country evidence on childlessness and the fraction of women with 2 or more children (Figure A4).

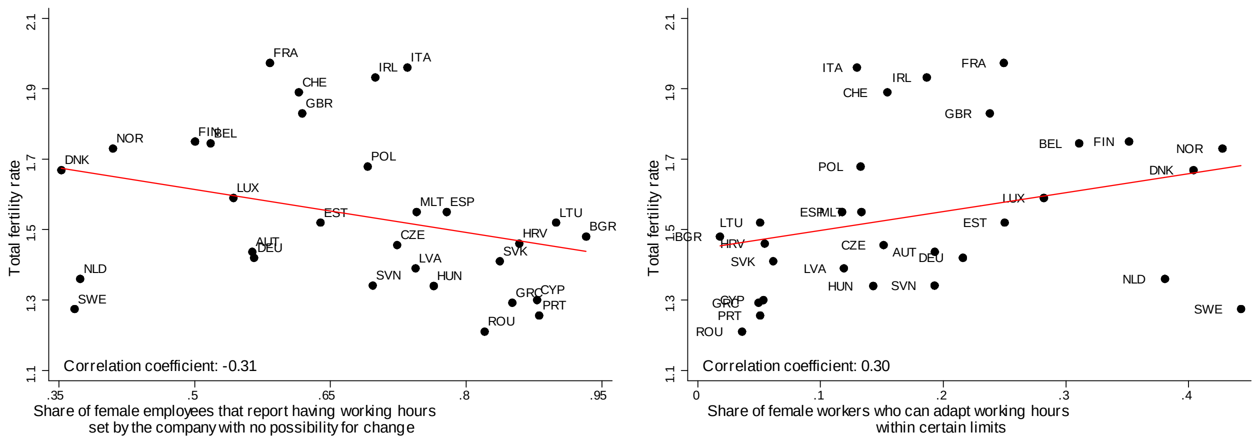

Figure A1. Flexibility and the TFR

Source: Data for year 2015 from OECD Family Database, Tables LMF2.4 Family-friendly workplace practices and SF2.1 Fertility rates, http://www.oecd.org/social/family/database.htm (accessed on 07/03/2023)

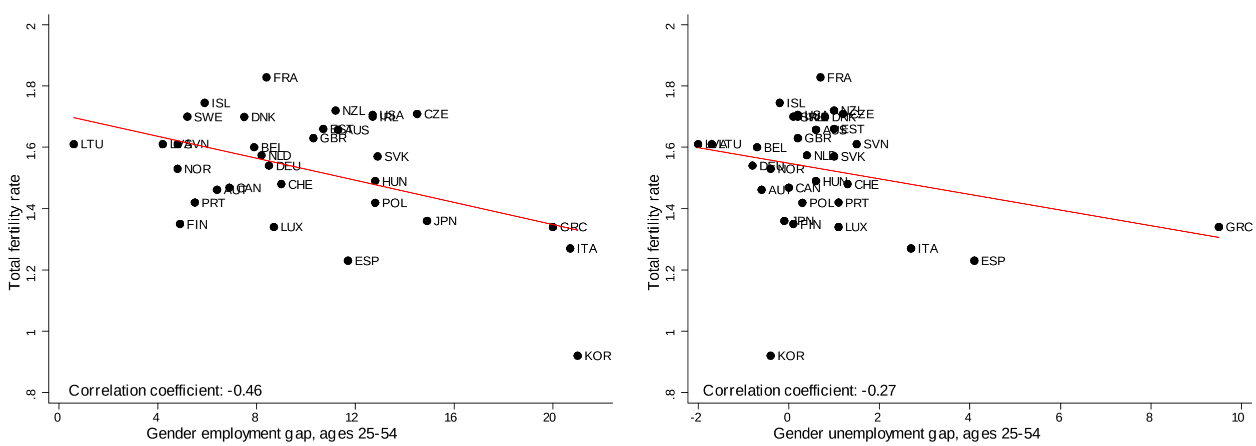

Figure A2. Gender Employment and Unemployment Gap and the TFR

Source: Data for year 2019 from OECD Employment Database, https://www.oecd.org/gender/data/employment/ and OECD Family Database, Table SF2.1 http://www.oecd.org/social/family/database.htm (accessed on 07/03/2023).

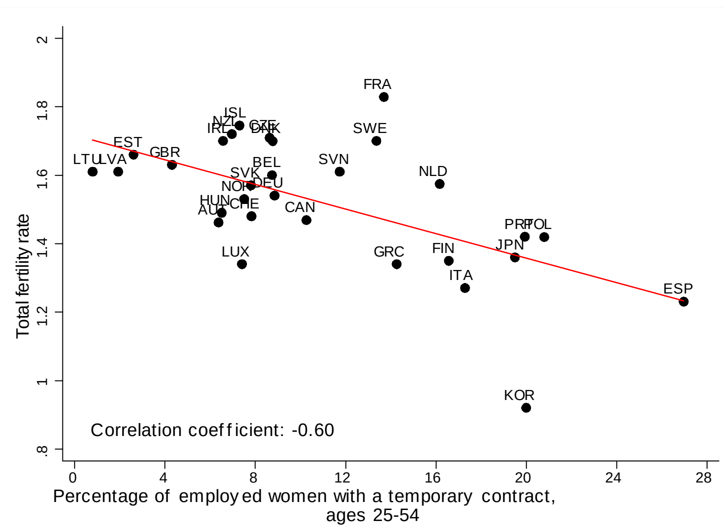

Figure A3. Temporary Contracts and the TFR

Source: Data for year 2019 from OECD Employment Database, https://bit.ly/2AjAnGc (accessed on 07/03/2023) and OECD Family Database, Table SF2.1 http://www.oecd.org/social/family/database.htm (accessed on 07/03/2023).

