Daddy's Home?
Paternity Leave and Labour Market Outcomes

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Abstract

Parenthood is a central source of gender inequality in labour market outcomes. To mitigate this, governments have introduced parental leave entitlements reserved for fathers. I develop a quantitative life-cycle model to study how leave design shapes household specialisation and parental labour supply, disciplining it with quasi-experimental estimates from administrative data on a Spanish paternity leave reform. In the model, couples trade off the benefits of taking leave together against extending childcare coverage through separate leave, while firms use paternity leave-taking as a signal of labour-market attachment when setting wages. Empirically, the reform had little effect on mothers' labour-market outcomes, as parents often take leave together. Model counterfactuals show that forcing all paternity leave after maternity leave raises maternal employment by 13%, compared with only 2% from extending fathers' leave by eight weeks when parents can take it jointly. Replacing non-transferable leave with a shared pool of weeks reinforces traditional household specialisation and reduces maternal employment by 11%.

Keywords Child Penalty, Household Labour Supply, Life-cycle Household Model, Labour Market Dynamics

JEL Classification: J13, J16, J22, J24, J31, E24

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1 Introduction

Parenthood is a central driver of gender differences in labour market outcomes over the life cycle. Recent studies show that the largest gap between men and women in advanced economies emerges after childbirth (Adda et al., 2017; Kleven, Landais, and Søgaard, 2019). Mothers' and fathers' labour supply diverges sharply after birth (Erosa et al., 2016) because childcare responsibilities fall disproportionately on mothers, contributing to mothers' specialisation in home production and fathers' specialisation in market work (Cortés and Pan, 2023). To promote a more equal allocation of care, many countries have introduced parental leave reserved exclusively for fathers (*non-transferable paternity leave*). These policies may allow fathers to take over childcare otherwise provided by mothers, freeing mothers' time for market work. However, increasing fathers' leave-taking need not lead to a redistribution of childcare responsibilities, and empirical evidence suggests that these policies often have only modest effects on mothers' labour market outcomes (Albanesi, Olivetti, and Petrongolo, 2023). Why do reforms that increase fathers' leave-taking often have such limited effects on gender gaps after childbirth, and how could alternative policy designs make them more effective?

To answer these questions, I develop a quantitative life-cycle model in which households' labour supply and parental leave decisions interact with firms' wage-setting decisions, and discipline it with quasi-experimental estimates from administrative data on a Spanish paternity leave reform. I argue that a high take-up of paternity leave is not sufficient to affect female labour market outcomes. Because the effects of paternity leave depend on whether it changes the allocation of childcare responsibilities within the household, how fathers use their leave matters, not just if they use it. I identify the timing of fathers' leave relative to mothers' as a novel within-household margin through which paternity leave can affect maternal labour supply: when fathers take their entitlement together with mothers, they do not extend the period of childcare covered by parental leave. Consistent with this mechanism, the empirical literature has shown that fathers often take leave in ways that do not redistribute primary care-giving responsibilities (Andresen and Nix, 2026; González, Guirola, et al., 2026). As a result, when paid maternity leave ends and no alternative childcare is available, mothers may still need to reduce their labour force participation if fathers do not take over.

I exploit exogenous variation from a reform in Spain in 2021, which equalised the length of non-transferable paid parental leave available to mothers and fathers at 16 weeks each. To analyse the effects of the policy, I link the universe of parental leave recipients between 2020 and 2023 to their complete labour market histories. I also link birth registry data, including gestation months and exact birth dates, to the sample. Spain provides an ideal setting to study paternity leave policy because paid maternity and paternity leave are quite short, so families may still need to provide or arrange care once leave ends. This makes the allocation of leave across parents particularly relevant for post-birth labour supply.

I begin by presenting key motivating facts on paternity leave. Fathers take nearly all of the leave

available in their entitlement, and a large fraction of it together with mothers. In couples where the father takes leave after the mother ("sequential" couples), mothers work about 28 days more in the first year after birth, although the total leave that fathers take is the same between these groups. Following the reform, the number of leave days that fathers take sequentially increases by 40%, but the majority of leave days are still taken jointly and aggregate maternal labour supply changes little. These stylised facts point to the importance of taking a more nuanced view of paternity leave policies. Not only how much leave fathers take matters, but also how it is taken.

I complement these motivating facts with a causal analysis of the policy effect using a sharp regression discontinuity design (RDD). Fathers take 97% of the additional days available to them and a growing share of fathers take leave separately from their partners. The causal results complement the small aggregate reform effects found. The RDD finds no statistically significant aggregate effect of the reform on maternal labour market outcomes, and the effects on paternal outcomes are similarly small. Despite the high uptake, changes in paternity leave do not affect aggregate gender gaps after childbirth. The marginal reform-induced shift in timing is not large enough to generate a detectable average causal effect.

Motivated by this evidence, I develop a quantitative household life-cycle model that incorporates leave-taking decisions and an endogenous wage penalty associated with fathers' leave-taking. I discipline the model using the RDD estimates of the reform effects and descriptive moments from the data. An innovation of the model is to endogenise the allocation of leave across parents and over time: couples jointly decide how much leave fathers take and when they take it relative to mothers. The model incorporates the main components of parental leave policy, including entitlement length, timing of leave, and transferability, while holding the wage replacement rate fixed.[1] Couples trade off the benefits of taking leave together against extending childcare coverage through taking leave separately. Parents also make joint decisions over labour supply. Each of these choices affects the accumulation of the two key parent-specific stocks: market human capital, which accumulates with market hours and can depreciate during leave and non-employment, and childcare-specific human capital, which accumulates with parental leave time and affects the productivity of parental inputs in home production. These sources of persistence allow policy changes to have consequences beyond the immediate period of leave.

The model delivers a set of predictions of the consequences of an exogenous increase in paternity leave length. In the model, fathers' leave affects mothers' subsequent labour supply through two channels. The first is a coverage channel: when the father is on leave after the mother has returned to work, his care allows her to spend more time in the labour market and accumulate additional market human capital. The strength of this channel naturally depends on how much of the leave is taken after the mother's leave. If much of the leave is taken together with the mother, this effect is muted. The second is a productivity channel: leave raises the father's childcare-specific human

[1] For analyses of how replacement rates affect parental leave-taking, see Jørgensen and Søgaard (2024) and Ziegler and Bamieh (2023).

capital, making his time at home more productive and encouraging the household to reallocate care towards him. The magnitude of this channel is correlated with the leave length that fathers take, especially relative to the mother. If the leave length is shorter, care skill gains can only be modest. The model also predicts that, if the skill gains are substantial, fathers may prefer to front-load their leave to enjoy these skill gains for as long as possible, which would counteract the coverage channel.

On the firm side, I introduce a new mechanism in which employers use paternity leave-taking as a signal of fathers' labour market attachment when setting wages. The strength of the signal depends on how selected the group of leave-takers is. Because households take the wage penalty attached to paternity leave as given, they do not internalise how their collective leave-taking decisions affect firms' beliefs. Paternity leave policy influences households' decisions by making leave more attractive, which encourages take-up. As paternity leave becomes more common, the signal weakens. Earmarked leave is one way to encourage take-up, but this mechanism can also operate through other policies that make paternity leave more attractive. Thus, policy has the direct effect of the entitlements it provides and an indirect effect by changing the composition of leave-takers, thereby diluting the signal and reducing the wage penalty associated with paternal leave.

To quantify the impact of paternity leave, I calibrate the model to match moments of earnings and employment around childbirth, as well as parental leave-taking and household labour-supply responses to the 2021 reform. The model successfully captures mothers' return-to-work and re-entry patterns, the allocation of parental leave, and the evolution of within-couple labour market gaps. It endogenously generates sorting into joint and sequential leave arrangements, with couples increasingly choosing sequential leave as fathers' entitlements expand. Consistent with the data, the reform substantially increases fathers' leave-taking but generates only limited changes in mothers' labour supply. Crucially, the model reproduces the relationship between leave arrangements and maternal labour supply documented in the data: mothers in couples taking leave sequentially work approximately 2.5 more days per month in the first three years after childbirth than those taking leave jointly, relative to 2.3 days in the data, capturing the observed differences in labour supply across leave arrangements.

The model rationalises the empirical finding of a small effect on maternal labour market outcomes because the two channels through which paternity leave can affect maternal outcomes are relatively weak in this particular policy set-up. The coverage channel in this reform is weak as most leave still remains joint. If fathers take leave at the same time as mothers, the short duration of leave means that mothers still need to stay home once leave ends. The productivity channel is also weak because the increase in fathers' leave entitlement was relatively small, and equalising fathers' and mothers' leave means that, at most, fathers become as productive as mothers.

In the model counterfactuals, I vary three key dimensions of paternity leave policy: leave length, leave timing, and leave transferability. Increasing the length of the entitlement of fathers by 8 weeks, while holding that of mothers constant, increases female employment a year after birth by 2%. The

increase in maternal employment comes from an increase in the coverage after her leave has ended, with the share of fathers' sequential leave days increasing from 28% to 42%. This policy is relatively expensive, given the impact it has on female employment, with the proportional tax rate to finance the entitlement increasing by 30%. The welfare effect of the policy is virtually neutral, as the increased coverage and learning-by-doing in childcare are offset by the cost of the policy.

To quantify the effect of the second key channel of policy, the timing of leave, I restrict the choices of when to take leave in the model. I first restrict leave to purely joint and then to purely sequential leave-taking, while keeping all else constant. Moving from a purely joint leave set-up to free choice increases maternal employment by 10% one year after childbirth, and the share of sequential days increases, with an increase in welfare. Forcing all leave to be taken sequentially raises maternal employment by an additional 2% relative to free choice. Overall, moving from purely joint to purely sequential leave increases maternal employment by 12%, but leaves welfare essentially unchanged. While sequential leave increases maternal employment, couples value both spending time at home together and retaining flexibility over their leave arrangements.

Finally, to quantify the impact of non-transferability, I replace the earmarked paternity leave entitlement with a shared pool of leave weeks, from which both parents can choose. In the baseline policy, take-up is near-universal and taking leave is uninformative about fathers' labour market attachment. A transferable pool restores selection into leave-taking, because each week of paternity leave is a week that could otherwise be taken by the mother, rather than a week lost. This generates a 5% wage markdown for fathers who take voluntary leave, which deters paternal uptake and leads to a loss in household welfare. Only 2% of fathers still take leave from the shared pool, relative to virtually all under the non-transferable policy. As the leave that is not taken by the father is then used by the mother, this reinforces traditional household specialisation, and maternal employment at 12 months after birth declines by 11%. Thus, although flexibility in the timing of leave benefits maternal employment, flexibility in its allocation between parents can have the opposite effect.

Related Literature This paper contributes to two main strands of literature. First, it relates to the quantitative literature on families in the macroeconomy. Previous research has identified several mechanisms through which parental leave policies affect labour market outcomes.[2] These include changes in workers' bargaining positions (Erosa et al., 2010), the preservation of mothers' attachment to career-oriented jobs (Kim and Yum, 2026), as well as the effect of firms through gender-specific wage-setting (Di Nola et al., 2024) and the use of maternity leave as a signal of labour market attachment (Tô, 2018). Related work highlights the importance of economic incentives and social norms in determining the allocation of parental leave (Albrecht et al., 2024).

[2]A broader quantitative literature examines gender gaps in employment and earnings (Flabbi and Moro, 2012; Morchio and Moser, 2024; Xiao, 2024) and the dynamic interaction between fertility, labour supply, and human-capital accumulation (Adda et al., 2017; Erosa et al., 2002; Erosa et al., 2016). Related quantitative analyses of family policies include Bover et al. (2026), Guner et al. (2020), and Low and Sánchez-Marcos (2015). Dynamic household models of childcare and labour supply decisions include Hassani-Nezhad (2020) and Turon (2019).

I contribute to this literature in three ways. Firstly, I do not treat parental leave as only a single policy margin. Instead, I incorporate the different margins of paternity leave, explicitly accounting for length, timing, and transferability. This makes it possible to evaluate the effects of different policy dimensions on household specialisation, labour supply, welfare, and fiscal costs. Secondly, I provide an explanation for the observation that expansions in paternity leave can have small effects on labour market outcomes, even under rational household behaviour and high paternal uptake, and study alternative designs of the policy that can have a stronger impact. Finally, I contribute to the scarce literature on the signalling effect of parental leave by expanding it to paternity leave specifically. The signal is an endogenous household choice and I show how firms' wage responses can discourage fathers from taking leave, providing an additional rationale for non-transferable paternity leave policies.[3]

Second, the paper contributes to the rich empirical literature on the effects of paternity leave. Previous work has established that earmarked paternity leave increases fathers' take-up (Farré, González, Hupkau, et al., 2025), but effects on mothers' labour market outcomes are small because fathers often take leave in ways that do not redistribute primary care-giving responsibilities (Andresen and Nix, 2026; González, Guirola, et al., 2026).[4] One exception is Kleven, Landais, Lassen, et al. (2026), who find that a Danish reform shifting parental leave from mothers to fathers reduces gender gaps in labour-market outcomes. This is consistent with the channel emphasised in this paper: fathers' leave substituting for childcare otherwise provided by mothers. González and Zoabi (2023) also show that responses to paternity leave are heterogeneous in age and education. I contribute to this literature in three key ways. First, by constructing the first household-level administrative panel for Spain.[5] This allows me to examine how paternity leave affects labour-market outcomes and specialisation within households, rather than studying mothers' and fathers' responses separately. Second, I contribute to this literature by identifying an additional margin of heterogeneity: whether fathers take leave jointly with mothers or sequentially. Third, the quantitative model allows me to go beyond the evaluation of existing reforms and examine alternative policy designs.

The remainder of the paper is organised as follows. Section 2 describes the institutional setting and the data. In Section 3, I present empirical facts about the effect of paternity leave in Spain, which motivate the structural model presented in Section 4. Then, in Section 5, I calibrate the model using a combination of causal estimates of reform effects and descriptive moments of parental leave-taking and labour market outcomes. Section 6 presents the results of the quantification exercise and studies the key margins of paternity leave policy that affect intra-household specialisation and

[3]The broader statistical discrimination literature focuses on observable characteristics, rather than endogenous household choices, as signals (Albanesi and Olivetti, 2009; Moro, 2003; Xiao, 2021).

[4]Canaan et al., 2022; Cools et al., 2015; Dunatchik and Özcan, 2021; Ekberg et al., 2013; Johansson, 2010; Kluve and Tamm, 2013; Patnaik, 2019 provide broader international evidence on paternity leave.

[5]Existing evidence for Spain focusing on individual-level behaviour includes Farré and González, 2019; Farré, González, Hupkau, et al., 2024; Farré, González, Hupkau, et al., 2025; Moreno-Mínguez et al., 2023.

female labour supply. Finally, Section 7 concludes.

2 Institutional Setting and Data

2.1 Institutional Setting

On 1 January 2021, Spain equalised paid paternity and maternity leave. This was a step in a phased expansion of earmarked paternity leave that began in 2007, with the introduction of 13 days of non-transferable paid paternity leave. Non-transferable, or earmarked, leave is reserved exclusively for the father[6], it is lost if not used by him and cannot be shared with the mother. Since 2007, multiple extensions of this leave have been implemented, while mothers' leave entitlement remained constant (see Farré, González, Hupkau, et al., 2025 for an overview). The policy change that occurred in 2021 is noteworthy as it constituted the equalisation of maternity and paternity leave. Figure 1 gives a brief visual overview of the policy environment. Eligible fathers with children born before January 2021 had a paternity week allowance of 12 weeks, out of which 4 were compulsory immediately after birth. Fathers with children born on or after January 1 2021 were eligible for 16 weeks of paid leave, out of which 6 were compulsory immediately after birth of the child. The reform therefore changed both the total entitlement and the compulsory portion for fathers. The length of the entitlement for mothers remained constant at 16 weeks, out of which the first 6 immediately after birth are compulsory. The reform also eliminated the possibility of sharing leave between parents. In practice, this change was not quantitatively important, as only about 1% of fathers used shared parental leave in the years preceding the reform (Farré, Felfe, et al., 2023). Under both policy regimes, the voluntary part of parental leave can be taken until the child turns one year old. Eligibility criteria for mothers and fathers are identical and are based on minimum social security contributions prior to childbirth that depend on age at birth[7].

The replacement rate on leave is paid at 100% of the worker's insured earnings (the contribution base, i.e. earnings on which Social Security contributions are calculated). This contribution base is capped and for an employee whose salary is above the capped level, the replacement rate may not replace the whole salary. This, however, corresponds to few observations: The maximum in 2020 and 2021 was €4,070.10 per month, while the average salary corresponds to €2,250 for men 2020-21 in the sample. The payment of childcare benefits come directly from Social Security, rather than from the employer.

This paternity leave policy extension is notable on several counts. Firstly, it was the longest father-specific entitlement in the OECD (OECD, 2022). Secondly, at 16 weeks, maternity leave

[6] In the Spanish setting, the relevant parent is formally the "second progenitor". For brevity I refer to this parent as the father throughout.

[7] Those aged 21–25 must have contributed at least 90 days in the previous 7 years, or for at least 180 days over their whole working lives. For those aged 26 and older the requirement rises to at least 180 days of contributions during the previous 7 years, or 360 over their working lives. Those under 21 are not subject to a minimum contribution requirement.

is relatively short, compared to an OECD average of 18.1 (ibid.). Thirdly, it is paid at 100% replacement rate, compared to an OECD average of below 65% for fathers and below 80% for mothers (OECD, 2026). Apart from parental leave, there are also other policies to support families in Spain. Parents can take unpaid parental leave with their job protected for up to 3 years after the exhaustion of earmarked leave. Parents also have the right to reduce their working hours up to half until the child turns 12.