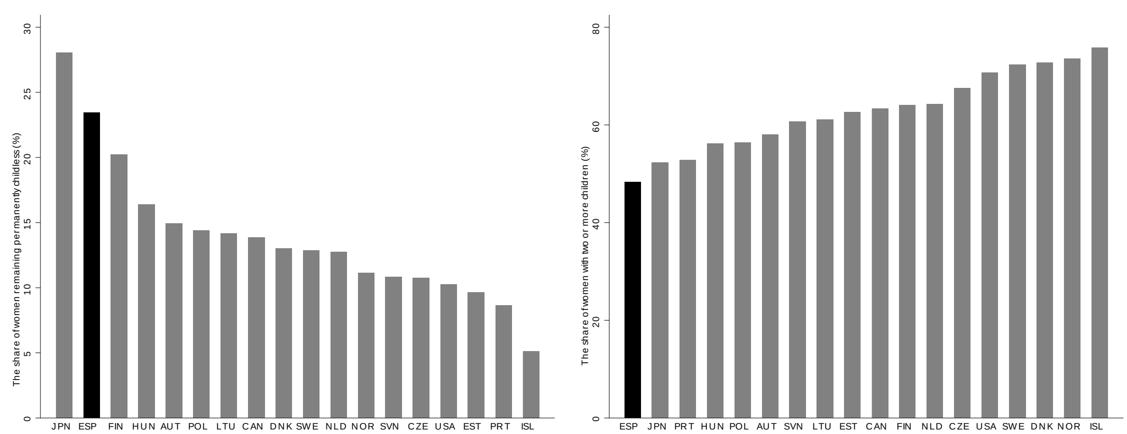

Figure A4. Childlessness (left panel) and Share of Women with Two Children (right panel)

Source: Data for 1973-76 cohorts of women (who reached at least age 44) from Human Fertility Database https://www.humanfertility.org/ (accessed on 24/04/2023).

Appendix B2: Temporary Contracts and Fertility of Men

In this Appendix, we show the association between employment in temporary contracts and fertility (Table A1) and between cumulative exposure to temporary contracts and the number of children, childlessness and daily earnings (Table A2) for men.

Table A1. Temporary Contracts and the First Birth Probability

	(1)	(2)	(3)	(4)
Men				
$\text{Temporary}_{\mathbf{t-4}}$	0.841***	0.792***	0.792***	0.811***
	(0.022)	(0.021)	(0.032)	(0.033)
Number of observations	353,359	353,359	206,352	206,352
Personal characteristics	no	yes	yes	yes
Work-related characteristics	no	no	yes	yes
Year fixed effects	no	no	no	yes

Notes: (i) Reported are the odds ratio with individual level clustered standard errors in parentheses. (ii) Personal characteristics include age. Work-related characteristics are firm tenure (in quarters), a binary indicator for public sector, a binary indicator for full-time, occupation dummies (ten social security categories) and NACE one-digit industry dummies (nine categories). All models include a constant term. (iii) *p $<$ 0.10,**p $<$ 0.05, ***p $<$ 0.01.

Table A2. Fertility and Earnings Statistics by Time Spent on Temporary Contracts, aged 25-44

	Number of children			% childless			Daily earnings		
	$<$50%	$\geq$50%	Δ	$<$50%	$\geq$50%	Δ	$<$50%	$\geq$50%	Δ
Men									
Married at age 35	0.94	1.04	-0.10***	37.04	33.37	3.67***	71.90	48.99	22.92**
Married at age 40	1.28	1.23	0.05***	23.42	24.72	-1.30	73.68	54.52	19.16***
Married at age 44	1.24	1.05	0.19***	24.08	31.86	-7.78***	74.69	56.42	18.27***

Notes: (i) We further restrict our sample of men to those who were employed at least 50% of the time between 1996Q1 and 2010Q4. (ii) Within each panel Δ denotes the difference between columns $<$50% and $\geq$50%. (iii) ***, **, and * indicate that the difference is statistically significant at the 0.01, 0.05 and 0.10 level, respectively.

Appendix B3: Split-shift Jobs by Occupation, Industry and Region

In this Appendix, we document the prevalence of split-shift schedule contracts across occupations, industries and regions (Table A3). We also show the relationship between the fraction of women working with split-shift schedules and the completed fertility across occupations and regions (Figure A5).

Table A3. Incidence of Split-Shift Schedules by Occupation, Industry and Region

	%
Occupation	
Business administration and public administration	59.46
Scientific technicians, professionals and intellectuals	37.51
Support technicians and professionals	44.41
Administrative-type employees	33.33
Catering, personal, and protection services and trade salespersons	31.54
Skilled agriculture and fishing workers	37.14
Craftspersons, qualified manufacturing, construction, and mining workers	55.50
Machine operators, fixed machinery fitters, mobile machinery drivers/operators	33.89
Unskilled workers	28.41
Industry	
Agriculture, forestry and fishing	45.87
Mining and quarrying	71.43
Manufacturing	44.84
Electricity, gas, steam, water supply, and waste	35.14
Construction	70.99
Wholesale, retail trade, repair of motor vehicles/motorcycles	50.97
Accomodation and food service activities	43.21
Transportation, storage, information and communication	29.24
Financial and insurance activities	36.25
Real estate, professional, scientific and technical activities	49.10
Admin. activities; public admin., defense, compulsory social security	18.35
Education	35.46
Human health and social work activities	13.29
Arts, entertainment, and recreation; other service activities; and activities of households as employers	38.53
Region	
Galicia, Asturias, Cantabria	41.44
Community of Madrid	38.34
Basque Community, Navarre, La Rioja, Aragon	36.42
Catalonia, Valencian Community, Balearic Islands	45.50
Castile and Leon, Castile-La Mancha, Extremadura	36.94
Andalusia, Region of Murcia	28.47
Canary Islands, Ceuta, Melilla	25.42

Source: The STUS, 2009-2010. Sample: 25-54 years old employees.

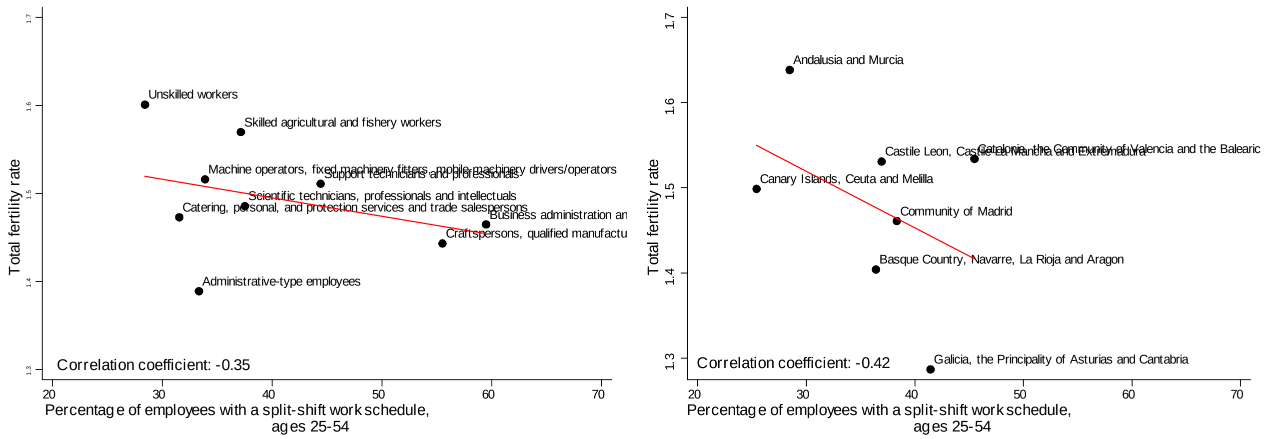

Figure A5. Split-shift Work Schedules and the TFR

Source: Percentage of 25-54 years old employees with a split-shift work schedule from the STUS, 2009-2010 and the TFR (number of children at and above the age of 40) from the FS, 2018.

Appendix B4: Transitions from Temporary to Permanent Contracts

In this Appendix, we show the association between gender, children and promotions from temporary to permanent contracts. In the LFS-flows sample, where we can calculate transitions among employment, unemployment and out-of-labor force as well as well moves from temporary to permanent contracts (i.e. promotions), each quarter about 6.39% of college-educated women are promoted from a temporary to a permanent contract. The transition rate is 8.76%, or 2.4 percentage points higher, for married men with a college education. Non-college women, on the other hand, have slightly higher transition rate than that of married non-college men (5.93% vs. 5.67%). These differences can be due to selection, if men and women with temporary contracts have different characteristics, such as the sector of employment, occupation, and tenure. To check whether the association between gender and promotions is robust to such controls, we use the MCVL sample. We focus on childless individuals working with a temporary contract in a given firm in a given quarter and estimate the probability of being promoted to a permanent contract using a logistic regression. Table A4 shows the odds ratio of promotion one year after a birth. Columns 1 and 2 present the results when we only control for gender and parenthood, respectively. For college women, being a female and having a child are negatively and significantly associated with lower odds of promotion (odds ratios are less than one). As we move across the columns, we gradually add the interaction between gender and the indicator for having a child (column 3), other personal and work-related characteristics (columns 4 and 5, respectively), and find that only gender matters. In the most demanding specification (column 6), where we control for all covariates along with year fixed-effects, the odds of being promoted one year after for college-educated women is 20% lower than the odds for males. The results at the bottom panel, however, suggest a higher odds of promotion for non-college women relative to men (columns 1-4), consistent with the quarterly figures from the LFS-flows sample, but this difference turns statistically indifferent from zero once work-related characteristics are controlled for.