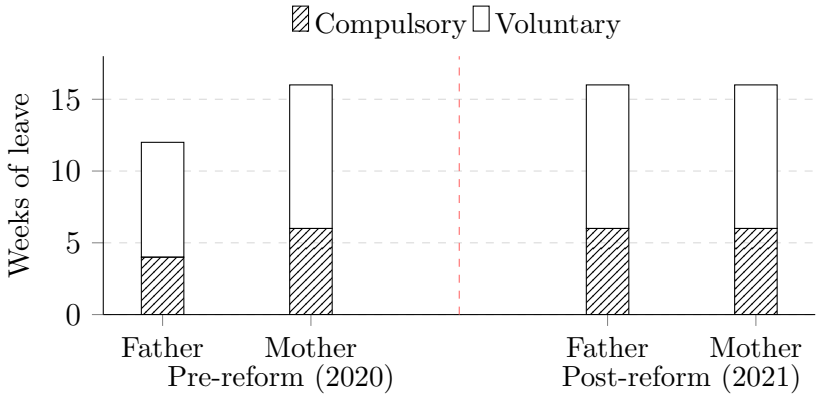


Figure 1: Parental leave entitlements before and after the 2021 reform

Notes: The figure illustrates parental leave entitlements before and after the 2021 reform.

2.2 Data

The empirical analysis uses linked administrative data covering the universe of births in Spain (Banco de España, 2025). Birth records from the *Movimiento Natural de la Población*, (Instituto Nacional de Estadística (INE), 2025) provide the exact date of birth of each child, which determines eligibility under the reform. These are matched to Social Security records containing individual-level information on parental leave (*nacimiento y cuidado del menor*, Seguridad Social, 2025). This data is at the leave-spell-level and includes information on the dates of leave taken, the income received on leave, as well as whether part-time leave was taken. Both parents are linked to their complete Social Security employment histories (*Vidas laborales*, Ministerio de Inclusión, Seguridad Social y Migraciones, 2025), giving longitudinal earnings, employment, and contribution records extending before conception and continuing after the birth. The data also comes at the spell-level. Each job spell includes information on the type of contract, wages, start and end date, part- or full-time status, sector, industry and other relevant labour market information.

The population of interest is parents with an attachment to the formal labour market, since these are the workers to whom the leave entitlement applies. I observe the full population of Social Security affiliates who had a child between 2020 and 2023, the period covered by the data made available. Because the first weeks of leave are mandatory, there is no selective take-up among eligible

parents: any parent entitled to leave appears in the benefits records. In the data both parents can be linked, so effects on fathers and mothers within the same household can be estimated.

The sample is restricted to first births of heterosexual couples in which both parents are covered by the General Social Security Regime and appear in the Social Security records as either employed or unemployed. I exclude self-employed workers, individuals enrolled in other special Social Security regimes, multiple births (e.g. twins), and birth for whom neither parent is ever observed in the administrative records.[8] The merge does not meaningfully alter the birth-year composition, but there is some selection by education, as expected, especially for mothers.

2.3 Descriptive Statistics

Table 1 reports characteristics of the sample of households giving birth one year around the refom cut-off. All characteristics are measured one year before child arrival, unless otherwise specified. Parents are in their mid-30s, with fathers about two years older than mothers. Mothers are considerably more educated than fathers, with 56% holding a college degree, relative to 37% of men. There is a gender pay gap, with fathers out-earning mothers by around €400 each month, and mothers are more than three times as likely as fathers to work part-time (20% versus 6%). Fathers contribute more than half of total household earnings, though in almost a third of couples the mother earns more. Just over half of couples fall in the same education category.

Table 1: Sample Characteristics

	Fathers	Mothers
Panel A: Demographic characteristics		
Age at birth	36.12	34.06
College degree	0.37	0.56
Panel B: Labour-market characteristics		
Monthly wage	2,215.86	1,806.68
Part-time employment	0.06	0.20
Employed in large firm	0.51	0.53
Panel C: Intra-household characteristics		
Father's share of couple earnings	0.56	
Mother out-earns father	0.32	
Equally educated	0.54	
Observations	170,471	

Notes: The table reports sample means for households with births within 365 days on either side of the 1 January 2021 reform cutoff. A large firm has at least 50 employees.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

[8] I further require that both parents are observed for at least one day during the sample period. This sample selection inevitably affects the sample composition relative to the universe of births in Spain. Table A1 in the appendix details the changes in sample composition and size following the restrictions applied.

3 Empirical Evidence

In this section I document empirical evidence on parental leave take-up, timing, and its effect on labour supply. I begin the section with key motivating facts on leave-taking and household specialisation. I then provide causal evidence using the exogenous variation of the 2021 paternity leave reform as part of a regression discontinuity (RD) design. Together, these facts motivate the dynamic household model developed in Section 4.

3.1 Motivating Facts: Leave-Taking and Labour Supply

3.1.1 Take-up and allocation of paternal leave

Fathers take nearly all the leave that is available to them, most of it jointly with the mother. Table 2 documents these features of leave-taking. First, fathers take nearly all their entitlement. Average leave duration increases from 79 of the 84 available days before the reform to 108 of 112 days afterward, with more than 80% of fathers taking their full entitlement. Mothers also take essentially all their available leave. Thus, the reform primarily increases the duration of leave taken, rather than inducing take-up among fathers who would otherwise take little or no voluntary leave. Second, joint leave remains common. Although more fathers take leave separately (Father-only leave increases by around 13 days), almost the whole additional voluntary entitlement is spent with the mother. Fathers take around 37.5% of their voluntary days separately before the reform, compared with 47.1% afterward. Thus, the share of voluntary days increases, but more than half of voluntary leave remains joint.

3.1.2 Maternal Labour Supply and Leave Timing

The timing of paternity leave affects maternal labour supply: in couples where the father takes leave after the mother, mothers work more in the first year after birth. Figure 2 plots average monthly days worked of mothers and fathers by leave timing. I classify fathers as sequential leave-takers if more than half of their total leave is taken when the mother is not on leave, and as joint leave-takers otherwise. Both parents in sequential-leave households work more days before childbirth, with mothers working approximately one additional day per month. After the end of maternity leave, in months 5–12 after childbirth, mothers in sequential-leave households work an average of 204 days, compared with 176 days among mothers in joint-leave households, a difference of approximately 3.5 days per month.

Fathers exhibit the opposite adjustment following childbirth: those in sequential-leave households return to work earlier while mothers remain on leave, before reducing their labour supply around six months after birth as they take their remaining leave. These patterns are consistent with sequential leave facilitating maternal labour supply through the reallocation of childcare between parents. Importantly, there also seems to be some hysteresis in maternal labour supply. Parental

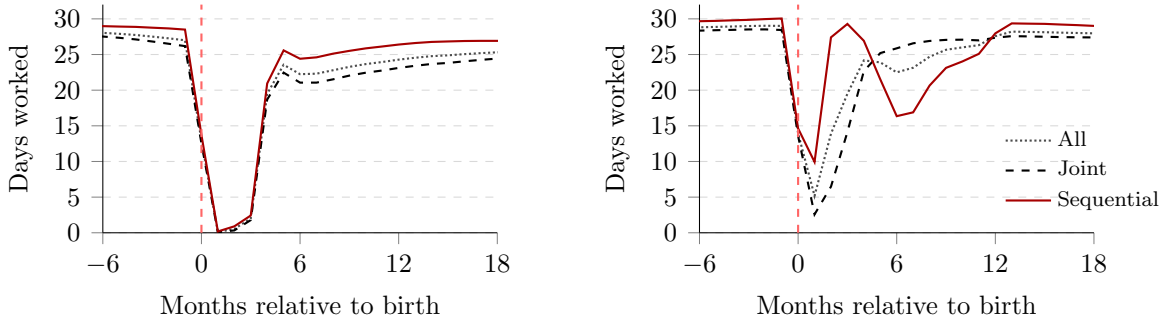
Table 2: Leave-taking Characteristics

	(1) Pre-reform	(2) Post-reform	(3) Std. diff.
Panel A: Fathers			
Days of leave taken	78.76	107.75	2.07
Share taking full entitlement	0.81	0.89	0.22
Panel B: Mothers			
Days of leave taken	111.01	111.75	0.14
Panel C: Household			
Father's share of household leave	0.41	0.49	1.50
Mother-only days	52.69	37.03	−0.55
Father-only days	20.44	33.03	0.46
Any parent on leave	131.45	144.78	0.48
Observations	83,582	86,889	

Notes: The table reports leave-taking characteristics for households with births within 365 days on either side of the 1 January 2021 reform cutoff. Columns (1) and (2) report pre- and post-reform means, respectively. Column (3) reports the standardised difference between these means.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

leave can be taken within the first year of child birth, but the differences in days worked of mothers persist beyond this. I also document the within-household gap in days worked in Appendix Figure A2, which is smaller after childbirth in sequential-leave households.



(a) Mothers (b) Fathers

Figure 2: Days Worked by Leave Arrangement

Notes: Average monthly days worked by parent and leave arrangement. Joint leave denotes concurrent leave-taking; sequential leave denotes fathers taking leave separately from mothers. Month zero is the birth month.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

However, pre-birth differences in labour supply suggest that there may be selection into different leave arrangements. Appendix Table A6 shows that sequential leave is associated with higher parental education and fathers working at a large firm. Accounting for pre-birth characteristics, however, has little effect on the differences in post-birth labour supply between sequential and joint couples (Appendix Figures A3 and A4).

3.1.3 Effects of the Reform on Maternal Labour Supply

Despite differences in maternal labour supply across leave timing arrangements, aggregate maternal labour supply changes little with the policy. Panel A of Table 3 shows average maternal days worked by policy regime. In all couples, maternal days worked increase from 184 before the reform to 188 afterward, a difference of around 4 days in total over months 5–12 after birth. There is heterogeneity by leave timing: In households that take leave sequentially, the increase in days worked is double that of joint households (1.58 days versus 0.89 days).

Panel B then reports a shift-share decomposition that separates changes in the distribution of households across leave timing arrangements from changes in maternal labour supply within these arrangements:

$$\underbrace{\Delta \bar{D}}_{\text{Total change}} = \underbrace{\sum_g \Delta s_g \bar{D}_{g,0}}_{\text{Composition}} + \underbrace{\sum_g s_{g,0} \Delta \bar{D}_g}_{\text{Within-group}} + \underbrace{\sum_g \Delta s_g \Delta \bar{D}_g}_{\text{Interaction}}, \tag{1}$$

where $g \in \{\text{joint}, \text{sequential}\}$ indexes leave arrangements, $s_{g,t}$ denotes the share of households in arrangement g, and $\bar{D}_{g,t}$ denotes their average maternal days worked over months 5–12. Subscripts $t = 0, 1$ refer to the pre- and post-reform periods, respectively, and Δ denotes the post-minus-pre difference. Changes in composition account for approximately two-thirds of the total increase. More households choose sequential leave and mothers in those households work more. Maternal labour supply differs substantially across leave timing arrangements, yet changes relatively little across policy regimes.

The effect of paternity leave policy on maternal labour supply is not only about take-up. Take-up is high, yet much of it overlaps with maternity leave. At the same time, maternal labour supply is substantially higher among households choosing to take leave sequentially, but aggregate labour supply changes little across policy regimes. Given that the aim of the policy is "the achievement of real and effective equality between men and women" (translated from Jefatura del Estado (2019)), the question is if the policy is targeting the right margin. If subsidising additional leave primarily increases household time together, it may not facilitate the reallocation of childcare that allows mothers to return to market work.

Table 3: Maternal Labour Supply Across Policy Regimes

	Pre-reform	Post-reform	Change
Panel A: Maternal days worked, months 5–12			
All households	184.31	187.77	3.46
Sequential leave	202.71	204.28	1.58
Joint leave	176.04	176.94	0.89
Panel B: Shift-share decomposition			
	Days worked		Share (%)
Composition	2.30		66.4
Within-group	1.10		31.8
Interaction	0.06		1.7

Notes: Panel A reports average cumulative maternal days worked over months 5–12 after childbirth, by policy regime and leave arrangement. Panel B decomposes the overall change into composition, within-group, and interaction effects.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

3.2 Causal Evidence: The 2021 Paternity Leave Reform

I now use the 2021 reform to estimate the causal response of leave-taking and labour market outcomes to an increase in fathers' entitlement. I use a regression discontinuity design around the 2021 reform to estimate its effects on fathers' leave allocation and mothers' labour supply. This section outlines the empirical strategy and results. The elasticity of outcomes to increases in paternity leave length are used to discipline the model.

3.2.1 Empirical Strategy

Design. The 2021 reform created a sharp discontinuity in fathers' parental leave entitlement and eligibility for the longer entitlement depends deterministically on the child's date of birth. I exploit this discontinuity using a sharp regression discontinuity (RD) design.

Let r_i denote the number of days between child i's date of birth and 1 January 2021, so that $r_i = 0$ at the cut-off, and define $D_i = \mathbb{1}\{r_i \geq 0\}$. The regression specification is

$$Y_i = \alpha + \tau D_i + f_-(r_i)\mathbb{1}\{r_i < 0\} + f_+(r_i)\mathbb{1}\{r_i \geq 0\} + \mathbf{X}_i'\gamma + \varepsilon_i, \tag{2}$$

where Y_i denotes the outcome of interest and f_- and f_+ are fitted separately on either side of the cut-off, with $f_-(0) = f_+(0) = 0$. The covariates $\mathbf{X}_i$ enter additively and include both parents' age and education, the day of the week of birth, and an indicator for whether the father was the higher earner before birth.

Identification. Identification requires the conditional means of the potential outcomes, $\mathbb{E}[Y_i(1) \mid r_i = r]$ and $\mathbb{E}[Y_i(0) \mid r_i = r]$, to be continuous at $r = 0$. Under this assumption,

$$\tau = \lim_{r \downarrow 0} \mathbb{E}[Y_i \mid r_i = r] - \lim_{r \uparrow 0} \mathbb{E}[Y_i \mid r_i = r]$$

identifies the local effect of eligibility for the longer entitlement. The assumption allows outcomes to vary with birth date, but rules out other changes at the cut-off that would cause a discontinuity in outcomes even without the reform. The estimates are intention-to-treat effects with respect to leave actually taken.

The extension was announced in 2019, well before the cut-off, potentially leaving scope for parents to adjust the timing of conception or delivery. To address this concern, I examine both the density of births and predetermined characteristics around 1 January. The density test reported in Appendix Figure A5 does not reject continuity at the cut-off. Table A15 reports balance tests of predetermined covariates. None of the reported differences is statistically significant at the 5% level.

Estimation. I estimate local linear regressions with a triangular kernel and use robust bias-corrected inference following Calonico, Cattaneo, and Titiunik (2014). I use a bandwidth of 60 days on either side of the cut-off, which is the mean-squared error optimal bandwidth for the key outcome of interest, mothers' days worked. For consistency, I use this bandwidth for all outcomes and horizons, including the balance tests. This holds the birth-date window fixed across the baseline estimates, so that the results are comparable across across outcomes. Additive adjustment for predetermined covariates can improve precision without changing the RD estimand when their conditional means are continuous at the cut-off (Calonico, Cattaneo, Farrell, et al., 2019). Appendix A.7 reports sensitivity to alternative bandwidths and to excluding births within seven days of the cut-off.

Outcomes. I estimate equation (2) for paternity leave outcomes and labour market outcomes. The paternity leave outcomes are total days of leave taken and leave days taken jointly or separately. The labour market outcomes are days worked per month, hours worked, monthly earnings, and an employment indicator equal to one when the individual holds a contract. Hours worked are measured as the fraction of the usual workday worked, using the contractual hours recorded in the Spanish Social Security employment records *(Vidas Laborales)*. I express changes in this fraction in percentage points. I estimate the effects for mothers and fathers separately and for the father–mother difference within each matched couple.

I focus on outcomes averaged over months 0–12, 13–24 and 25–36 after birth, as well as over months 0–36. These windows show whether changes are concentrated around leave-taking or persist after it ends. For each interval, I construct the mean over the window. All households are observed throughout each window. I also estimate point-in-time outcomes at months 12, 24 and 36 and

cumulative outcomes, reported in Appendix **??**. I also report estimates excluding the months in which the father is on leave. However, because the reform changes the duration and timing of paternal leave, these estimates reflect both changes in labour supply and changes in the composition of months included.

3.2.2 Empirical Results

Leave take-up. Take-up of voluntary leave is not automatic, so I first estimate equation (2) with days of leave taken as the outcome. Row (1) of Figure 3 shows that fathers with children born on or after the cut-off take about 27 more days of leave than their pre-reform counterparts. This is approximately 97% of the statutory increase of 28 days, corroborating the high take-up documented in the stylised facts. Row (2) reports the corresponding estimate for mothers, which is small and statistically insignificant. Given that the reform did not target mothers and mothers were taking virtually all their maternity leave before and after the reform, this is expected.

Leave allocation. How fathers schedule their leave matters as well as whether they take it. Descriptively, there was an increase in the days of leave that fathers take separately from mothers. The last two rows of Figure 3 report the corresponding reform-induced causal effects. Fathers eligible for the longer entitlement take about 16 extra days together with the mother (out of which 14 are mandatory) and eleven additional days separately from the mother. The reform increases separate leave as well as total leave, although most leave is still taken jointly. This confirms that the increase in separate leave documented in the stylised facts is, at least in part, driven by the reform rather than by changes across cohorts.

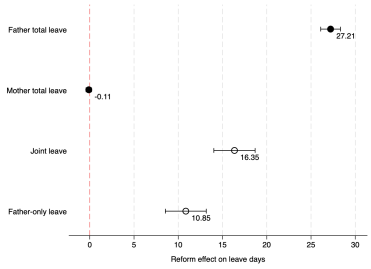


Figure 3: Allocation of Extra Leave Days

Notes: The graph plots the RDD estimates of extra leave days.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Labour market outcomes. I restrict the exposition of labour market outcomes presented here to days worked and monthly wages (Figure 4), averaged across post-birth windows. Other results are available in Appendix Section A.7. Over months 0–12, the reform reduces fathers' days worked by approximately 1.5–2 days per month and the fraction of the usual workday worked by around

5–7 percentage points. Mothers' average labour supply changes little, so the father–mother gaps in days and hours worked narrow over the first year. These effects largely disappear in months 13–24 and 25–36. There is no statistically significant effect on the average earnings gap at the reported horizons in the baseline specification.

The estimates including the leave period are shown by open circles; filled squares exclude months in which the father takes leave. Excluding these months, the estimate for fathers' average days worked is statistically insignificant. The first-year reductions in the days and hours gaps within couples remain statistically significant at the 5% level, subject to the caveat that the reform changes which months are included in the estimation. This pattern is consistent with much of the first-year reduction reflecting additional time on leave. The findings are robust to alternative bandwidths and donut specifications in Appendix Table A21.

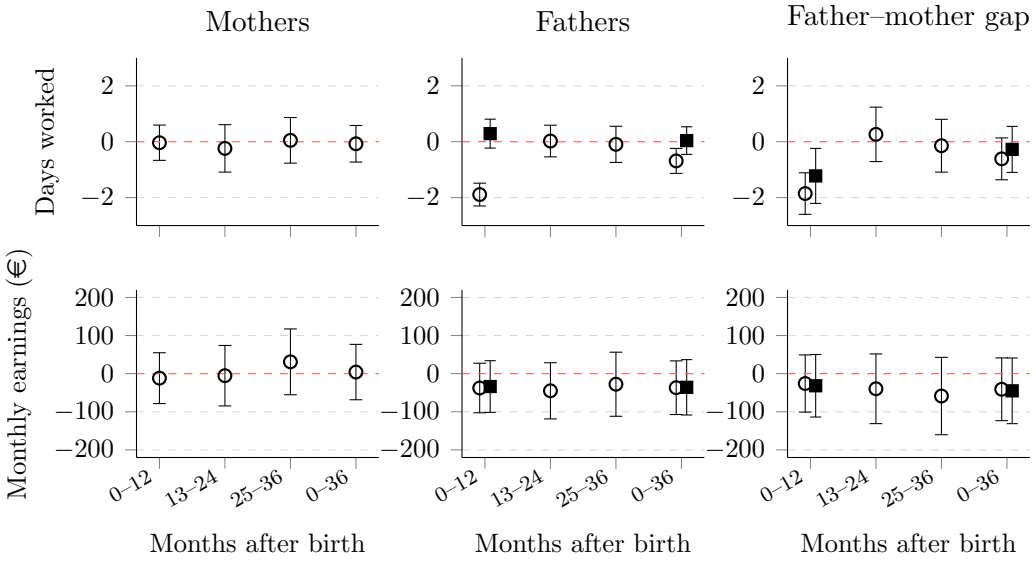


Figure 4: RD estimates of average labour market outcomes

Notes: The figure reports RD estimates for outcomes averaged over the indicated post-birth windows. Open circles denote estimates using all post-birth months. Filled squares denote estimates excluding leave-taking months. Points and whiskers report robust bias-corrected local-linear RD estimates and 95% confidence intervals. All specifications use a triangular kernel, a 60-day bandwidth, and include baseline covariates.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, December 2025–present. Accessed remotely. Own calculations.

The point-in-time estimates in Appendix Figure **??** complement this evidence. There is no statistically significant change in mothers' employment, days or hours worked at months 12, 24 or 36. Fathers' days and hours are slightly higher at month 12, with no corresponding employment effect, and these differences disappear at later horizons.

Appendix Figure **??** reports cumulative days and earnings. Fathers work fewer days in total over months 0–12, while the estimates for mothers remain statistically indistinguishable from zero.

The reduction in fathers' days is smaller and no longer statistically significant when paternal-leave months are omitted.

Leave timing across observable groups. Although I have shown the importance of differences across leave timing choice, I do not estimate separate effects for couples taking joint and sequential leave. The reform affects leave timing. Couples taking sequential leave before and after the reform are, thus, not necessarily comparable, and differences in maternal labour supply may reflect changes in group composition rather than causal effects of the reform. Instead, I perform a shift-share decomposition to explore if the increase in sequential leave-taking is because the share of couples with characteristics associated with sequential leave has increased (composition) or if couples with the same observable characteristics have become more likely to take sequential leave after the reform (within) in Appendix A11. Of the total increase in the share of couples classified as sequential, between 93% and 100% are accounted for by changes within groups, depending on how they are defined[9]. Sequential leave-taking increases within each observable subgroup.

Taken together, the estimates show a large response of paternal leave-taking, including more days taken separately, but little response in mothers' labour supply. In Section 5, I combine these reform estimates with pre-reform outcomes and descriptive pre–post difference to estimate the model parameters. The counterfactuals in Section 6 then vary leave length, timing, and transferability separately, measuring the welfare effect of each, which no reduced form exercise can do.

4 Model

I develop a life-cycle household model to study how the length and timing of paternal leave affect labour-market outcomes. Couples trade off the value of taking leave together against the benefits of sequential leave. Leave also affects future outcomes through employment and human capital. I first present the household model used to study the 2021 reform. I then add a firm-side extension for policies that change selection into paternal leave.

4.1 Environment and Parental Leave

A household consists of a mother, a father, and one child. Parents maximise joint utility with equal welfare weights. I abstract from divorce and subsequent births.[10] Time starts at childbirth. Decisions are monthly until child age three and annual thereafter, through the parents' working lives. Fathers have a job at birth; mothers may be employed or non-employed. Both may receive paid-leave benefits.

[9]The groups are: Mother more educated; Father earns above average wage; Father employed at a large firm; Father is the higher earner within the couple; Income share quantile of father; Age group of each parent.

[10]Although, research has found that the introduction of earmarked parental leave increases divorce (Avdic and Karimi, 2018) and may reduce subsequent fertility (Farré and González, 2019), I assume that an extension of an existing policy does not have these effects.

A model month contains $W = 4$ weeks. The mother takes all 16 weeks of paid leave immediately after birth, as in the data. Thus, her leave is $k_{m,t} = 4$ in months $t = 0, \ldots, 3$ and zero thereafter. Fathers receive 12 weeks in 2020 (four compulsory and eight voluntary) and 16 weeks in 2021 (six compulsory and ten voluntary).

Compulsory weeks are taken immediately after birth, and after they are over, fathers choose voluntary leave $k^v_{p,t}$ each month. Leave benefits replace 100% of earnings. I denote a leave policy, made up of length (compulsory and voluntary), timing, and transferability by $\mathcal{P}$.[11] The father chooses the number of voluntary weeks each month, not their placement within the month and joint leave is

$$j_t = \min\{k_{p,t}, k_{m,t}\},$$

and cumulative joint leave obeys $\bar{J}_{t+1} = \bar{J}_t + j_t$, starting from $\bar{J}_0 = 0$. Paternal leave in months 0–3 is joint; leave in months 4–11 is solo. This is an endogenous choice across months. Appendix B.1 gives the entitlement rules.

4.2 Preferences and Childcare

Until child age three, households value consumption c_t, both parents' leisure $l_{i,t}$, and home-produced childcare Q_t. Joint leave provides an additional payoff. Monthly utility during the leave window is

$$u_t = \log c_t + \sum_{i \in \{m,p\}} \psi_i e^{\nu_{i,t}} \log l_{i,t} + \alpha_Q \log Q_t + \gamma\left[(\bar{J}_t + j_t)^\upsilon - \bar{J}_t^\upsilon\right], \tag{3}$$

where ψ_i, α_Q and $0 < \upsilon < 1$. γ is the taste for joint leave, which varies across households. Parents also have a persistent taste for leisure, $\nu_{m,t}$. See Appendix B.1 for the taste distributions. Each parent has $T^{\text{wk}} = 80$ hours per week available. Outside paid leave, parents choose weekly market hours $h^{\text{wk}}_{i,t} \in \{0, 20, 40\}$ and childcare hours $n^{\text{wk}}_{i,t}$. During a paid-leave week, parents do not spend time on market work, but they spend $\bar{n} = 40$ hours on care.

Monthly hours and leisure satisfy

$$h_{i,t} = (W - k_{i,t}) h^{\text{wk}}_{i,t}, \tag{4}$$

$$n_{i,t} = (W - k_{i,t}) n^{\text{wk}}_{i,t} + k_{i,t}\bar{n}, \tag{5}$$

$$l_{i,t} = WT^{\text{wk}} - h_{i,t} - n_{i,t} > 0. \tag{6}$$

Leave is therefore not equivalent to leisure. Parents produce childcare using their time and caregiving productivity $\phi_{i,t}$:

$$Q_t = \left[\tfrac{1}{2}(\phi_{p,t} n_{p,t})^\rho + \tfrac{1}{2}(\phi_{m,t} n_{m,t})^\rho\right]^{1/\rho}, \tag{7}$$

with substitution elasticity $1/(1-\rho)$, following Del Boca et al. (2014).

[11] The replacement rate is constant in this setup.

Non-parental care provides *coverage* but does not enter Q_t. Let a_t^{cc} indicate access to formal or informal care. When both parents work, the weeks not covered by parental leave are

$$x_t = (W - k_{p,t} - k_{m,t} + j_t)\mathbb{1}\{h_{p,t}^{\text{wk}} > 0,\ h_{m,t}^{\text{wk}} > 0\}.$$

Without access to childcare, at least one parent must be at home to take care of the child. If households have childcare access, the cost is $\chi x_t/W$ per month. Access arrives from child age four months and is then permanent (Appendix B.1), but not every household is covered at birth. This constraint makes the timing of paternal leave relevant for maternal employment.

4.3 Labour-Market Dynamics

Work and leave affect future choices through market human capital $H_{i,t}$ and caregiving productivity $\phi_{i,t}$. Market human capital follows

$$H_{i,t+1} = (1 - \delta_{i,t})H_{i,t} + \zeta_i H_{i,t}^{\alpha_H}\tilde{h}_{i,t}, \tag{8}$$

where $\tilde{h}_{i,t}$ is effective work time. Depreciation depends on time spent working, on paid leave, or out of employment. Work raises future productivity, and interruptions and part-time employment can lower future wages. Hourly wages are

$$\log w_{i,t} = r_i^{\text{init}} + \log H_{i,t} + \varepsilon_{i,t}, \tag{9}$$

where $\varepsilon_{i,t}$ is a transitory shock. Initial human capital is chosen to match the pre-birth wage gap. Appendix B.2 specifies effective hours and depreciation.

Caregiving productivity rises with paid leave:

$$\phi_{i,t+1} = \phi_{i,t} + \xi k_{i,t}, \qquad \phi_{i,0} = \phi_0. \tag{10}$$

Parents work only if they hold a job. Paid parental leave preserves existing job status. Outside protected periods, jobs can end and non-employed parents may receive offers. There is also the opportunity to take one uninterrupted spell of unpaid, but job-protected leave in the first year. Appendix B.2 sets out the transitions.

4.4 Household Problem

Households cannot save or borrow. Net income combines earnings, paid-leave benefits, and a minimum-income transfer. Consumption satisfies

$$y_{i,t} = (1-\tau)w_{i,t}h_{i,t} + b_{i,t}, \tag{11}$$

$$\mathcal{B}_t = \max\{0, \bar{y} - \textstyle\sum_i y_{i,t}\}, \tag{12}$$

$$c_t = \sum_i y_{i,t} + \mathcal{B}_t - \varrho - \chi x_t/W > 0, \tag{13}$$

where τ is the payroll tax and ϱ is child-goods expenditure. Paid leave replaces full-time reference earnings for weeks taken, $b_{i,t} = \bar{w}_{i,t}\bar{h}^{\text{wk}}k_{i,t}$, with $\bar{h}^{\text{wk}} = 40$. The reference wage excludes any firm-side markdown. Benefits and transfers are not taxed.

Let s_t collect human capital, remaining paternal leave, employment and care-access states, preferences, wage shocks, and child age.[12] Given policy $\mathcal{P}$ and τ, the household solves

$$V_t(s_t) = \max_{k^v_{p,t},\, \{h^{\text{wk}}_{i,t}, n^{\text{wk}}_{i,t}\}_{i\in\{m,p\}}} \left\{ u_t + \beta \mathbb{E}_t\left[V_{t+1}(s_{t+1})\right] \right\}, \tag{14}$$

subject to the constraints above, with monthly discount factor β. The mother follows her fixed leave schedule. The father chooses voluntary weeks by comparing their value across months.

Later phases. After paid leave expires, parents continue to choose work and care time until child age three. Thereafter, childcare production and caregiving productivity drop out. Annual labour-supply choices preserve the career effects of earlier decisions, with discount factor β^{12}. Appendix B.3 gives the continuation problems.

4.5 Firm-Side Extension and Equilibrium

The preceding household model is used for the 2020–21 reform. Paternity leave take-up is universal, therefore I estimate this benchmark without the firm-side markdown. I introduce this in a separate calibrated extension. The firm side extension matters for policies that restore selection into fathers' leave-taking, such as a shareable pool of leave weeks, rather than earmarked leave.

In the extension, fathers draw a permanent leave taste $\omega_p \sim \mathcal{N}(0, \sigma^2_\omega)$, not observed by firms. The first voluntary leave week adds the one-off payoff $\omega_p D_{p,t}$, where

$$D_{p,t} = (1 - a^{\text{vl}}_{p,t})\mathbb{1}\{k^v_{p,t} > 0\},$$

[12] Maternal leave and compulsory entitlements follow deterministically from age and policy. During maternal leave, cumulative joint leave is implied by the father's remaining balance. After month three, it drops out of utility. Care-giving productivity drops out after age three. Other states are dropped when their choices expire. See Appendix B.3.

and $a_{p,t}^{\text{vl}}$ records earlier voluntary take-up.

Firms observe whether a father takes leave and use it to infer labour-market attachment. Let d index birth cohorts, and let $\hat{\omega}_d$ be firms' belief about the mean type among voluntary leave-takers. The wage markdown faced by new takers is

$$\kappa_d = \Gamma \hat{\omega}_d, \tag{15}$$

which lowers their log-wage intercept from the first voluntary leave onward. Firms update their beliefs with a lag, using an adaptive learning rule based on the realised mean $\bar{\omega}_d$ among takers and their belief about the mean type of takers in the previous period $\hat{\omega}_d$:

$$\hat{\omega}_{d+1} = (1 - K)\hat{\omega}_d + K\bar{\omega}_d. \tag{16}$$

Increased take-up can make the signal less informative and reduce the markdown, as the average type of taker has a lower mean taste. A lower markdown then encourages further take-up. Appendix B.4 gives the wage-setting and belief details.

Government. The government finances leave benefits and minimum-income transfers through a payroll contribution. For policy counterfactuals, the balanced rate solves

$$\tau^* = \frac{L(\tau^*) + G(\tau^*)}{Y(\tau^*)},$$

where L is leave expenditure, G is other transfers, and Y is the gross labour-income tax base.

Equilibrium. The model is in partial equilibrium. Households take wages, job-transition probabilities, and childcare availability as given. In equilibrium, households optimise subject to the policy environment and the government runs a balanced budget. In the firm-side extension, beliefs must also be at a rest point:

$$\hat{\omega}^* = \bar{\omega}(\Gamma \hat{\omega}^*; \tau^*, \mathcal{P}). \tag{17}$$

There is no labour-market clearing condition: apart from the informational markdown, wage rates do not respond to aggregate labour supply.

5 Model Estimation

I calibrate the benchmark economy to 2020, when fathers were entitled to 12 weeks of paid leave and mothers to 16. I also solve the model under the 2021 entitlement of 16 weeks for fathers and the difference between the two economies provides the model counterpart of the reform effect measured in the data. I proceed in three steps. First, I set some parameters from external evidence and from the data. Second, I estimate 14 household parameters jointly using pre-reform outcomes and

the reform estimates in Section 3. Third, I calibrate the firm-side extension separately using the historical evolution of paternal leave take-up.

Parameter values selected without solving the model. Leave entitlements and other institutional parameters follow the Spanish policy environment, as described in Appendix B.7. I set the monthly discount factor to $\beta = 0.996$, corresponding to an annual discount rate of approximately 4.9%. The curvature of human-capital accumulation, $\alpha_H = 0.7$, follows Huggett et al. (2011), while the utility weight on home-produced childcare, $\alpha_Q = 0.36$, follows Del Boca et al. (2014). The substitution parameter in childcare production, ρ, and the curvature of the joint-leave payoff, υ, are both set to 0.5. The former implies a substitution elasticity of two between parents' care, within the range used in quantitative household models (Blundell, Pistaferri, et al., 2018; Kim and Yum, 2026; Knowles, 2013). I consider alternative values in Appendix B.10.

I set part-time and full-time employment to 20 and 40 hours per week. The hours exponent in learning by doing, $\beta_h = 0.1245$, implies a long-run hourly wage penalty of approximately 25% for part-time work, consistent with Blundell, Costa Dias, et al. (2016). The monthly human-capital depreciation rate while working, $\delta^{\text{work}} = 0.027$, reproduces the decline in earnings growth with experience in the data. This is a gross depreciation rate, offset by learning by doing when parents work. Depreciation during paternal leave, δ_p^l, is set to zero, consistent with the negligible wage penalty associated with fathers' leave. I set the father's monthly separation rate, $\delta_p^{\text{sep}} = 0.009$, to the observed exit rate.

I use the pre-birth wage distribution, including a gender wage gap of 21%, to set initial market human capital. At each model evaluation, I set fathers' learning-by-doing rate, ζ_p, to reproduce their observed pre-birth earnings growth. Maternal employment at birth is set to its observed share in each policy regime. The father's job-finding probability is calibrated directly to the observed monthly re-entry rate of 0.099, giving $\lambda_p^{\text{find}} = 0.102$.

Finally, I set monthly child-related goods expenditure, ϱ, to €556 and the childcare fee, χ, to €200, following Save the Children España (2022). The minimum-income floor, $\bar{y}$, is €738, corresponds to the 2020 amount for two adults with one child (Gobierno de España, 2021). I summarise the externally selected and directly calibrated parameters in Table 4.[13]

Household parameters and identification. I estimate 14 household parameters jointly by simulated method of moments (SMM), using 24 moments of labour supply, wages and leave-taking. I combine pre-reform level outcomes with RDD responses to the 2021 reform and report the estimates, as well as their most informative moments, in Table 5.

Maternal wage profiles distinguish human-capital depreciation and accumulation. The full-time wage penalty shortly after maternity leave informs depreciation while on leave, δ_m^l, while the additional penalty for late returners is informative about depreciation during non-employment,

[13]The markdown of the firm is introduced in the extension.