Table A4. Gender, First-birth and the Probability of Promotion

	(1)	(2)	(3)	(4)	(5)	(6)
Men and College Women						
Female	0.898**	-	0.904**	0.854***	0.866**	0.797***
	(0.042)		(0.043)	(0.041)	(0.061)	(0.062)
First-birth	-	0.833**	0.896	0.906	0.886	0.843
		(0.062)	(0.072)	(0.073)	(0.106)	(0.104)
Female × First-birth	-	-	0.607**	0.630**	0.622	0.651
			(0.133)	(0.138)	(0.215)	(0.225)
Number of observations	63,527	63,527	63,527	63,527	32,054	32,054
Men and Non-College Women						
Female	1.192***	-	1.191***	1.166***	1.071	1.007
	(0.039)		(0.040)	(0.039)	(0.054)	(0.057)
First-birth	-	0.865**	0.896	0.901	0.879	0.839
		(0.059)	(0.072)	(0.072)	(0.105)	(0.100)
Female × First-birth	-	-	0.972	0.971	1.112	1.123
			(0.150)	(0.150)	(0.253)	(0.256)
Number of observations	83,280	83,280	83,280	83,280	43,209	43,209
Personal characteristics	no	no	no	yes	yes	yes
Work-related characteristics	no	no	no	no	yes	yes
Year fixed effects	no	no	no	no	no	yes

Source: The MCVL, 2005-2010. Sample: Native, married women born between 1966Q1 and 1971Q4 and native married men born between 1964Q1 and 1969Q4. Sample is further restricted to childless individuals when first observed. Notes: (i) Reported are the odds ratio with individual level clustered standard errors in parentheses. (ii) The outcome variable takes the value one if the individual is employed in a firm with a temporary contract in a given quarter is promoted to a permanent contract one year after and zero otherwise. (iii) Personal characteristics include age. Work-related characteristics are firm tenure (in quarters), a binary indicator for public sector, a binary indicator for full-time, occupation dummies (ten social security categories) and NACE one-digit industry dummies (nine categories). All models include a constant term. (iv) $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Appendix B4: Moments

In this Appendix, we document set of moments used in the calibration (Section 4).

Table A5. Education and Marriage

Women, ages 25-44 (%)

	College	Non-College
Education	0.19	0.81
Married to a Husband with		
College	0.49	0.07
Non-College	0.51	0.93

Source: The LFS, 1987-2010. Sample: 25-44 years old married native women born between 1966 and 1971 (only household heads and spouses).

Table A6a. Distribution across Labor Market States by Motherhood Status, ages 25-44 (%)

(College)

	Out of Labor Force	Unemp.	Temp.	Perm.
All women	15.35	7.70	19.30	57.65
Non-mothers	7.73	11.40	26.34	54.53
Mothers	17.72	6.55	17.11	58.62
Mothers of 0-2 years old	22.03	6.68	16.75	54.54

Source: The LFS, 1987-2010. Sample: 25-44 years old married native women with at least a college education born between 1966 and 1971 (only household heads and spouses).

Table A6b. Distribution across Labor Market States by Motherhood Status, ages 25-44 (%)

(Non-College)

	Out of Labor Force	Unemp.	Temp.	Perm.
All	44.58	14.48	13.53	27.41
Non-mothers	23.77	17.06	19.30	39.87
Mothers	47.81	14.08	12.64	25.48
Mothers of 0-2 years old	57.52	11.79	8.12	22.57

Source: The LFS, 1987-2010. Sample: 25-44 years old married native women with below college education born between 1966 and 1971 (only household heads and spouses).

Table A7. Inequality

	College	Non-College
Average hourly wage of wives	12.97	7.46
Average hourly wage of husbands	13.89	9.92
Variance of wives' log(hourly wage)	0.207	0.171
Variance of husbands' log(hourly wage)	0.214	0.182
Correlation between husbands' and wives' log(hourly wage)	0.439	0.413

Source: The EU-SILC, 2004-2012. Sample: 25-44 years old married native women born between 1966 and 1971 and their husbands (only household heads and their spouses). Sample is further restricted to employees with non-missing wage and hours information.

Table A8a. Quarterly Transition Rates across Labor Market States, aged 30-34 (College)

Married women	O_t	U_t	T_t	P_t
O_{t-1}	84.22	10.02	4.69	1.07
U_{t-1}	12.93	73.00	12.17	1.90
T_{t-1}	4.86	5.37	83.38	6.39
P_{t-1}	0.92	0.55	1.10	97.43

	Non-College			College		
Married men	N_t	T_t	P_t	N_t	T_t	P_t
N_{t-1}	67.17	30.56	2.27	80.00	18.18	1.82
T_{t-1}	8.19	86.42	5.67	5.67	85.57	8.76
P_{t-1}	0.81	2.04	97.15	0.25	0.76	98.98

Source: The LFS-flows, 2000Q1-2000Q4. Sample: Married women with at least a college education born between 1966 and 1970 and their potential husbands (married men born between 1966 and 1970). Notes: (i) O: Out of Labor Force, U: Unemployed N: Non-employed, T: Employed with a temporary contract, P: Employed with a permanent contract. (ii) 1966-1970 cohort is 30-34 years old in 2000.

Table A8b. Quarterly Transition Rates across Labor Market States, aged 30-34
(Non-College)

Married Women	O_t	U_t	T_t	P_t
O_{t-1}	89.50	6.51	3.22	0.77
U_{t-1}	16.89	69.62	12.08	1.42
T_{t-1}	10.90	13.68	69.49	5.93
P_{t-1}	3.28	1.01	1.07	94.64

	Non-College			College		
Married men	N_t	T_t	P_t	N_t	T_t	P_t
N_{t-1}	67.17	30.56	2.27	80.00	18.18	1.82
T_{t-1}	8.19	86.42	5.67	5.67	85.57	8.76
P_{t-1}	0.81	2.04	97.15	0.25	0.76	98.98

Source: The LFS-flows, 2000Q1-2000Q4. Sample: Married women with below college education born between 1966 and 1970 and their potential husbands (married men born between 1966 and 1970). Notes: (i) O: Out of Labor Force, U: Unemployed N: Non-employed, T: Employed with a temporary contract, P: Employed with a permanent contract. (ii) 1966-1970 cohort is 30-34 years old in 2000.