Table 4: Parameters set externally or calibrated directly

Preferences and technology		*Labour market and institutions*	
Monthly discount factor (β)	0.996	HC depreciation while working (δ^{work})	0.027
HC curvature (α_H)	0.70	HC depreciation on paternal leave (δ_p^l)	0
Childcare utility weight (α_Q)	0.36	Father's separation rate (δ_p^{sep})	0.009
Care substitution (ρ)	0.50	Father's job-finding rate (λ_p^{find})	0.1019
Joint-leave curvature (υ)	0.50	Pre-birth gender wage gap	0.210
Hours exponent (β_h)	0.125	Child-related goods (ϱ)	€556
Full-time hours per week	40	Childcare fee (χ)	€200
Part-time hours per week	20	Minimum-income floor ($\bar{y}$)	€738

Notes: The job-finding rate for fathers is calibrated directly to the observed re-entry rate. Fathers' learning-by-doing rate ζ_p is recalculated at each model evaluation to match pre-birth earnings growth and therefore has no fixed value in this table.

δ_m^{ne}. Maternal earnings growth from returning to work after childbirth provides a benchmark for learning by doing on the job, ζ_m.[14]

The return-to-work profile helps distinguish preferences from labour-market frictions. The leisure weights, ψ_m and ψ_p, are informed by maternal return and work patterns and by fathers' part-time employment and days worked, respectively. The dispersion of maternal leisure tastes, σ_ν, accounts for differences in how quickly mothers return, while the re-draw probability, λ_ν, affects the persistence of those differences. Initial childcare availability, π_0^{cc}, affects return immediately after the four months of maternity leave, while the arrival rate of childcare access, λ^{cc}, shapes the early return profile. Access to unpaid, job-protected leave, π_0^{ul}, allows mothers to delay their return without losing their job.

The maternal job-finding probability, λ_m^{find}, is determined by re-entry at 24 and 36 months after birth, conditional on not being employed previously. When fathers take their leave provides information about preferences over timing. A higher average taste for joint leave across the population, makes joint leave more attractive, while dispersion in the taste means households respond differently to the same entitlement. The targeted pre-reform moments are the share of paternal leave taken after the mother, fathers' leave-taking one month after childbirth month 1 and the share of overlap of leave with mothers. The RDD responses then inform how the reform affects paternity leave timing. These moments are the change in fathers that are taking leave in them month after maternity leave ends and the change in late leave-taking (i.e. in months 5–12 after birth).

The estimation also targets the responses of the within-couple days-worked gap separately for sequential and simultaneous arrangements. These moments connect the leave timing to changes in household labour supply and help discipline the increase in care-giving productivity from leave, ξ. The reform mechanically reduces fathers' days worked as it increases leave days. However, the additional response of household labour supply, given the timing of leave, informs care-productivity

[14] Fathers' learning-by-doing rate, ζ_p, is pinned down using paternal pre-birth earnings growth.

accumulation. In couples where fathers are more productive, they take over more childcare, and mothers can work more.

I impose a common rate of caregiving-productivity accumulation for both parents, $\xi_m = \xi_p = \xi$, set fathers' non-employment depreciation equal to mothers', $\delta_p^{\text{ne}} = \delta_m^{\text{ne}}$, and tie the maternal separation rate to her job-finding rate. These restrictions leave 14 free household parameters.

For each parameter vector, I solve the household problem and simulate 50,000 households under both leave regimes.[15] All additional information on the SMM, including objective function, moment scaling and weights, is provided in Appendix C.6.

Table 5: Household parameters estimated by SMM

Parameter	Interpretation	Estimate	Main identifying moments
Market human capital and labour supply			
δ_m^l	HC depreciation on maternity leave	0.0033	Wage penalty 6m post birth
δ_m^{ne}	HC depreciation out of employment	0.0087	Wage penalty returning at 24m
ζ_m	Maternal learning by doing	0.00014	Wage recovery after childbirth
ψ_m	Mother's leisure weight	0.69	Return to work; work/part-time days
ψ_p	Father's leisure weight	0.56	Work/part-time days
Leave timing and caregiving productivity			
μ_γ	Mean of joint-leave taste	0.53	Paternity leave timing
σ_η	Dispersion of joint-leave taste	0.20	Variation in leave timing
ξ	Care-productivity LBD on leave	0.039	RDD by leave timing
Return dynamics, childcare and job frictions			
σ_ν	Maternal leisure-taste dispersion	0.40	Return at 6–36 months after childbirth
λ_ν	Taste re-draw probability	0.055	Re-entry at 24 and 36 months
π_0^{cc}	Initial childcare availability	0.12	Early maternal return
λ^{cc}	Arrival of childcare access	0.37	Slope of return-to-work profile
π_0^{ul}	Access to protected unpaid leave	0.29	Returns at 6 months, relative to 24
λ_m^{find}	Maternal job-finding probability	0.048	Re-entry at 24 and 36 months

Notes: The last column reports the main sources of identification. The RDD moments are estimated using the specifications outlined in Section 3.

Firm-side calibration. I calibrate the firm-side extension separately, holding the estimated household parameters fixed. I first choose the dispersion of fathers' leave-taking taste, $\sigma_\omega = 1.844$, to reproduce conditional take-up of approximately 95% in 2018. The idea behind this is that, at this point, the remaining reason for not taking leave is taste, rather than discrimination.[16]

I then use the evolution of take-up between 2007 and 2018 to discipline firms' beliefs. There was

[15] I minimise the objective function using the TikTak multistart global optimisation algorithm described by Arnoud et al. (2019), combining an initial global search over Sobol points with local Nelder–Mead minimisation.

[16] Introducing this heterogeneity changes benchmark levels by at most 3%, so I retain the estimated household parameters.

no policy change until 2017, yet take-up increased markedly. This provides information about belief adjustment of firms. The 2017 and 2018 extensions then changed the incentives to take leave for fathers by making the leave length more generous. I solve the household model under the historical entitlements and jointly fit the initial markdown, κ_0, the response of wages to firms' beliefs, Γ, and the annual updating gain, K, to the take-up path.

More concretely, to fit the initial markdown, I ask what the wage cost for fathers would have to be for the take-up rate to match the observed one, given household preferences. The response of wages and annual updating gain are then disciplined by the take-up path. The speed of the increase in take-up between 2007–2016 identifies the gain, and the 2017 and 2018 extensions discipline how far the markdown falls as the composition of takers changes. This gives $\kappa_0 = 0.80\%$, $\Gamma = 0.006$ and $K = 0.83$. As leave-taking becomes more common, the average type of a taker changes and the wage markdown falls, reaching approximately 0.06% by 2020. This supports abstracting from the markdown when estimating the benchmark household model. Details of the historical policy sequence and belief updating are given in Appendix C.7.

The transferability counterfactual uses an additional historical moment. Before 2007, fathers could use up to 10 weeks of the mother's entitlement. There was no non-transferable, earmarked leave. The rationale for allowing the wage response to differ from that under earmarked leave is the following: with a shared pool, fathers taking a week means that the mother loses her week, which is very different from fathers taking a week that would otherwise be lost. I use the 1.66% take-up rate of fathers in 2002–06 to infer the markdown consistent with take-up under a shared pool, holding the estimated household parameters fixed. I then set the pool-specific response to firms' beliefs, Γ_{pool}, so that the implied markdown is stationary. This yields $\kappa_{\text{pool}} = 6.3\%$ and $\Gamma_{\text{pool}} = 0.075$. Appendix C.7 reports the fixed-point calculation.

5.1 Estimation Results

Table 6 the fit of the model to the data. The model reproduces direction of the reform effects on mothers' labour supply well, slightly overstating the return rates of mothers. It also captures the larger wage losses among mothers who return later, although it understates the six-month full-time wage penalty. Turning to fathers' labour supply, the model generally fits the direction well, slightly overstating the part-time and unpaid leave share of fathers. Turning to leave timing, the model reproduces the broad calendar of fathers' leave. Crucially, it reproduces the difference in days worked between leave timing arrangements well. Finally, the model matches the aggregate reform responses well the overstating the decline in the first-year within-couple days-worked gap by around half a day (-2.6 rather than -1.9 days per month).

Beyond the 24 targeted moments, the model predicts a 6.81 percentage point increase in the share of couples classified as sequential following the reform, compared with 6.5 percentage points in the data. Additionally, the model predicts a difference in maternal days worked in the first year after birth between sequential and joint couples of 2.5, while it is 2.3 in the data. This provides

an additional check on the model's response along the timing margin, which is a key mechanism of the model. Further untargeted moments can be found in Appendix Table B4. In general, the model matches the reform effects very well.

Table 6: Model fit: targeted moments

Moment	Data	Model
Maternal employment		
Returned to work after 6/12 months	0.754/0.799	0.761/0.814
Returned to work after 24/36 months	0.837/0.839	0.859/0.858
Re-entry, 24/36 at months | out before	0.497/0.394	0.534/0.417
Maternal wages		
Within-couple FT wage penalty at 6/12 months	−0.029/−0.023	−0.016/−0.027
24m, late minus early returners	−0.070	−0.080
Paternal labour supply and take-up		
Father part-time, 12m	0.050	0.073
Father's earnings rel. pre-birth at 12/24 months	0.983/0.924	0.888/0.871
Father takes unpaid leave	0.018	0.047
Leave timing and conditional reform responses		
Non-overlapping share of paternal leave	0.257	0.304
Father on leave, birth month 1	0.593	0.666
after maternal paid leave	0.148	0.164
RDD: father on leave, month 3	0.390	0.387
after maternal paid leave	0.052	0.020
RDD: days gap | sequential	−0.734	−0.710
days gap | simultaneous	−0.617	−0.666
Aggregate reform responses		
Within-couple days gap, year 1/3	−1.880/ − 0.080	−2.551/ − 0.092
Father's days worked, year 1	−2.012	−2.226
Mother part-time, year 1	−0.007	0.007

Firm-side fit. Figure 5 compares observed and model-implied paternal leave take-up between 2007 and 2018. The model reproduces the increase in take-up well, although it slightly underpredicts the increase in take-up rates following the 2017 reform. On the other hand, it almost exactly matches the take-up following the 2018 reform.

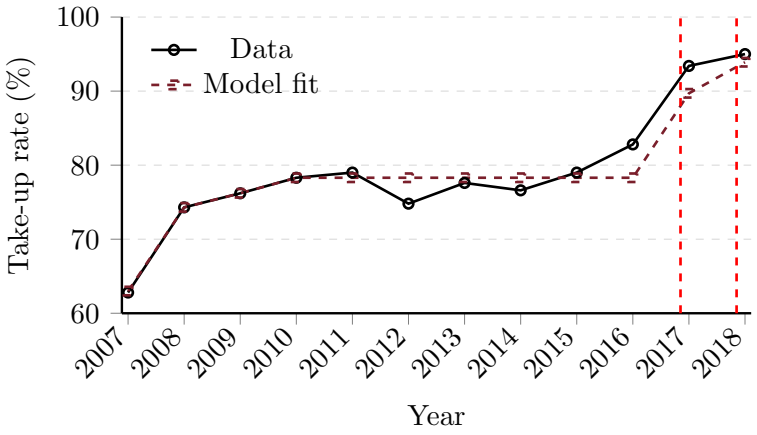


Figure 5: Paternity leave take-up, 2007–2018, model versus data

Notes: Take-up rates 2007–2018 in the data (Farré, Felfe, et al., 2023) and the model.

6 Counterfactuals

In this section I vary each of the three key dimensions of the design of paternity leave: the length of the entitlement, the timing of fathers' leave, and the non-transferability. I focus on maternal employment one year after birth as a key outcome of interest, and report all other outcomes in Appendix C. I also report consumption-equivalent welfare at birth (CEV) and the payroll tax required to balance the government budget. Each counterfactual is evaluated at its own balanced-budget tax rate and wage markdown, should paternity leave become informative to firms. The replacement rate is kept constant at 100% in each counterfactual. The welfare criterion and financing assumptions are described in Appendix C.1.

6.1 Length

In this counterfactual I consider three changes in leave length: an increase in paternity leave only, an increase in maternity leave only, and an increase of both. I increase each entitlement, or both, to 24 weeks in total. Table 7 reports the results.

Increasing paternity leave by eight weeks increases maternal employment at 12 months by 1.6 percentage points, compared with 0.7 percentage points when only mothers' leave is extended. The share of fathers' leave taken without the mother rises from 28% to 42% under the increase in paternity leave, whereas it falls to 13% under the maternity leave extension. The additional paternal weeks, thus, extend childcare coverage beyond maternity leave, while additional maternal weeks prolong the period mothers spend away from work. Increasing paternity leave increases maternal employment when the additional weeks provide childcare after mothers return to work (see Appendix Table C1 for all outcomes).

Table 7: Extending parental leave by eight weeks

Design	Maternal emp. 12m (%)	Non-overlap share (%)	Payroll tax (%)	CEV (%)
2021 benchmark	82.6	27.9	2.578	0.000
Father +8 weeks	84.2	41.6	3.264	+0.356
Mother +8 weeks	83.3	13.3	3.159	+0.349
Both parents +8 weeks	84.0	14.3	3.860	+0.655

Notes: Each extension increases the entitlement to 24 weeks. CEV is measured relative to the 2021 benchmark; the tax balances the government budget.

This policy is quite expensive: extending paternal leave raises the payroll tax from 2.58% to 3.26%, while welfare increases by 0.36%. The welfare gain depends on fathers' learning in home production. When this mechanism is switched off, an eight-week paternal extension instead reduces welfare by 0.14%, although it still increases maternal employment (Appendix Table C2).

To illustrate the effect that leave length increases are most effective in increasing maternal labour supply when longer leave means that fathers take leave after mothers, I decompose the effect of extending leave by how it depends on when the additional weeks are taken. Figure C2 illustrates this using the 2021 extension of the fathers' entitlement from 12 to 16 weeks. When all leave is forced to be taken jointly with maternity leave, the extension increases maternal employment at 12 months by only 0.06 percentage points. When fathers can choose the timing of their leave and take around 30% of their leave separately from mothers, this increases maternity leave by 0.38 percentage points. Thus, most of the effect of the reform comes from allowing the additional weeks to extend childcare coverage, rather than from increasing the entitlement alone.

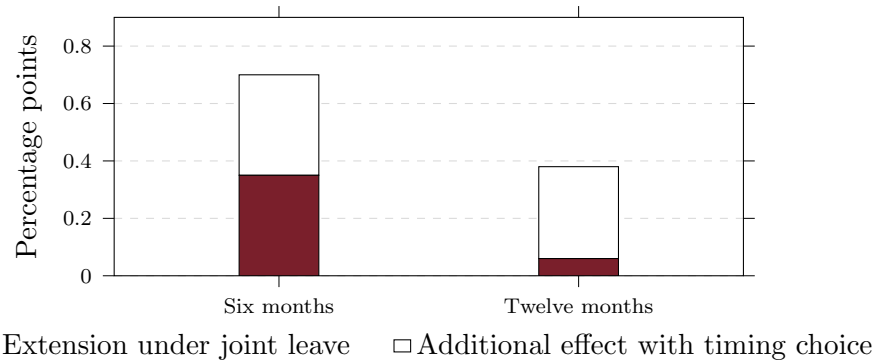


Figure 6: The Role of Timing in the Effect of Extending Paternity Leave

Notes: The dark bars show the effect of extending paternal leave from 12 to 16 weeks when all leave must overlap with maternal leave. The light bars show the additional effect when households can choose the timing of voluntary leave.

6.2 Timing

The timing of paternity leave has larger effects on maternal employment than the modest extension of the entitlement considered above. The empirical analysis shows that mothers' labour supply differs across leave arrangements, but households select into these arrangements. To isolate the effect of timing, I hold the 2021 entitlements fixed at 16 weeks for each parent and change when fathers can take their leave by forcing a certain set of leave weeks to be taken either together or after the mother. I consider all leave together, all of the 10 voluntary leave weeks separately, and all 16 weeks of leave separately, relative to the benchmark in Table 8.

Table 8: The timing of paternal leave at a fixed entitlement

Timing rule	Maternal emp. 12m (%)	Non-overlap share (%)	Payroll tax (%)	CEV (%)
All joint	74.8	0.0	2.619	-0.742
2021 benchmark: free choice	82.6	27.9	2.578	0.000
Ten voluntary weeks sequential	83.5	62.4	2.564	-0.209
All 16 weeks sequential	84.5	100.0	2.534	-0.737

Notes: The mother's entitlement is fixed at 16 weeks. CEV is relative to the 2021 benchmark.

Allowing fathers to choose when to take voluntary leave raises maternal employment at 12 months from 74.8% under joint-only leave to 82.6%. At six months, the corresponding increase is from 64.8% to 78.1% (Appendix Figure C1). Requiring all ten voluntary weeks to be taken after the end of maternity leave raises employment at 12 months to 83.5%. Finally, forcing all 16 weeks of leave to be taken sequentially, increases mothers' employment after birth to 84.5%.

Thus, fathers taking leave after mothers substitutes for unpaid leave mothers would otherwise take after the end of paid maternity leave, allowing them to return to work earlier. The differences arise mainly from the allocation of leave rather not its take-up, which remains close to universal across these timing rules (Appendix Tables C3 and C5). The balanced budget tax rate is also similar among these experiments, as the length of the leave entitlement remains unchanged.

However, the employment gains come with a trade-off in household welfare (Figure C1). Moving from joint-only leave to free choice increases welfare by about 0.74 percentage points. Moving all 16 weeks after the mother's leave reduces welfare by 0.74%, almost entirely offsetting the gain from allowing free choice rather than joint-only leave. Households value spending time at home together and retaining flexibility over when leave is taken. They also jointly optimise within the household, so any mandate is welfare-reducing.