Table A9. Distribution of Households by the Main Mode of Childcare Arrangement (%)
(Children Ages 0-2)

	College	Non-College
Education at pre-school	50.00	44.81
Childcare at a day-care centre	1.85	3.25
Childcare by a professional childcare provider	16.98	9.09
Childcare by grandparents/relatives/friends	31.17	42.86

Source: The EU-SILC, 2004-2012. Sample: 25-44 years old married native women born between 1966 and 1971 and their husbands (only household heads and their spouses). The sample is further restricted to households who have at least one 0-2 years old child and reported positive hours of education or childcare use in any of the above categories for a 0-2 years old child. Note: The number of hours in education and childcare during a usual week is collected for household members not over 12 years old (age at the date of interview).

Table A10. Employment Rate of Women by Household Gross Income Tercile (College)

Tercile	Employment/Population	Household income (euros)
1	0.58	23,547.81
2	0.83	44,368.69
3	0.93	76,366.25

Source: The EU-SILC, 2004-2012. Sample: 25-44 years old married native women with at least a college education born between 1966 and 1971 (only household heads and spouses).

Table A11. Average Number of Children at age 44, Married Women (College)

Tercile	Female Earnings[a]	Household Income[b]
1st	1.35	1.43
2nd	1.49	1.64
3rd	1.72	1.83

Source: [a]The MCVL, 2005-2010. [b]The FS, 2018. Sample: Native, married women without a college education born between 1966Q1 and 1971Q4.

Appendix C: Calibration Details, College Women

In this Appendix, we provide further details on the calibration of the model for women with a college education.

Interest Rate The real interest rates are calculated as the nominal rates minus the CPI-inflation. The data on long-term interest rates and the consumer prices index is taken from the OECD database (https://data.oecd.org/interest/long-term-interest-rates.htm, and https://data.oecd.org/interest/long-term-interest-rates.htm). The data on deposit rates is taken from the monthly Statistical Bulletin of the Bank of Spain. The numbers refer to average values for 2003-2018 period (https://www.bde.es/webbde/en/estadis/infoest/bolest.html).

Age-Earnings Profiles and Labor Market Outcomes for Husbands The targets for males reflect averages for husbands (with or without a college degree) who are married to college-educated women in our samples (see Figure 2).

Transfers We use pooled data from the EU-SILC from 2006 to 2012 since information on household income variables, including transfer income, are only available 2006 onward. Transfer income includes old-age benefits, survivor' benefits, sickness benefits, disability benefits, education-related allowances, family/children related allowances and housing allowances, and social exclusion not elsewhere classified. We restrict the sample to households with one married couple and only consider household heads and spouses. We further restrict wives to be born between 1966 and 1971, native, and 25 to 44 years old, and calculate the average household income in the sample including all households (about 36,775.55 euro). Both the transfers and household income for college women are reported as a fraction of the average household income in the *overall* sample.

Unemployment Benefits We use pooled data from the EU-SILC from 2004 to 2012 as information on unemployment benefits are collected at individual level and available 2004 onward. We restrict the sample to married household heads and spouses in which the wife is born between 1966 and 1971, native, and 25-44 years old. Then, we calculate the average income of unemployed from unemployment insurance (including zeros), separately for men and for college women. As per transfers, we calculate these as a fraction of the average household income in the *overall* sample.

Labor Market Transitions for Husbands These exogenous transitions are calibrated without running the full model. To reduce the number of parameters, we assume that transitions are same for three age groups, 25-34, 35-44, and 45-54, which are shown in Table A12. Calibrated transitions differ slightly from the ones we observe in the data (e.g. in Table A8) since we are matching labor market shares. We could alternatively take the transitions from the data, which would result in slightly different shares.

Table A12. Labor Market Transitions for Husbands of College Wife, % (Calibrated)

	Age-25 shares (%)		
	N_t	T_t	P_t
	10.0	46.5	43.5
	Transitions		
	N_t	T_t	P_t
	Ages 25-29		
N_{t-1}	85.0	15.00	0.00
T_{t-1}	3.00	87.00	10.00
P_{t-1}	0.00	3.00	97.00
	Ages 30-34		
N_{t-1}	80.0	18.0	2.00
T_{t-1}	5.00	86.00	9.00
P_{t-1}	0.00	1.00	99.00
	Ages 35-54		
N_{t-1}	61.0	23.0	16.00
T_{t-1}	6.00	70.00	24.00
P_{t-1}	1.00	2.00	97.00

Wealth-to-Income Ratio To compute the wealth-to-income ratio we use the 2014 wave of the EFF (see Appendix A - to access the EFF data: bit.ly/3ij7Ouj) and restrict the sample to married couples in which the wife has at least a college degree. The EFF provides information on gross wealth defined as the sum of all financial and real assets as well as on total income obtained by all household members in the previous calendar year including labour income, capital income and income from public or other assistance or social benefits.

Appendix D: Calibration, Non-College Women

In this Appendix, we provide further details on the calibration of the model for women without a college education.

Parameters Chosen a Priori

For the simulations for households with a college-educated wife, the parameters l, r, α_j, and $\Omega(n, i)$ take the values in Table 4. The tax and transfer functions, $G(I)$ and $T(I)$, are also identical for two types of households. For unemployment benefits, we use the same data source and the steps as the one for college-educated wives (see Appendix C). The values are $\theta_f = 0.058$ and $\theta_m = 0.095$.