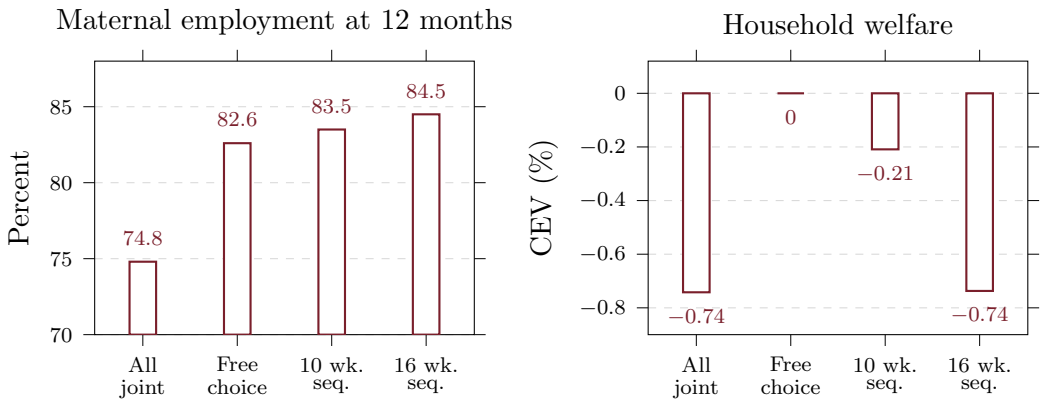


Figure 7: Maternal Employment and Household Welfare Across Paternal Leave Timing Regimes

Notes: All counterfactuals use the 2021 entitlement. Welfare is measured relative to the 2021 benchmark with free timing choice.

The model rationalises why increasing the entitlement with the 2021 reform has limited effects on maternal labour market outcomes with through this timing margin. When much of the additional leave overlaps with maternity leave, mothers' labour market outcomes are not much improved. Thus, an extension that mainly increases overlap does little to relieve mothers' childcare constraints after their leave ends.

6.3 Transferability

Replacing earmarked parental leave with a shared pool of transferable leave reduces fathers' leave-taking, which reactivates the signalling value of paternity leave take-up. The wage penalty associated with taking leave emerges again.

In this counterfactual, I replace the benchmark entitlements of 16 weeks per parent with six compulsory weeks for each parent and a ten-week transferable pool. Unlike earmarked leave, shared weeks can be taken by either parent. This restores selection into paternal leave-taking, making it informative about fathers' labour-market attachment.

Figure 8 illustrates how the wage markdown affects the allocation of transferable leave. Without a markdown, half of the shared pool, but, as the markdown increases, fathers' leave uptake rate decreases. At a wage markdown of 5.5%, fathers' leave falls to 0.14 weeks, while mothers take the rest of the leave available to the household. The wage penalty reinforces the traditional household specialisation and the allocation of leave towards mothers.

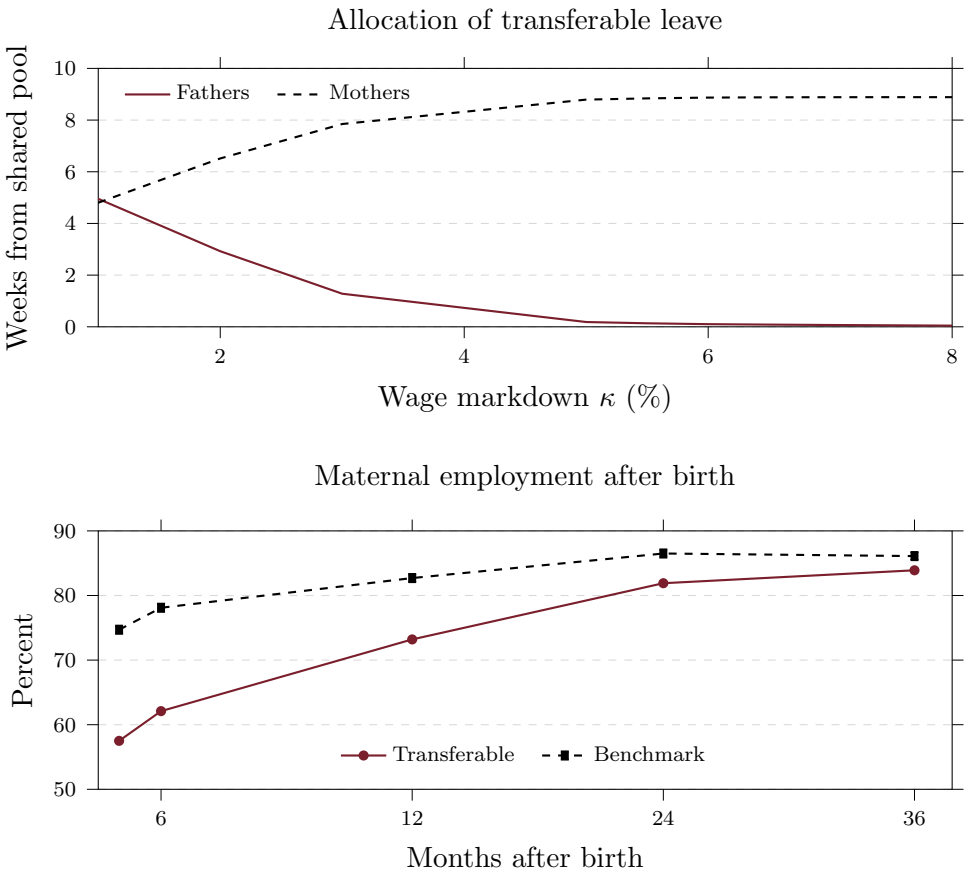


Figure 8: Transferability, Leave Allocation and Maternal Employment

Notes: Panel A shows the allocation of the ten-week shared pool between parents at different imposed wage markdowns. Panel B compares maternal employment under the 2021 earmarked entitlement and transferable leave. The mother's original 16-week entitlement and the father's six compulsory weeks remain unchanged.

This has substantial effects on maternal employment. Under this policy, maternal employment at 12 months falls from approximately 83% to 73%. This effect is most drastic in the short run. The employment gap narrows over time but persists two years after childbirth.

Table 9 reports the outcomes. Only 1.6% of fathers take any shared leave. The wage markdown increases is 5.5% and, relative to the benchmark, household welfare falls by 2.21%, despite the lower payroll tax.

6.4 Formal Childcare and Paternal Leave

Extending formal childcare, rather than informal childcare, reduces the need for fathers to take leave after mothers return to work. The counterfactuals have shown the importance of childcare availability, so that mothers may return to work earlier.

Making childcare universally available increases maternal employment at 12 months from 82.6%

Table 9: Replacing earmarked paternal leave with a shared pool

Design	Maternal emp. 12m (%)	Wage markdown κ (%)	Payroll tax (%)	CEV (%)
2021 earmarked benchmark	82.6	–	2.578	0.000
Shared pool: 2021 point	73.5	5.54	1.661	-3.230

Notes: Under the policy, six compulsory weeks per parent remain, ten voluntary weeks become a shared pool that either parent may draw. The shared pool is evaluated at the initial markdown, inverted from the observed pre-2007 take-up of transferable weeks.

to 85.0% and reduces the share of paternity leave taken without overlap from 27.9% to 4.9%. With reliable childcare, fathers can take more leave jointly with mothers, rather than using it to cover gaps in care. Removing childcare fees instead increases employment to 83.9%, but reduces maternal earnings at 24 months, as some mothers shift from full-time to part-time work. These results suggest that childcare availability can substitute for sequential fathers in supporting maternal employment. The detailed experiments, including the removal of paternal leave, are reported in Appendix Table C7.

Together, the counterfactuals show that paternal leave is most effective in supporting maternal employment when it provides care after maternity leave and remains earmarked to fathers. While flexibility over the timing of paternity leave supports maternal employment, flexibility over its allocation between parents has the opposite effect. Transferability reinforces traditional household specialisation, and firms' wage-setting responses further discourage fathers from taking leave. Additional outcomes are reported in Appendix Table C6.

7 Conclusion

Why could equalising paternity leave lead to a small aggregate effect on mothers' labour supply, even though fathers took almost all of the leave made available to them? The results of this paper suggest that the answer lies in how fathers take leave relative to mothers, not only if they take leave at all. When paternity leave is taken while the mother is also on leave, this increases fathers' time at home without changing the division of care between parents.

Using a novel linked administrative dataset covering the universe of parental-leave recipients in Spain, I show that fathers took around 97 percent of the additional leave made available by the reform and increased the number of days they took separately from mothers, although the majority is still taken jointly. Yet the reform produced no detectable change in mothers' labour market outcomes. I use a quantitative life-cycle household model to understand why and provide policy counterfactuals.

The model rationalizes the data findings of a small effect on maternal labour market outcomes because the channels through which paternity leave can affect maternal outcomes are relatively weak in this particular setting. The coverage channel is weak as most leave still remains joint. If

fathers take leave at the same time as mothers, the short duration of leave means that mothers still need to stay home once leave ends. The productivity channel is also weak because the increase in fathers' leave entitlement was relatively small, and equalising fathers' and mothers' leave means that, at most, fathers become as productive as mothers. Finally, the employer channel is also weak in this setting: because fathers take leave almost universally, leave-taking conveys little information about their underlying attachment to the labour market, leaving little scope for the reform to affect wages through employer beliefs.

The counterfactuals show that different dimensions of leave design operate through distinct margins. Increasing the length of the entitlement of fathers by 8 weeks, while holding that of mothers constant, increases female employment a year after birth by 2%. In terms of timing, moving from a purely joint leave set-up to free choice increases maternal employment by 10% one year after childbirth. Forcing all leave to be taken sequentially raises maternal employment by an additional 2% relative to free choice, but offsets the welfare gain from allowing choice. Overall, moving from purely joint to purely sequential leave increases maternal employment by 12%. The last policy margin, non-transferability, is crucial. A transferable pool restores selection into leave-taking, because each week of paternity leave is a week that could otherwise be taken by the mother, rather than a week lost. This generates a wage markdown for fathers who take leave, which deters paternal uptake. Only 2% of fathers still take leave from the shared pool, which reinforces traditional household specialisation, and maternal employment at 12 months after birth declines by 11%. These counterfactuals suggest that extending fathers' leave entitlements alone is not sufficient to substantially increase maternal employment; how policies shape take-up and the timing of leave within households is equally important.

The results reiterate that take-up is an incomplete measure of the effectiveness of earmarked paternity leave. A policy can induce nearly all fathers to take leave without changing who provides care or who adjusts labour supply. There are other key design margins, such as timing of leave, that can more strongly affect intra-household specialisation and, through that, maternal labour supply and household welfare.

Future work will extend this in two directions. A richer firm side would make it possible to study how firms adjust their hiring and wage-setting decisions in anticipation of paternity leave. Firms already anticipate employment interruptions associated with motherhood, but the expansion of paternity leave may lead them to anticipate similar interruptions for fathers in the longer run. This could reduce gender differences in hiring and wages without necessarily eliminating the distortions associated with anticipated leave-taking. A general equilibrium framework would allow me to quantify how these adjustments affect the allocation of labour, aggregate employment, and welfare. It would be interesting to explicitly distinguish between reducing gender inequality and improving labour-market efficiency, as they may not go hand-in-hand. On the household side, a promising extension is to incorporate intra-household bargaining over leave-taking and labour supply decisions. Parents' relative bargaining power may influence whether leave is taken jointly or sequentially.

These choices, affect future earnings and potentially bargaining power itself, creating a feedback mechanism that could reinforce household specialisation over time.

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A Empirical Appendix

A.1 Sample Composition: Merging

Table A1: Sample Size and Characteristics Across Matching Stages

	Raw births	Raw benefits		Cleaned benefits		Final matched	
	Sample	Fathers	Mothers	Fathers	Mothers	Fathers	Mothers
Panel A: Sample size							
Observations	983,982	625,246	594,811	497,407	496,145	380,642	396,624
Share of raw births (%)	100.00	63.54	60.45	50.55	50.42	38.68	40.31
Retention from preceding stage (%)	–	63.54	60.45	79.55	83.41	76.53	79.94
Panel B: Birth year (%)							
2020	24.55	24.40	24.63	24.56	24.86	26.13	26.30
2021	25.57	25.90	25.63	25.84	25.47	27.21	26.91
2022	25.01	24.99	24.91	24.93	24.83	24.49	24.45
2023	24.86	24.71	24.82	24.67	24.85	22.17	22.33
Panel C: Father's education (%)							
Category 1	32.83	29.51	–	28.12	–	26.58	–
Category 2	32.71	35.21	–	35.72	–	36.61	–
Category 3	32.95	33.58	–	34.43	–	35.35	–
Missing	1.50	1.71	–	1.73	–	1.47	–
Panel D: Mother's education (%)							
Category 1	21.36	–	27.06	–	13.45	–	12.82
Category 2	29.55	–	34.56	–	31.29	–	31.69
Category 3	46.27	–	34.24	–	53.38	–	53.59
Missing	2.82	–	4.13	–	1.88	–	1.91

Notes: Raw births include births in 2020–2023. Raw benefits refer to births matched with uncleaned benefit records. Cleaned benefits refer to births matched with cleaned benefit records. Final matched samples apply subsequent linking and sample restrictions. Retention rates are calculated relative to the preceding stage. Education shares include missing values. Percentages unless stated otherwise.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

A.2 Sample Descriptives

Table A2: Sample Characteristics

	(1) Full sample	(2) RD sample	(3) Abs. std. diff.
Panel A: Demographic characteristics			
Father's age at birth	36.15	36.14	0.003
Mother's age at birth	34.03	34.06	0.006
College degree, fathers	0.36	0.38	0.035
College degree, mothers	0.55	0.57	0.035
Panel B: Labour-market characteristics			
Monthly wage, fathers	2,251.73	2,245.08	0.006
Monthly wage, mothers	1,878.35	1,848.14	0.029
Part-time employment, fathers	0.06	0.06	0.019
Part-time employment, mothers	0.20	0.20	0.018
Father employed in large firm	0.52	0.51	0.018
Mother employed in large firm	0.55	0.53	0.038
Panel C: Intra-household characteristics			
Father's share of couple earnings	0.55	0.55	0.015
Mother out-earns father	0.32	0.32	0.012
Equally educated	0.54	0.54	0.010
Observations	321,343	24,838	

Notes: RD sample: births within 60 days of the cutoff. Absolute standardized differences compare the full and RD samples using pooled standard deviations. Large firm: at least 50 employees.
Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A3: Leave-taking Characteristics

	Full sample		RD sample		Abs. std. diff.	
	Pre	Post	Pre	Post	Pre	Post
Panel A: Fathers						
Days of leave taken	78.76	108.42	80.27	107.98	0.139	0.034
Share taking full entitlement	0.81	0.90	0.88	0.89	0.224	0.038
Panel B: Mothers						
Days of leave taken	111.01	111.74	111.46	111.74	0.087	0.000
Panel C: Household						
Father's share of household leave	0.41	0.49	0.42	0.49	0.087	0.032
Mother-only days	52.68	38.33	52.58	36.63	0.005	0.059
Father-only days	20.43	35.02	21.40	32.88	0.047	0.074
Any parent on leave	131.44	146.75	132.85	144.61	0.067	0.074
Observations	83,778	237,565	11,881	12,957		

Notes: RD sample: births within 60 days of the cutoff. Standardized differences compare full and RD samples separately by reform status.
Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A4: Leave Composition

	Full sample		RD sample		Abs. std. diff.	
	Pre	Post	Pre	Post	Pre	Post
Sequential (%)	30.99	42.58	32.86	40.29	0.047	0.047
Joint (%)	69.01	57.42	67.14	59.71	0.047	0.047
All taken jointly	48.51	35.32	47.15	38.28	0.017	0.005
Less than half sequential	8.50	7.61	8.09	7.50	0.015	0.011
At least half sequential	17.25	24.61	16.76	24.15	0.032	0.065
All taken sequentially	22.57	29.75	24.76	27.04	0.060	0.064
No voluntary leave taken	3.17	2.71	3.24	3.03	0.005	0.020
Observations	83,774	237,400	11,880	12,942		

Notes: Sequential leave: at least half of fathers' leave taken without the mother on leave. Standardized differences compare full and RD samples; category-specific denominators exclude missing values.
Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A5: Distribution of Parental Leave Days by Birth Year and Parent

Birth year	Parent	*N*	P5	P10	P25	Median	P75	P90	Mean
Panel A: Children born in 2020									
2020	Fathers	81,440	42.0	56.0	84.0	84.0	84.0	84.0	77.51
	Mothers	81,440	112.0	112.0	112.0	112.0	112.0	112.0	110.79
Panel B: Children born in 2021									
2021	Fathers	86,430	63.0	91.0	112.0	112.0	112.0	112.0	105.87
	Mothers	86,430	112.0	112.0	112.0	112.0	112.0	112.0	111.58
Panel C: Children born in 2022									
2022	Fathers	86,610	70.0	91.0	112.0	112.0	112.0	112.0	105.80
	Mothers	86,610	112.0	112.0	112.0	112.0	112.0	112.0	111.45
Panel D: Children born in 2023									
2023	Fathers	87,221	70.0	82.0	112.0	112.0	112.0	112.0	105.23
	Mothers	87,221	112.0	112.0	112.0	112.0	112.0	112.0	111.25

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

A.3 Motivating Evidence

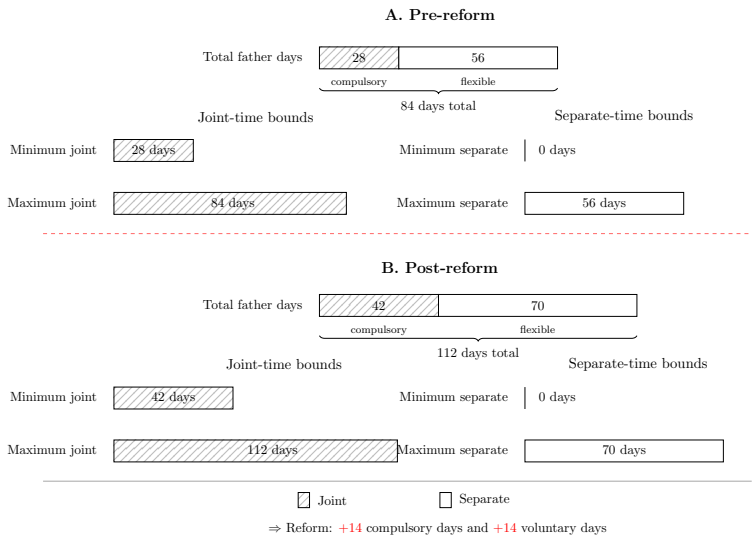


Figure A1: Parental leave entitlements before and after the 2021 reform

Notes: The figure illustrates possible allocations of parental leave, given compulsory and voluntary entitlements.