The construction of age-earnings profiles and labor market outcomes for an average husband who is married to a wife without a college degree also follows the same steps. In the LFS sample, 93% of wives without a college degree have husbands without a college degree, while 7% are college graduates (Table A5). The resulting profiles (Figure A6) are then used to calibrate the earnings function (ω_0^P, ω_1^P, and ω_2^P) and the labor market transitions, $\pi_j^m(\lambda_m, \lambda_m')$. Table A13 shows the transitions between non-participation, temporary and permanent employment. Compared to the husbands of college-educated women (Table A12), a larger share is out of the labor force at age 15 (20% versus 10%). Husbands of non-college-educated women are also much less likely to be promoted from a temporary to a permanent job; for ages between 35 and 54, the gap is quite large (24% versus 4%).

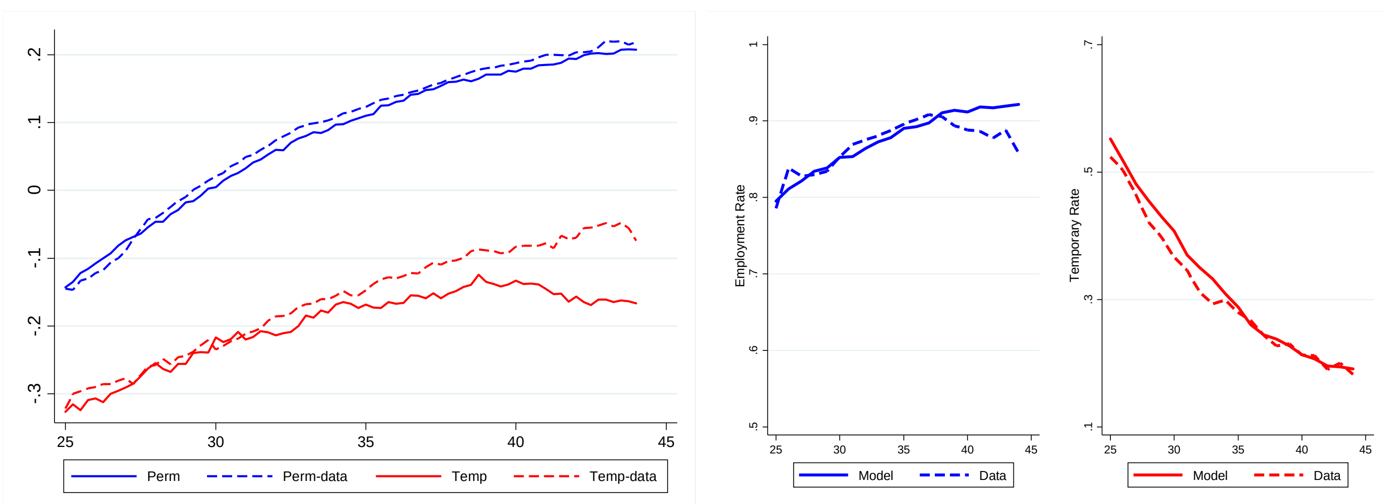

Figure A6. Age-Earnings Profiles (left) and Labor Market Outcomes (right), Males, model vs. data

Notes: Right panel sample includes husbands of 25-44 years old, native, married women without a college education born between 1966 and 1971 (from the LFS, 1987-2010). Left panel is based in authors' calculation from the sample of 1964-1969 born, native and married men (from the MCVL 2005-2010) weighted by the couple's education distribution (from the LFS, 1987-2010).

Table A13. Labor Market Transitions for Husbands of Non-College Wife, % (Calibrated)

	Age-25 shares (%)		
	N_t	T_t	P_t
	20.0	45.0	35.0
	Transitions		
	N_t	T_t	P_t
	Ages 25-29		
N_{t-1}	83.0	15.00	2.00
T_{t-1}	2.00	91.00	7.00
P_{t-1}	0.00	1.00	99.00
	Ages 30-34		
N_{t-1}	83.0	15.0	2.00
T_{t-1}	7.00	90.00	3.00
P_{t-1}	0.00	1.00	99.00
	Ages 35-54		
N_{t-1}	83.0	15.0	2.00
T_{t-1}	7.00	89.00	4.00
P_{t-1}	0.00	1.00	99.00

Calibrated Parameters

With a few exceptions, the calibration of the parameters for non-college-educated women uses the same targets as the ones for college-educated women.

First, since the mean ability for the husbands of college-educated women is normalized to 1, the mean ability for the husbands of non-college-educated women is an additional parameter that needs to be calibrated. We choose this parameter so that the average earnings of the husbands of non-college wives relative to the average earnings of husbands of college wives is in line with the data.

Second, we calibrate the parameters for female human capital accumulation, i.e. parameters in $\ln(h') = \ln h + \ln(1 + \eta_1^P + \eta_2^P j)$ and $w_f(a, h, P) = \zeta_P a h$ with $\zeta_0 < \zeta_1 = 1$, differently. Garcia-Louzano, Hospido, and Ruggieri (2022) show that for women without a college education there are no differences between returns to experience accumulated in temporary and permanent jobs (see their Table 6). As a result, we assume that η_1^P and η_2^P are the same for both types of jobs and target them to match the age-earnings profiles for permanent jobs (Figure A7). The parameter ζ_0 is then chosen to match the age-25 earnings gap between non-college-educated women with and without a permanent job, about 18 log points (Figure A7). Table A14 shows the targets for inequality.

In Table A15 and Figure A8, we show the targets for labor market outcomes. The model matches these labor market outcomes for non-college-educated women very well. One exception is the fraction of mothers who work with a regular contract, which is lower than the number observed in the data. Figure A9 and Table A16 show the fertility targets.

The estimated parameters are in Table A17. The values for γ_3 are relatively smaller for non-college-educated women, since they have their children earlier along the life cycle

(Figure A9). The childcare costs (d_1 and d_2) are also estimated to be lower since less-educated households, on average, spend a smaller fraction of their household income on childcare. Less-educated households also have a higher usage of informal care. Returns to experience are significantly lower for less-educated women compared to ones with a college degree. Finally, both temporary and permanent jobs are more unstable for less-educated women, i.e., both δ^1 and δ^0 are higher.

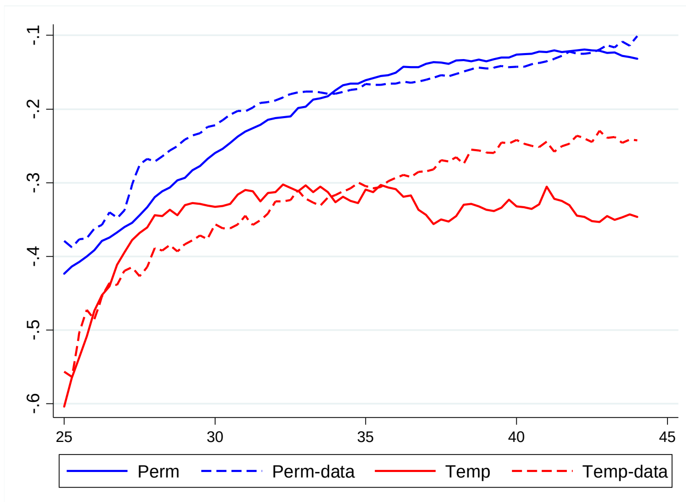

Figure A7. Age-Earnings Profiles, Females, model vs. data

Source: The MCVL, 2005-2010.

Sample: Native, married women without a college education born between 1966Q1 and 1971Q4.

Table A14: The Model vs. Data – Inequality (Non-College)

	Model	Data	Source
Variance of Wife Log Earnings	0.14	0.17	Table A7
Variance of Husband Log Earnings	0.18	0.18	Table A7
Husband and Wife Earnings Correlation	0.34	0.41	Table A7
Husbands Earnings/Husbands of College Educated			Figure A6
Female Wage Growth, 25–35 (permanent)			Figure A6
Female Wage Growth, 35–52 (permanent)			Figure A6
Temp. Cont. Wage Gap			Figure A6
Av earn at 44 $\geq$ 50% relative $<$ 50% on temp. contracts	1.05	1.15	Table A2
Hourly Wage Gender Gap	0.75	0.75	Table A7
Median wealth to income ratio, hholds, 35-44	1.91	2.06	The EFF

Table A15: The Model vs. Data – Labor Market
(Females, Non-College)

	Model	Data	Source
Female Unemployment/Population, 25-27	0.20	0.23	Figure A8
Female Unemployment/Population, 25–44	0.14	0.15	Table A6b
Fraction Temporary, Female Workers, 25–44	0.32	0.33	Table A6b
Trans prob. Temporary to Unemployment, 30–34	13.5	13.7	Table A8b
Trans prob. Permanent to Unemployment, 30–34	1.1	1.0	Table A8b
Employment/Population, 25-44	0.41	0.41	Table A6b
Employment/Population, 25-44, Mothers	0.31	0.38	Table A6b
Employment/Population, 25-44, Mothers with Babies	0.24	0.31	Table A6b
(Employment/Population, 25-44, Non-Mothers)	0.62	0.59	Table A6b
Out of Labor Force/Population, 25-44	0.46	0.45	Table A8b
Fraction of Non-mothers on Regular Contracts	0.59	0.59	Section 2
Fraction of Mothers on Regular Contracts	0.64	0.75	Section 2

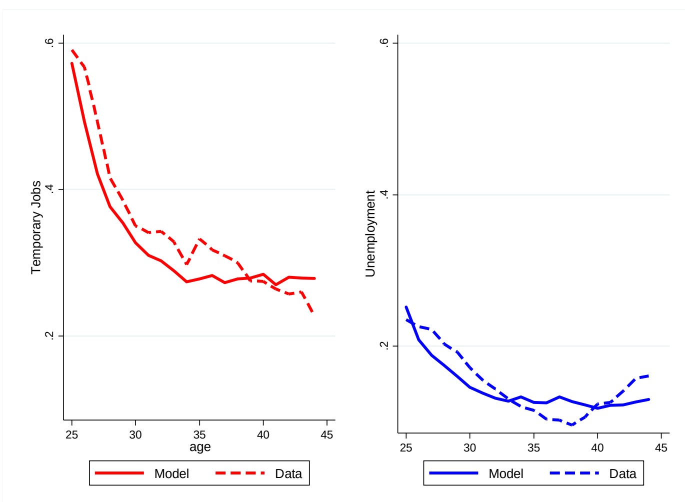

Figure A8. Workers with a Temp. Contract (left), Frac. Unemployed (right), Females, model vs. data

Source: The LFS, 1987-2010.