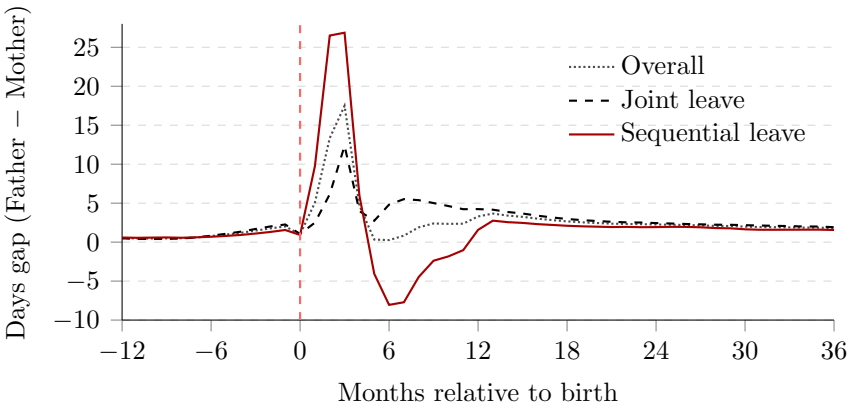


Figure A2: Within-Household days gap by leave timing: adjusted and unadjusted differences

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, December 2025–present. Accessed remotely. Own calculations.

Table A6: Correlates of Sequential Parental Leave

	OLS					Logit
	(1)	(2)	(3)	(4)	(5)	(6)
Within-household log earnings gap	-0.016***	-0.027***	-0.022***	0.002	-0.004	-0.014
	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.035)
Father's earnings (€1,000)	0.231***	0.239***	0.195***	0.244***	0.194***	0.933***
	(0.009)	(0.009)	(0.009)	(0.013)	(0.013)	(0.063)
Father's earnings squared	-0.036***	-0.039***	-0.034***	-0.039***	-0.033***	-0.157***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.009)
Mother's earnings (€1,000)	0.114***	0.074***	0.070***	0.019	0.018	0.055
	(0.009)	(0.009)	(0.009)	(0.013)	(0.013)	(0.063)
Mother's earnings squared	-0.017***	-0.014***	-0.013***	-0.007***	-0.006***	-0.024***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.009)
Either near	-0.056***	-0.046***	-0.049***	-0.049***	-0.045***	-0.193***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.017)
Post reform	0.117***	0.119***	0.120***	0.119***	0.122***	0.541***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.011)
Father college		0.027***	0.025***	0.025***	0.025***	0.109***
		(0.003)	(0.003)	(0.003)	(0.003)	(0.014)
Mother college		0.057***	0.043***	0.042***	0.040***	0.176***
		(0.003)	(0.003)	(0.003)	(0.003)	(0.012)
Father's age		0.000*	-0.002***	-0.003***	-0.002***	-0.008***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Mother's age		0.003***	0.002***	0.002***	0.002***	0.010***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Father in large firm			0.071***	0.071***	0.066***	0.286***
			(0.002)	(0.002)	(0.002)	(0.010)
Father's experience (years)			0.006***	0.006***	0.005***	0.022***
			(0.000)	(0.000)	(0.000)	(0.001)
Father higher earner				-0.011***	-0.012***	-0.056***
				(0.003)	(0.003)	(0.012)
Days-worked gap				0.000	0.000*	0.002*
				(0.000)	(0.000)	(0.001)
Hours-worked gap				-0.013**	-0.019***	-0.084***
				(0.005)	(0.005)	(0.024)
Father's earnings share				-0.271***	-0.177***	-0.964***
				(0.059)	(0.059)	(0.291)
Occupation FE			✓	✓	✓	✓
Sector FE					✓	✓
Region FE					✓	✓
Observations	216042	216042	216042	216042	216042	216042
R^2	0.047	0.051	0.060	0.060	0.071	
Pseudo-R^2						0.054

Notes: Dependent variable: sequential leave. Robust SEs in parentheses; logit coefficients in (6). Earnings in thousands of euros. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

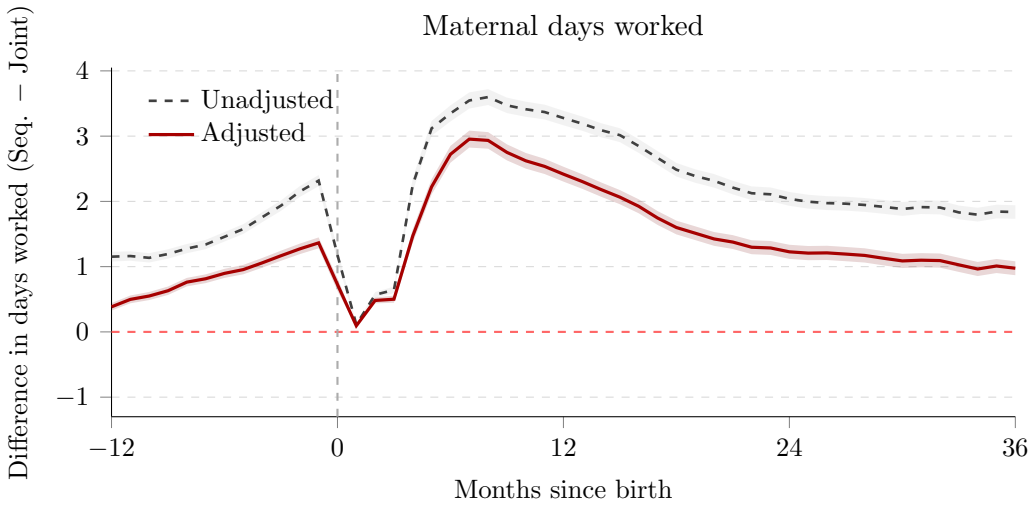


Figure A3: Maternal days worked by leave timing: adjusted and unadjusted differences

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, December 2025–present. Accessed remotely. Own calculations.

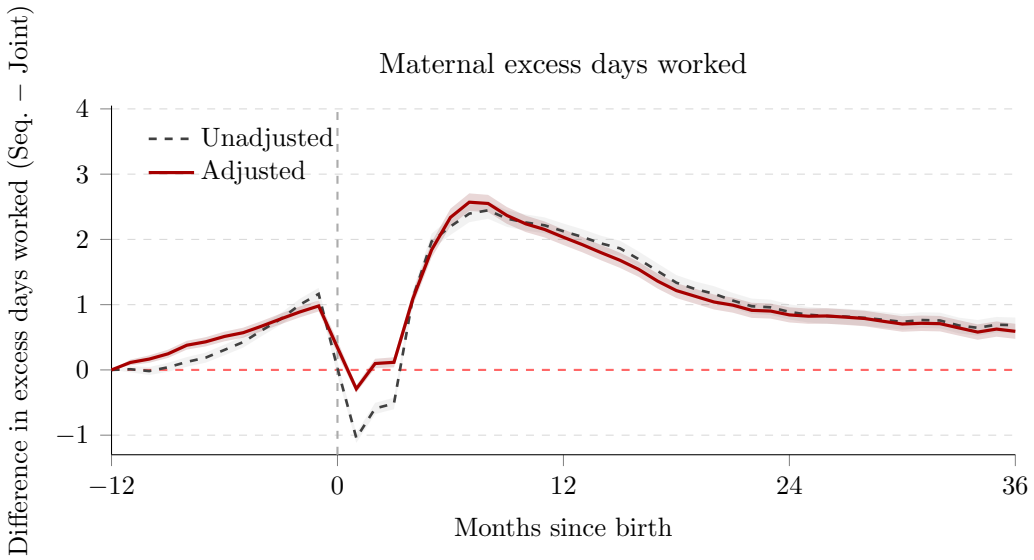


Figure A4: Maternal excess days worked by leave timing: adjusted and unadjusted differences

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, December 2025–present. Accessed remotely. Own calculations.

A.4 Leave Timing Across Observable Groups

Couples taking leave jointly differ systematically from those taking it sequentially. Table A10 compares pre-birth characteristics by leave arrangement. Sequential leave-takers are more highly

Table A7: Summary Statistics Before and After the 2021 Reform

Statistic	Age at birth, fathers	Age at birth, mothers	Days, mothers	Days, fathers	Hours, mothers	Hours, fathers	Wage, fathers	Wage, mothers	Wage gap	Log wage gap
Panel A: Pre-reform										
Mean	36.40	34.19	29.52	29.85	0.838	0.945	2,206.35	1,784.60	421.76	0.245
P10	30	29	29	30	0.500	0.875	1,110.21	683.41	−972.57	−0.443
P25	33	31	30	30	0.750	1.000	1,486.17	1,107.34	−188.55	−0.089
Median	36	34	31	31	1.000	1.000	1,990.35	1,560.27	372.81	0.207
P75	40	37	31	31	1.000	1.000	2,916.66	2,370.60	1,092.60	0.581
P90	43	40	31	31	1.000	1.000	4,070.10	3,353.63	1,880.65	0.974
N	38,432	38,432	38,432	38,432	38,432	38,432	38,432	38,432	38,432	36,149
Panel B: Post-reform										
Mean	36.31	34.21	29.28	29.53	0.843	0.943	2,267.87	1,880.27	387.60	0.221
P10	30	29	29	29	0.500	0.875	1,138.30	729.17	−1,068.02	−0.460
P25	33	31	30	30	0.750	1.000	1,522.77	1,160.05	−236.97	−0.105
Median	36	34	30	30	1.000	1.000	2,061.09	1,660.28	329.51	0.180
P75	39	37	31	31	1.000	1.000	3,019.62	2,537.30	1,078.25	0.547
P90	42	40	31	31	1.000	1.000	4,070.10	3,529.60	1,869.88	0.939
N	41,009	41,009	41,009	41,009	41,009	41,009	41,009	41,009	41,009	38,561
Panel C: Full sample										
Mean	36.35	34.20	29.40	29.68	0.841	0.944	2,238.11	1,833.99	404.13	0.233
P10	30	29	29	29	0.500	0.875	1,124.01	705.84	−1,023.97	−0.453
P25	33	31	30	30	0.750	1.000	1,504.23	1,132.38	−212.86	−0.097
Median	36	34	31	31	1.000	1.000	2,022.60	1,606.30	351.09	0.193
P75	39	37	31	31	1.000	1.000	2,969.75	2,464.97	1,085.68	0.563
P90	43	40	31	31	1.000	1.000	4,070.10	3,444.17	1,874.03	0.957
N	79,441	79,441	79,441	79,441	79,441	79,441	79,441	79,441	79,441	74,710

Notes: Pre/post refers to births before/on or after January 1, 2021. Outcomes are measured one year before birth; hours are full-time equivalents and the earnings gap is father minus mother.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A8: Parental Educational Attainment Before and After the 2021 Reform

	Fathers		Mothers	
Educational level	*N*	%	*N*	%
Panel A: Pre-reform				
No education	1	0.00	0	0.00
Incomplete primary education	39	0.10	25	0.07
Primary education	433	1.13	269	0.70
Lower-secondary education	9,797	25.49	4,696	12.22
General upper-secondary education	2,889	7.52	2,212	5.76
Vocational upper-secondary education	4,641	12.08	4,150	10.80
Post-secondary non-tertiary education	42	0.11	55	0.14
Higher vocational education	6,295	16.38	5,602	14.58
Short-cycle university degree	4,794	12.47	7,774	20.23
University degree	5,467	14.23	6,930	18.03
Master's degree or equivalent	2,363	6.15	4,263	11.09
Doctorate	701	1.82	886	2.31
Missing	970	2.52	1,570	4.09
Total	**38,432**	**100.00**	**38,432**	**100.00**
Panel B: Post-reform				
No education	0	0.00	0	0.00
Incomplete primary education	38	0.09	25	0.06
Primary education	474	1.16	257	0.63
Lower-secondary education	9,557	23.30	4,432	10.81
General upper-secondary education	3,144	7.67	2,207	5.38
Vocational upper-secondary education	4,786	11.67	4,189	10.21
Post-secondary non-tertiary education	85	0.21	87	0.21
Higher vocational education	7,122	17.37	6,100	14.87
Short-cycle university degree	5,243	12.78	9,017	21.99
University degree	6,056	14.77	7,388	18.02
Master's degree or equivalent	3,072	7.49	5,306	12.94
Doctorate	928	2.26	1,212	2.96
Missing	504	1.23	789	1.92
Total	**41,009**	**100.00**	**41,009**	**100.00**

Notes: Pre/post refers to births before/on or after January 1, 2021. Missing education is reported separately; percentages may not sum to 100 due to rounding.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A9: Employment in Large Firms Before and After the 2021 Reform

	Fathers	Mothers
Pre-reform	50.15	51.69
Post-reform	52.54	55.69
Full sample	51.92	54.65

Notes: Percentage of parents working at firms with at least 50 employees at birth. Pre/post refers to January 1, 2021.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

educated, earn higher monthly wages and are less likely to work part-time. Intra-household earnings shares are similar across the two groups, with father-breadwinner couples accounting for the majority in both. Firm characteristics also differ: 59% of fathers in sequential households work in large firms, compared with 46% in joint-leave households. These associations do not identify the effect of firms on leave timing.

Table A10: Characteristics by Leave Timing

	(1) Joint leave	(2) Sequential leave	(3) Std. diff.
Panel A: Demographic characteristics			
Father's age at birth	35.82	36.67	0.173
Mother's age at birth	33.72	34.64	0.223
College degree, fathers	0.34	0.46	0.264
College degree, mothers	0.52	0.66	0.303
Panel B: Labour-market characteristics			
Monthly wage, fathers	2,075.39	2,533.44	0.391
Monthly wage, mothers	1,704.39	2,092.52	0.369
Part-time employment, fathers	0.08	0.04	-0.173
Part-time employment, mothers	0.21	0.17	-0.107
Father employed in large firm	0.46	0.59	0.248
Mother employed in large firm	0.50	0.57	0.146
Panel C: Intra-household characteristics			
Father's share of couple earnings	0.55	0.55	-0.002
Mother out-earns father	0.32	0.31	0.011
Equally educated	0.52	0.58	0.095
Observations	15,720	9,118	

Notes: Sample means by leave timing. Sequential leave requires at least half of fathers' leave taken separately. Signed standardised differences are sequential minus joint, divided by the pooled SD.
Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Changes within and across groups. To examine whether the increase in sequential leave reflects changes within observable groups or changes in their population shares, I use a shift-share decomposition:

$$\Delta\bar{Y} = \underbrace{\sum_k s_{k,0}(\bar{Y}_{k,1} - \bar{Y}_{k,0})}_{\text{Within-group}} + \underbrace{\sum_k \bar{Y}_{k,0}(s_{k,1} - s_{k,0})}_{\text{Composition}} + \underbrace{\sum_k (s_{k,1} - s_{k,0})(\bar{Y}_{k,1} - \bar{Y}_{k,0})}_{\text{Interaction}}. \tag{A1}$$

Here $\bar{Y}_{k,t}$ is the share of couples classified as sequential in group k and period t, and $s_{k,t}$ is the group's population share. A couple is classified as sequential if the father takes at least half of his leave separately from the mother. Periods $t = 0$ and $t = 1$ denote the pre- and post-reform samples.