Sample: Native, married women without a college education, born between 1966 and 1971.

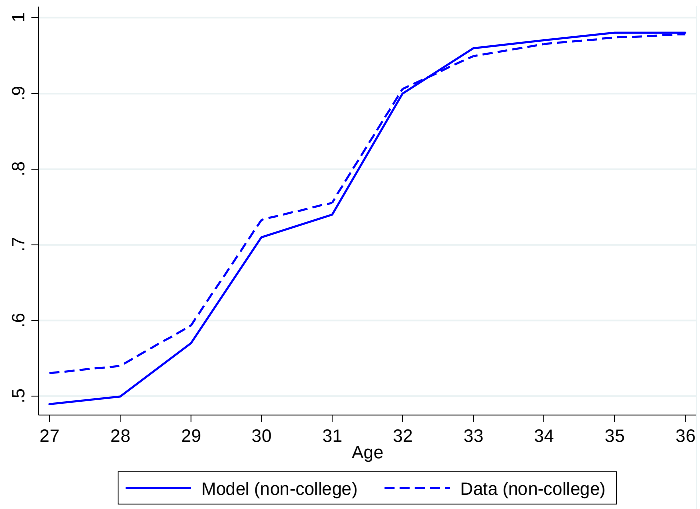

Figure A9. Fraction of Women with a First Births Below a Certain Age

Source: The FS, 2018.

Sample: Married native women without a college degree, born between 1966 and 1971.

Table A16: The Model vs. Data – Fertility
(Non-College)

	Model	Data	Source
Fertility timing	Figure A6		The FS
(Age at First Birth)	28.0	27.0	The FS
Fraction childless	0.17	0.17	The FS
Fraction with 1 Child	0.16	0.23	The FS
Fraction with 2 Children	0.58	0.50	The FS
(Fraction with 3 or More Children)	0.09	0.10	The FS
(Number of Children)	1.60	1.54	The FS
Median Childcare Costs/Household Income, $i = 1$	0.05	0.06	The FS
Median Childcare Costs/Household Income, $i = 2$	0.04	0.03	The FS
Informal Child Care Use, Mothers with Babies, Employed	0.45	0.43	Table A9

Table A17: Parameter Values - Calibrated
(Non-College)

Parameter	Description
Ability Distribution	
$\mu_{a_m} = 0.92, \mu_{a_f} = 0.68, \sigma_{a_f} = 0.46, \sigma_{a_m} = 0.41, \rho = 0.17$	Joint Log Normal Distribution
Preferences	
$\beta = 0.997$ (quarterly)	Discount Factor
$\gamma_1 = 0.40$, $\gamma_2 = 0.442$, $\overline{n} = 2.72$	Preferences for Children
$\gamma_3^{low} = 10.0$ $\gamma_3^{med} = 24.0$, $\gamma_3^{high} = 34.0$	Preferences for Children
$\chi = 0.5$	Preferences for Leisure
Cost of Children	
$d_1 = 0.13$	Childcare Cost, youngest is a baby
$d_2 = 0.09$	Childcare Cost, youngest is a child
$\varphi = 0.216$	Frac. of Household with Informal Care
$\iota = 0.07$	Time Cost of Babies
Female Wages	
$\eta_1^P = 0.0084$, $\eta_2^P = -0.0002$, $P \in \{0, 1\}$	Human Capital Accumulation
$\zeta_0 = 0.83$	Temporary Contract Wage Penalty
$\delta_h = 0.006$ (quarterly)	Depreciation Rate
Labor Market	
$\xi = 0.83$	Time Cost of Participation
$\pi = 0.052$	Promotion Probability
$\phi = 0.175$, $\phi_{25} = 0.55$	Job Finding Rate
$\delta^1 = 0.017$, $\delta^0 = 0.16$	Job Destruction Rate
$\kappa = 0.138$	Time Cost of Split Jobs
$\psi = 0.40$	Frac. of Split-Schedule Jobs

Table A18: Female Labor Force Participation and the Fertility
(Non-College)

	BM	(i) Single Contract	(ii) Single Contract for Both	(iii) Single Contract Sep. rate	(iv) Single Contract Find rate
Age at First Birth	28.0	27.4	27.5	27.9	28.1
Number of Children	1.60	1.29	1.56	1.58	1.65
Fraction childless	0.17	0.32	0.20	0.19	0.15
Fraction with 1 kid	0.16	0.13	0.12	0.14	0.16
Fraction with ≥2 kids	0.67	0.55	0.68	0.67	0.69
Ages 25-44					
Partic./Pop.,	0.54	0.81	0.68	0.56	0.54
Emp./Pop., Non-mothers	0.62	0.84	0.80	0.68	0.66
Emp./Pop., Mothers	0.31	0.63	0.52	0.32	0.31
Emp./Pop., Mothers, with babies	0.24	0.55	0.46	0.26	0.27
Unemp. Rate	0.25	0.11	0.10	0.21	0.23
Regular, 25-44, Non-Mothers	0.59	0.58	0.56	0.59	0.58
Regular, 25-44, Mothers	0.64	0.66	0.67	0.64	0.62
δ^0 (Separation, temporary)	0.17	0.017	0.017	0.05	0.017
δ^1 (Separation, permanent)	0.017	0.017	0.017	0.05	0.017
ϕ (Finding rate)	0.175	0.175	0.175	0.175	0.04