Table A11: Sequential Leave-Taking Across Observable Groups

Characteristic	Group	Pre	Post	Change
Panel A: Relative education				
Mother more educated	No	0.351	0.409	0.058
	Yes	0.291	0.391	0.100
Panel B: Paternal wage				
High paternal wage	No	0.272	0.347	0.075
	Yes	0.453	0.509	0.056
Panel C: Father's firm size				
Large firm	No	0.271	0.341	0.070
	Yes	0.387	0.458	0.072
Panel D: Household breadwinner				
Father higher earner	No	0.324	0.392	0.068
	Yes	0.331	0.407	0.077
Panel E: Father's pre-birth share of household income				
Income share quartile	Q1	0.316	0.370	0.054
	Q2	0.351	0.436	0.085
	Q3	0.341	0.419	0.078
	Q4	0.308	0.385	0.078

Notes: Sequential-leave rates by pre-birth subgroup and period. Change is post minus pre (not an RD estimate). Quartiles use fathers' pre-birth earnings share.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A12: Decomposition of the Increase in Sequential Leave-Taking

Characteristic	Within-group	Composition	Total
Father's age	0.073	0.000	0.074
Mother's age	0.073	0.000	0.074
Relative education	0.074	0.001	0.074
Paternal wage	0.069	0.006	0.074
Father employed at large firm	0.071	0.003	0.074
Household breadwinner	0.074	−0.000	0.074
Father's pre-birth income share	0.074	0.000	0.074
Sequential leave rate, pre		0.329	
Sequential leave rate, post		0.402	

Notes: The change in sequential leave (7.4 pp) is decomposed into within-group and composition effects; small interaction terms are omitted. See Table A14.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A13: Sequential Leave-Taking by Parental Age Group

Group	N_0	N_1	Share_0	Share_1	Seq._0	Seq._1	Δ Seq.	Within	Composition	Interaction
Panel A: Father's age										
0	476	509	0.040	0.039	0.258	0.312	0.054	0.002	−0.000	−0.000
1	964	973	0.081	0.075	0.182	0.268	0.087	0.007	−0.001	−0.001
2	2,990	3,420	0.252	0.264	0.310	0.387	0.077	0.019	0.004	0.001
3	4,620	5,114	0.389	0.395	0.350	0.436	0.086	0.033	0.002	0.000
4	2,228	2,337	0.188	0.180	0.376	0.422	0.046	0.009	−0.003	−0.000
5	603	604	0.051	0.047	0.371	0.421	0.049	0.002	−0.002	−0.000
Panel B: Mother's age										
0	697	743	0.059	0.057	0.265	0.354	0.089	0.005	−0.000	−0.000
1	1,734	1,801	0.146	0.139	0.225	0.302	0.077	0.011	−0.002	−0.001
2	3,833	4,424	0.323	0.341	0.320	0.411	0.091	0.029	0.006	0.002
3	4,390	4,712	0.369	0.364	0.371	0.432	0.062	0.023	−0.002	−0.000
4	1,170	1,218	0.098	0.094	0.383	0.430	0.047	0.005	−0.002	−0.000
5	57	59	0.005	0.005	0.491	0.492	0.000	0.000	−0.000	−0.000

Notes: Subscripts 0 and 1 denote pre- and post-reform values; shares are group frequencies. Within is the pre-reform-share-weighted change in sequential leave. Age-group codes follow the underlying data.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

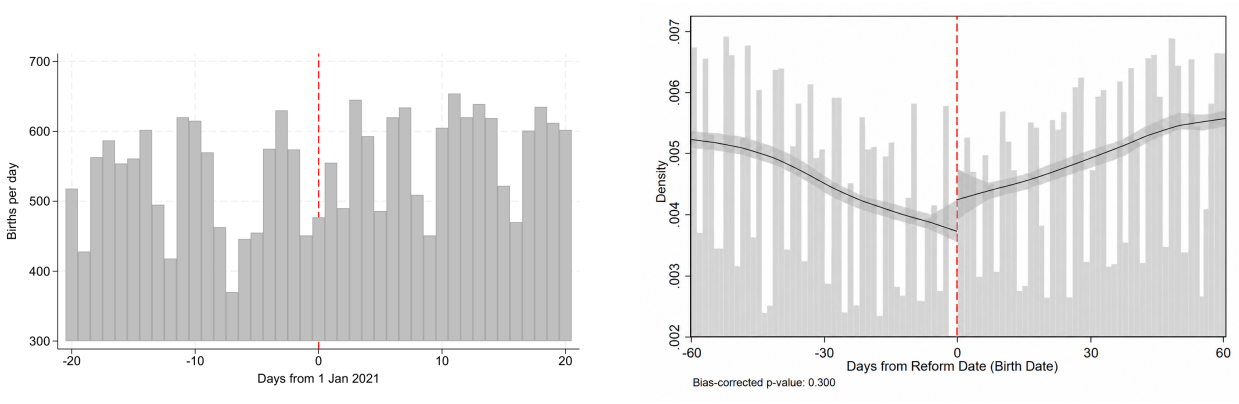
Table A14: Heterogeneity in Changes in Sequential Leave-Taking

Characteristic	Group	N_0	N_1	Share_0	Share_1	Seq._0	Seq._1	Δ Seq.	Within	Composition	Interaction
Panel A: Relative education											
Mother more educated	No	7,480	8,280	0.630	0.639	0.351	0.409	0.058	0.037	0.003	0.001
	Yes	4,401	4,677	0.370	0.361	0.291	0.391	0.100	0.037	−0.003	−0.001
Panel B: Paternal wage											
High paternal wage	No	8,178	8,513	0.688	0.657	0.272	0.347	0.075	0.051	−0.009	−0.002
	Yes	3,703	4,444	0.312	0.343	0.453	0.509	0.056	0.017	0.014	0.002
Panel C: Father's firm size											
Large firm	No	5,979	6,173	0.503	0.476	0.271	0.341	0.070	0.035	−0.007	−0.002
	Yes	5,902	6,784	0.497	0.524	0.387	0.458	0.072	0.036	0.010	0.002
Panel D: Household breadwinner											
Breadwinner	Mother higher earner	3,721	4,146	0.313	0.320	0.324	0.392	0.068	0.021	0.002	0.000
	Father higher earner	8,160	8,811	0.687	0.680	0.331	0.407	0.077	0.053	−0.002	−0.001
Panel E: Father's income share											
Income share quartile	Q1	2,848	3,213	0.240	0.248	0.316	0.370	0.054	0.013	0.003	0.000
	Q2	2,791	3,259	0.235	0.252	0.351	0.436	0.085	0.020	0.006	0.001
	Q3	3,123	3,239	0.263	0.250	0.341	0.419	0.078	0.020	−0.004	−0.001
	Q4	3,113	3,233	0.262	0.250	0.308	0.385	0.078	0.020	−0.004	−0.001

Notes: Definitions follow Table A12. Income-share quartiles use fathers' pre-birth share of couple earnings; missing values are excluded.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

A.5 RDD Validity



(a) Daily Births

(b) Density Discontinuity Test

Figure A5: Testing for Manipulation around the Reform Cut-off

Source: BBELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A15: Balance Tests at the RD Cut-off

Variable	RD Estimate	Robust SE	p-value
Panel A: Pre-treatment characteristics			
Mother more educated	0.012	0.021	0.56
Mother in large firm at birth	0.029	0.022	0.184
Father in large firm at birth	0.011	0.022	0.625
Mother college educated	0.028	0.022	0.21
Father college educated	0.009	0.022	0.671
Panel B: Pre-treatment household gaps			
Wage gap	-67.767	51.074	0.185
Log wage gap	-0.057	0.031	0.07
Days worked gap	0.077	0.442	0.863
Hours worked gap	-0.001	0.016	0.961
Father higher earner	-0.017	0.020	0.409
Panel C: Mother's pre-treatment outcomes			
Log wage	0.041	0.028	0.15
Wage	59.257	44.945	0.187
Days worked	0.132	0.35	0.7053
Hours worked	0.001	0.013	0.919
Employed	-0.001	0.011	0.957
Education level	0.166	0.104	0.108
Age at birth	0.156	0.184	0.398
Panel D: Father's pre-treatment outcomes			
Log wage	-0.022	0.023	0.325
Wage	-8.510	46.211	0.854
Days worked	0.209	0.308	0.498
Hours worked	0.001	0.011	0.961
Employed	0.004	0.01	0.681
Education level	0.154	0.113	0.171
Age at birth	-0.014	0.22	0.948

Notes: Bias-corrected local-linear RD estimates at the January 2021 cutoff, 60-day bandwidth and triangular kernel. Robust standard errors and p-values.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A16: Fuzzy RDD: Allocation of Additional Fathers' Leave

	First stage Fathers' leave days	Joint leave days	Father-only leave days
Reform eligibility	27.40^{***}		
	(0.56)		
Fathers' leave days		0.59^{***}	0.41^{***}
		(0.039)	(0.048)
Bandwidth	60	60	60

Notes: Reform eligibility instruments for fathers' leave days. Joint and father-only columns report fuzzy RD effects per additional father day; robust SEs in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

A.6 RDD Results

Table A17: RDD Estimates of Point-in-Time Labour Market Outcomes

	12 months	24 months	36 months
Panel A: Mothers			
Monthly earnings (€)	23.107	74.607*	96.199**
	(42.323)	(44.212)	(47.807)
Days worked	0.063	-0.121	0.328
	(0.526)	(0.513)	(0.507)
Hours worked	-0.005	0.003	0.011
	(0.016)	(0.016)	(0.016)
Employment	0.004	-0.002	0.004
	(0.017)	(0.016)	(0.015)
Panel B: Fathers			
Monthly earnings (€)	14.021	45.648	66.639
	(38.004)	(41.925)	(46.948)
Days worked	1.489***	-0.440	0.194
	(0.371)	(0.390)	(0.426)
Hours worked	0.043***	-0.018	0.004
	(0.012)	(0.013)	(0.014)
Employment	0.006	-0.012	-0.004
	(0.011)	(0.011)	(0.012)
Panel C: Intra-household gaps			
Monthly earnings gap (€)	-9.085	-28.958	-29.560
	(49.723)	(52.559)	(57.525)
Days worked gap	1.426**	-0.319	-0.134
	(0.634)	(0.586)	(0.586)
Hours worked gap	0.048**	-0.021	-0.007
	(0.020)	(0.019)	(0.019)
Observations	23,318	23,318	23,318

Notes: Bias-corrected local-linear RD estimates; robust SEs in parentheses. Triangular kernel, 60-day bandwidth, baseline covariates. Gaps are father minus mother. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A18: RDD Estimates of Average Labour Market Outcomes

	0–12 months	13–24 months	25–36 months	0–36 months
Panel A: Mothers				
Monthly earnings (€)	-11.804	-5.326	30.996	4.178
	(34.029)	(40.459)	(44.051)	(37.064)
Days worked	-0.036	-0.239	0.049	-0.074
	(0.322)	(0.433)	(0.416)	(0.334)
Hours worked	-0.003	-0.004	0.006	0.000
	(0.010)	(0.014)	(0.014)	(0.011)
Employment	-0.002	-0.008	0.003	-0.002
	(0.013)	(0.014)	(0.013)	(0.012)
Panel B: Fathers				
Monthly earnings (€)	-37.658	-45.003	-27.746	-36.826
	(33.181)	(37.609)	(42.893)	(35.903)
Days worked	-1.891***	0.024	-0.094	-0.687**
	(0.208)	(0.289)	(0.330)	(0.228)
Hours worked	-0.062***	-0.001	-0.002	-0.023**
	(0.007)	(0.010)	(0.011)	(0.008)
Employment	0.002	0.002	-0.003	0.000
	(0.008)	(0.009)	(0.010)	(0.008)
Panel C: Intra-household gaps				
Monthly earnings gap (€)	-25.854	-39.677	-58.742	-41.003
	(38.290)	(46.647)	(51.776)	(42.010)
Days worked gap	-1.855***	0.263	-0.143	-0.613
	(0.379)	(0.497)	(0.482)	(0.382)
Hours worked gap	-0.059***	0.003	-0.009	-0.022*
	(0.012)	(0.017)	(0.016)	(0.013)
Observations	23,318	23,318	23,318	23,318

Notes: Bias-corrected local-linear RD estimates; robust SEs in parentheses. Triangular kernel, 60-day bandwidth, baseline covariates. Gaps are father minus mother. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A19: RDD Estimates of Total Labour Market Outcomes

	0–12 months	13–24 months	25–36 months	0–36 months
Panel A: Mothers				
Total earnings (€)	-153.449	-63.917	371.948	154.582
	(442.375)	(485.505)	(528.614)	(1371.361)
Days worked	-0.471	-2.869	0.584	-2.756
	(4.187)	(5.190)	(4.989)	(12.355)
Hours worked	-0.038	-0.051	0.077	-0.013
	(0.134)	(0.172)	(0.167)	(0.420)
Employment	-0.031	-0.093	0.040	-0.084
	(0.170)	(0.168)	(0.160)	(0.428)
Panel B: Fathers				
Total earnings (€)	-489.553	-540.037	-332.955	-1362.545
	(431.358)	(451.313)	(514.715)	(1328.412)
Days worked	-24.583***	0.284	-1.127	-25.426**
	(2.699)	(3.469)	(3.960)	(8.420)
Hours worked	-0.804***	-0.012	-0.026	-0.842**
	(0.096)	(0.122)	(0.135)	(0.302)
Employment	0.025	0.023	-0.036	0.012
	(0.103)	(0.110)	(0.126)	(0.284)
Earnings, excluding leave (€)	-669.618**	–	–	-1542.610
	(307.636)			(1182.909)
Days worked, excluding leave	-1.086	–	–	-1.929
	(2.684)			(8.239)
Hours worked, excluding leave	-0.100	–	–	-0.138
	(0.093)			(0.294)
Panel C: Intra-household gaps				
Total earnings gap (€)	-336.104	-476.120	-704.902	-1517.127
	(497.773)	(559.760)	(621.316)	(1554.384)
Days worked gap	-24.112***	3.154	-1.711	-22.670
	(4.921)	(5.966)	(5.789)	(14.144)
Hours worked gap	-0.766***	0.039	-0.102	-0.829*
	(0.161)	(0.200)	(0.197)	(0.487)
Earnings gap, excluding leave (€)	-399.730	–	–	-1580.753
	(353.213)			(1416.603)
Days worked gap, excluding leave	-10.901**	–	–	-9.458
	(4.304)			(13.654)
Hours worked gap, excluding leave	-0.329**	–	–	-0.392
	(0.140)			(0.468)
Observations	23,318	23,318	23,318	23,318

Notes: Bias-corrected local-linear RD estimates; robust SEs in parentheses. Triangular kernel, 60-day bandwidth, baseline covariates. Cumulative sums; "excl. leave" omits fathers' leave months. Gaps are father minus mother. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

A.7 RDD Robustness

Table A20: Robustness of RDD Estimates for Point-in-Time Labour Market Outcomes

	12 months				24 months				36 months			
	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)
Panel A: Mothers												
Monthly earnings (€)	23.107	4.248	42.266	112.951	74.607*	49.686	77.813**	181.452**	96.199**	91.836	85.201**	159.236*
	(42.323)	(61.107)	(29.214)	(75.979)	(44.212)	(64.083)	(30.329)	(76.917)	(47.807)	(69.004)	(33.024)	(85.120)
Days worked	0.063	-0.493	0.320	1.309	-0.121	-0.157	0.193	0.225	0.328	0.537	0.143	-0.315
	(0.526)	(0.755)	(0.363)	(0.952)	(0.513)	(0.742)	(0.351)	(0.890)	(0.507)	(0.744)	(0.347)	(0.882)
Hours worked	-0.005	-0.010	0.001	0.005	0.003	0.012	0.005	-0.015	0.011	0.020	0.005	-0.019
	(0.016)	(0.023)	(0.011)	(0.030)	(0.016)	(0.023)	(0.011)	(0.028)	(0.016)	(0.023)	(0.011)	(0.028)
Employment	0.004	-0.008	0.007	0.021	-0.002	0.005	-0.002	-0.015	0.004	0.003	-0.001	-0.006
	(0.017)	(0.024)	(0.012)	(0.031)	(0.016)	(0.022)	(0.011)	(0.027)	(0.015)	(0.022)	(0.010)	(0.027)
Panel B: Fathers												
Monthly earnings (€)	14.021	22.995	18.000	30.356	45.648	53.038	59.694**	53.766	66.639	92.979	59.626*	31.207
	(38.004)	(55.088)	(26.524)	(70.757)	(41.925)	(60.179)	(29.356)	(77.445)	(46.948)	(68.262)	(32.534)	(86.456)
Days worked	1.489***	1.521**	0.691**	1.412**	-0.440	-0.815	0.026	0.158	0.194	0.107	0.031	0.033
	(0.371)	(0.551)	(0.253)	(0.671)	(0.390)	(0.562)	(0.273)	(0.736)	(0.426)	(0.627)	(0.293)	(0.773)
Hours worked	0.043***	0.047**	0.012	0.021	-0.018	-0.023	-0.009	-0.020	0.004	0.007	-0.003	-0.014
	(0.012)	(0.018)	(0.009)	(0.022)	(0.013)	(0.019)	(0.009)	(0.024)	(0.014)	(0.021)	(0.010)	(0.025)
Employment	0.006	0.002	-0.001	0.005	-0.012	-0.018	-0.007	-0.014	-0.004	-0.003	-0.005	-0.023
	(0.011)	(0.016)	(0.008)	(0.021)	(0.011)	(0.016)	(0.008)	(0.022)	(0.012)	(0.018)	(0.009)	(0.023)
Panel C: Intra-household gaps												
Monthly earnings gap (€)	-9.085	18.748	-24.266	-82.595	-28.958	3.352	-18.119	-127.686	-29.560	1.143	-25.575	-128.029
	(49.723)	(71.449)	(34.560)	(91.485)	(52.559)	(75.610)	(36.463)	(94.216)	(57.525)	(81.946)	(40.263)	(106.749)
Days worked gap	1.426**	2.014**	0.372	0.103	-0.319	-0.658	-0.167	-0.067	-0.134	-0.430	-0.111	0.348
	(0.634)	(0.925)	(0.433)	(1.125)	(0.586)	(0.845)	(0.405)	(1.066)	(0.586)	(0.836)	(0.408)	(1.059)
Hours worked gap	0.048**	0.057**	0.012	0.016	-0.021	-0.034	-0.013	-0.005	-0.007	-0.013	-0.008	0.005
	(0.020)	(0.029)	(0.014)	(0.035)	(0.019)	(0.027)	(0.013)	(0.035)	(0.019)	(0.027)	(0.013)	(0.035)
Observations	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780

Notes: Bias-corrected RD estimates (robust SEs in parentheses). Triangular kernel and baseline controls. Donut excludes ±7 days; gaps are father minus mother. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A21: Robustness of RDD Estimates for Average Labour Market Outcomes

	0–12 months				13–24 months				25–36 months				0–36 months			
	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)
Panel A: Mothers																
Monthly earnings (€)	-11.804	-5.895	-7.511	72.156	-5.326	-33.532	9.902	99.550	30.996	36.797	23.336	87.979	4.178	-1.012	8.141	86.172
	(34.029)	(49.380)	(23.448)	(60.867)	(40.459)	(58.565)	(27.704)	(70.471)	(44.051)	(63.858)	(30.240)	(77.050)	(37.064)	(53.783)	(25.429)	(65.113)
Days worked	-0.036	-0.051	-0.228	0.107	-0.239	-0.303	-0.008	-0.053	0.049	0.238	-0.067	-0.386	-0.074	-0.039	-0.105	-0.105
	(0.322)	(0.467)	(0.222)	(0.577)	(0.433)	(0.625)	(0.295)	(0.743)	(0.416)	(0.599)	(0.287)	(0.735)	(0.334)	(0.484)	(0.228)	(0.578)
Hours worked	-0.003	0.001	-0.009	-0.002	-0.004	0.002	0.003	-0.014	0.006	0.016	0.004	-0.017	0.000	0.006	-0.001	-0.011
	(0.010)	(0.015)	(0.007)	(0.019)	(0.014)	(0.021)	(0.010)	(0.025)	(0.014)	(0.020)	(0.010)	(0.025)	(0.011)	(0.016)	(0.008)	(0.020)
Employment	-0.002	-0.001	-0.010	-0.002	-0.008	-0.009	-0.001	-0.003	0.003	0.008	0.000	-0.006	-0.002	-0.001	-0.004	-0.004
	(0.013)	(0.019)	(0.009)	(0.023)	(0.014)	(0.020)	(0.010)	(0.024)	(0.013)	(0.019)	(0.009)	(0.023)	(0.012)	(0.017)	(0.008)	(0.020)
Panel B: Fathers																
Monthly earnings (€)	-37.658	-19.646	-18.374	-10.349	-45.003	-26.356	-25.726	-69.939	-27.746	-4.706	-22.303	-50.114	-36.826	-16.977	-22.033	-42.572
	(33.181)	(48.104)	(23.011)	(60.928)	(37.609)	(54.050)	(26.296)	(69.705)	(42.893)	(61.930)	(29.922)	(79.366)	(35.903)	(51.875)	(25.016)	(66.456)
Days worked	-1.891***	-2.035***	-2.058***	-1.517***	0.024	0.040	-0.050	-0.591	-0.094	-0.192	-0.151	-0.525	-0.687**	-0.764**	-0.788***	-0.895**
	(0.208)	(0.304)	(0.146)	(0.387)	(0.289)	(0.414)	(0.203)	(0.551)	(0.330)	(0.486)	(0.228)	(0.602)	(0.228)	(0.331)	(0.159)	(0.427)
Hours worked	-0.062***	-0.067***	-0.069***	-0.049***	-0.001	0.000	-0.003	-0.020	-0.002	-0.003	-0.004	-0.017	-0.023**	-0.025**	-0.026***	-0.029*
	(0.007)	(0.011)	(0.005)	(0.014)	(0.010)	(0.015)	(0.007)	(0.019)	(0.011)	(0.017)	(0.008)	(0.021)	(0.008)	(0.012)	(0.006)	(0.015)
Employment	0.002	-0.002	-0.005	0.012	0.002	0.001	-0.001	-0.014	-0.003	-0.008	-0.004	-0.016	0.000	-0.003	-0.003	-0.005
	(0.008)	(0.012)	(0.006)	(0.015)	(0.009)	(0.013)	(0.006)	(0.018)	(0.010)	(0.015)	(0.007)	(0.019)	(0.008)	(0.011)	(0.005)	(0.014)
Panel C: Intra-household gaps																
Monthly earnings gap (€)	-25.854	-13.752	-10.864	-82.504	-39.677	7.176	-35.627	-169.489**	-58.742	-41.503	-45.639	-138.093	-41.003	-15.965	-30.174	-128.744*
	(38.290)	(55.447)	(26.616)	(71.143)	(46.647)	(66.983)	(32.360)	(84.020)	(51.776)	(73.881)	(36.265)	(96.161)	(42.010)	(60.367)	(29.247)	(77.147)
Days worked gap	-1.855***	-1.983***	-1.830***	-1.624**	0.263	0.343	-0.042	-0.538	-0.143	-0.429	-0.083	-0.139	-0.613	-0.725	-0.684**	-0.790
	(0.379)	(0.552)	(0.262)	(0.684)	(0.497)	(0.718)	(0.340)	(0.873)	(0.482)	(0.684)	(0.336)	(0.872)	(0.382)	(0.551)	(0.263)	(0.676)
Hours worked gap	-0.059***	-0.068***	-0.060***	-0.047**	0.003	-0.002	-0.006	-0.006	-0.009	-0.019	-0.007	-0.001	-0.022*	-0.031	-0.025**	-0.019
	(0.012)	(0.018)	(0.009)	(0.022)	(0.017)	(0.024)	(0.011)	(0.030)	(0.016)	(0.023)	(0.011)	(0.030)	(0.013)	(0.019)	(0.009)	(0.024)
Observations	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780

Notes: Bias-corrected RD estimates (robust SEs in parentheses). Triangular kernel and baseline controls. Donut excludes ±7 days; gaps are father minus mother. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

Table A22: Robustness of RDD Estimates for Total Labour Market Outcomes

	0–12 months				13–24 months				25–36 months				0–36 months			
	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)	Baseline (60 days)	Half BW (30 days)	Double BW (120 days)	Donut (±7 days)
Panel A: Mothers																
Total earnings (€)	-153.449	-76.630	-97.638	938.023	-63.917	-402.386	118.821	1194.601	371.948	441.568	280.027	1055.750	154.582	-37.448	301.210	3188.374
	(442.375)	(641.945)	(304.821)	(791.269)	(485.505)	(702.785)	(332.442)	(845.652)	(528.614)	(766.301)	(362.885)	(924.597)	(1371.361)	(1989.959)	(940.887)	(2409.188)
Days worked	-0.471	-0.666	-2.963	1.391	-2.869	-3.638	-0.100	-0.635	0.584	2.851	-0.807	-4.629	-2.756	-1.453	-3.870	-3.873
	(4.187)	(6.070)	(2.889)	(7.507)	(5.190)	(7.500)	(3.538)	(8.917)	(4.989)	(7.192)	(3.445)	(8.816)	(12.355)	(17.922)	(8.446)	(21.370)
Hours worked	-0.038	0.013	-0.114	-0.030	-0.051	0.020	0.039	-0.171	0.077	0.197	0.045	-0.198	-0.013	0.231	-0.029	-0.400
	(0.134)	(0.193)	(0.093)	(0.242)	(0.172)	(0.247)	(0.118)	(0.300)	(0.167)	(0.240)	(0.116)	(0.297)	(0.420)	(0.606)	(0.289)	(0.740)
Employment	-0.031	-0.015	-0.129	-0.028	-0.093	-0.106	-0.016	-0.040	0.040	0.093	0.002	-0.069	-0.084	-0.028	-0.143	-0.136
	(0.170)	(0.247)	(0.117)	(0.301)	(0.168)	(0.242)	(0.115)	(0.289)	(0.160)	(0.231)	(0.110)	(0.281)	(0.428)	(0.621)	(0.292)	(0.736)
Panel B: Fathers																
Total earnings (€)	-489.553	-255.402	-238.868	-134.531	-540.037	-316.274	-308.707	-839.272	-332.955	-56.470	-267.641	-601.368	-1362.545	-628.145	-815.217	-1575.171
	(431.358)	(625.348)	(299.143)	(792.063)	(451.313)	(648.604)	(315.553)	(836.463)	(514.715)	(743.157)	(359.068)	(952.388)	(1328.412)	(1919.370)	(925.594)	(2458.867)
Days worked	-24.583***	-26.449***	-26.755***	-19.725***	0.284	0.475	-0.605	-7.091	-1.127	-2.303	-1.807	-6.296	-25.426**	-28.277**	-29.167***	-33.112**
	(2.699)	(3.952)	(1.894)	(5.035)	(3.469)	(4.970)	(2.438)	(6.614)	(3.960)	(5.838)	(2.733)	(7.229)	(8.420)	(12.251)	(5.898)	(15.803)
Hours worked	-0.804***	-0.870***	-0.892***	-0.643***	-0.012	-0.005	-0.033	-0.239	-0.026	-0.034	-0.044	-0.208	-0.842**	-0.909**	-0.968***	-1.090*
	(0.096)	(0.139)	(0.067)	(0.176)	(0.122)	(0.174)	(0.086)	(0.230)	(0.135)	(0.199)	(0.094)	(0.247)	(0.302)	(0.436)	(0.212)	(0.558)
Employment	0.025	-0.028	-0.062	0.159	0.023	0.012	-0.013	-0.165	-0.036	-0.090	-0.044	-0.190	0.012	-0.107	-0.118	-0.196
	(0.103)	(0.150)	(0.073)	(0.195)	(0.110)	(0.158)	(0.077)	(0.211)	(0.126)	(0.186)	(0.087)	(0.229)	(0.284)	(0.413)	(0.198)	(0.531)
Earnings, excluding leave (€)	-669.618**	-639.386	-1661.745***	-1159.534**	–	–	–	–	–	–	–	–	-1542.610	-1012.130	-2238.094**	-2600.175
	(307.636)	(449.261)	(211.370)	(556.481)									(1182.909)	(1710.594)	(823.427)	(2189.103)
Days worked, excluding leave	-1.086	-4.503	-16.747***	-6.126	–	–	–	–	–	–	–	–	-1.929	-6.331	-19.159***	-19.513
	(2.684)	(3.905)	(1.872)	(4.934)									(8.239)	(11.974)	(5.770)	(15.466)
Hours worked, excluding leave	-0.100	-0.213	-0.583***	-0.257	–	–	–	–	–	–	–	–	-0.138	-0.252	-0.660**	-0.704
	(0.093)	(0.134)	(0.065)	(0.169)									(0.294)	(0.424)	(0.206)	(0.544)
Panel C: Intra-household gaps																
Total earnings gap (€)	-336.104	-178.772	-141.230	-1072.554	-476.120	86.111	-427.528	-2033.873**	-704.902	-498.037	-547.669	-1657.118	-1517.127	-590.698	-1116.427	-4763.545*
	(497.773)	(720.812)	(346.014)	(924.863)	(559.760)	(803.793)	(388.323)	(1008.237)	(621.316)	(886.575)	(435.180)	(1153.927)	(1554.384)	(2233.594)	(1082.148)	(2854.455)
Days worked gap	-24.112***	-25.783***	-23.792***	-21.116**	3.154	4.113	-0.505	-6.456	-1.711	-5.154	-1.000	-1.667	-22.670	-26.824	-25.297**	-29.239
	(4.921)	(7.170)	(3.403)	(8.892)	(5.966)	(8.616)	(4.077)	(10.474)	(5.789)	(8.211)	(4.027)	(10.470)	(14.144)	(20.391)	(9.736)	(25.018)
Hours worked gap	-0.766***	-0.884***	-0.778***	-0.613**	0.039	-0.025	-0.072	-0.068	-0.102	-0.231	-0.089	-0.010	-0.829*	-1.140	-0.939**	-0.691
	(0.161)	(0.232)	(0.112)	(0.291)	(0.200)	(0.287)	(0.138)	(0.355)	(0.197)	(0.280)	(0.138)	(0.358)	(0.487)	(0.698)	(0.337)	(0.871)
Earnings gap, excluding leave (€)	-399.730	-145.057	-597.170**	-1251.380*	–	–	–	–	–	–	–	–	-1580.753	-556.983	-1572.366	-4942.372*
	(353.213)	(511.368)	(243.738)	(639.222)									(1416.603)	(2032.282)	(985.168)	(2585.154)
Days worked gap, excluding leave	-10.901**	-18.900**	-10.458***	0.559	–	–	–	–	–	–	–	–	-9.458	-19.941	-11.963	-7.564
	(4.304)	(6.227)	(2.976)	(7.715)									(13.654)	(19.662)	(9.394)	(24.052)
Hours worked gap, excluding leave	-0.329**	-0.610**	-0.379***	0.014	–	–	–	–	–	–	–	–	-0.392	-0.866	-0.540*	-0.064
	(0.140)	(0.200)	(0.097)	(0.251)									(0.468)	(0.670)	(0.324)	(0.835)
Observations	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780	23,318	10,543	51,468	20,780

Notes: Bias-corrected RD estimates (robust SEs in parentheses). Triangular kernel and baseline controls. Donut excludes ±7 days. Cumulative sums; "excl. leave" omits fathers' leave months. Gaps are father minus mother. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Source: BELab, Banco de España Data Laboratory, MNP Nacimientos, MCVL, Prestaciones, Accessed remotely, December 2025–present. Own calculations.

B Model Appendix

B.1 Leave Rules and Preferences

The policy $\mathcal{P}$ specifies compulsory and voluntary leave L_i^c, L_i^v, replacement rates θ_i, and the last eligible child age $\bar{g} = 12$ months. Let $L_{i,t}^c$ and $L_{i,t}^v$ be the remaining balances. Then

$$k_{i,t}^c = \min\{W, L_{i,t}^c\}, \tag{B1}$$

$$\bar{k}_{i,t}^v = \mathbb{1}\{t < \bar{g}\} \min\{W - k_{i,t}^c, L_{i,t}^v\}. \tag{B2}$$

The father chooses $k_{p,t}^v \in \{0, \ldots, \bar{k}_{p,t}^v\}$. Entitlements fall by weeks taken. The mother's 16-week spell is fixed at birth: $k_{m,t} = W$ for $t = 0, \ldots, 3$ and zero thereafter. Within-month placement is not chosen. Overlap is determined by equation (4.1). The 2020 policy has $L_p^c = 4, L_p^v = 8$; the 2021 policy has $L_p^c = 6, L_p^v = 10$.

Wage shocks are observed before the father chooses voluntary leave. Households then allocate work and care outside leave weeks. Human capital, entitlement balances, and stochastic states update at the end of the month. The numerical implementation uses value-based conditional choice probabilities for paternal leave counts.

Leave benefits are

$$b_{i,t} = \theta_i \bar{w}_{i,t} \bar{h}^{\text{wk}} k_{i,t}, \qquad \theta_i = 1, \quad \bar{h}^{\text{wk}} = 40, \tag{B3}$$

with $\log \bar{w}_{i,t} = r_i^{\text{init}} + \log H_{i,t} + \varepsilon_{i,t}$. The reference wage excludes the firm-side markdown.

Preferences. The joint-leave taste is permanent:

$$\gamma \sim \text{Logistic}(\mu_\gamma, \sigma_\gamma). \tag{B4}$$

I set father's leisure taste shock equal to 0. The mother's leisure taste is time-varying and has stationary distribution $N(0, \sigma_\nu^2)$ and transition

$$\nu_{m,t+1} = \begin{cases} \nu_{m,t}, & \text{with probability } 1 - \lambda_\nu, \\ \nu'_{m,t+1}, & \text{with probability } \lambda_\nu, \end{cases} \tag{B5}$$

where $\nu'_{m,t+1}$ is an independent stationary draw. The paternal leisure taste is normalised to zero. The taste shocks are mutually independent.

Childcare access. A share π_0^{cc} of households has access at birth. Others may gain access from age $\underline{g}^{\text{cc}} = 4$ months onwards:

$$\Pr(a_{t+1}^{\text{cc}} = 1 \mid a_t^{\text{cc}} = 0) = \lambda^{\text{cc}} \mathbb{1}\{t \geq \underline{g}^{\text{cc}}\}, \qquad \Pr(a_{t+1}^{\text{cc}} = 1 \mid a_t^{\text{cc}} = 1) = 1. \tag{B6}$$

Without access, the choice must satisfy $x_t = 0$ in equation (4.2).

B.2 Human Capital and Employment

Effective work and market-human-capital depreciation in a mixed leave/work month are

$$\begin{aligned} \tilde{h}_{i,t} &= (W - k_{i,t})\bar{h}^{\mathrm{wk}} \left(h_{i,t}^{\mathrm{wk}}/\bar{h}^{\mathrm{wk}}\right)^{\beta_h}, \\ 1 - \delta_{i,t} &= (1-\delta_i^l)^{k_{i,t}/W}(1-\delta_{i,t}^x)^{1-k_{i,t}/W}, \qquad \delta_{i,t}^x = \begin{cases} \delta^{\mathrm{work}}, & h_{i,t}^{\mathrm{wk}} > 0, \\ \delta_i^{\mathrm{ne}}, & h_{i,t}^{\mathrm{wk}} = 0. \end{cases} \end{aligned} \tag{B7}$$

Unpaid leave uses non-employment depreciation. Wage shocks are i.i.d. $N(0, \sigma_{\varepsilon,i}^2)$.

Steady state. At fixed weekly work hours $h^{\mathrm{wk}} > 0$, set $\bar{h} = W\bar{h}^{\mathrm{wk}}$. The steady-state market human capital is

$$H_i^*(h^{\mathrm{wk}}) = \left[\frac{\zeta_i \bar{h}}{\delta^{\mathrm{work}}} \left(\frac{h^{\mathrm{wk}}}{\bar{h}^{\mathrm{wk}}}\right)^{\beta_h}\right]^{1/(1-\alpha_H)}. \tag{B8}$$

The local convergence rate is $\delta^{\mathrm{work}}(1-\alpha_H) \simeq 0.008$ per month. The steady-state wage elasticity with respect to hours is $\beta_h/(1-\alpha_H) \simeq 0.42$, following Blundell, Costa Dias, et al. (2016).

Employment transitions. Let $a_{i,t}^{\mathrm{jc}}$ indicate jobholding and $\pi_{i,t}^{\mathrm{jp}}$ the initial protected window, including one week for return to work. Outside the separate unpaid-leave option, job status evolves as

$$\Pr(a_{i,t+1}^{\mathrm{jc}} = 1 \mid s_t, h_{i,t}, k_{i,t}) = \begin{cases} 1, & \pi_{i,t}^{\mathrm{jp}} = 1,\ a_{i,t}^{\mathrm{jc}} = 1, \\ 0, & \pi_{i,t}^{\mathrm{jp}} = 1,\ a_{i,t}^{\mathrm{jc}} = 0, \\ 1 - \delta_i^{\mathrm{sep}}, & \substack{\pi_{i,t}^{\mathrm{jp}}=0,\ a_{i,t}^{\mathrm{jc}}=1, \\ h_{i,t}>0 \text{ or } k_{i,t}>0}, \\ \lambda_i^{\mathrm{find}}, & \pi_{i,t}^{\mathrm{jp}} = 0, \text{ otherwise.} \end{cases} \tag{B9}$$

Protected jobholders retain a job; protected non-employed mothers do not find one. Paid benefits do not change status. Job offers need not be accepted. At birth, employed parents independently draw access to one uninterrupted unpaid, job-protected spell with probability π_0^{ul}. Access expires after the first year or on returning to work. Unpaid leave pays no benefits and does not raise caregiving productivity.

B.3 State Space and Later Phases

In the benchmark, a sufficient monthly state contains

$$s_t = \big(H_{p,t}, H_{m,t}, \phi_{p,t}, \phi_{m,t}, L_{p,t}^v, a_{p,t}^{\mathrm{jc}}, a_{m,t}^{\mathrm{jc}}, a_{p,t}^{\mathrm{ul}}, a_{m,t}^{\mathrm{ul}}, a_t^{\mathrm{cc}}, \eta, \nu_{m,t}, \varepsilon_{p,t}, \varepsilon_{m,t}\big).$$

Age is indexed by t. Maternal leave and compulsory balances are deterministic. Before month four, cumulative joint leave is implied by the paternal entitlement balance and compulsory weeks already taken; later it drops out. Caregiving productivity is also removed after age three. Other states disappear when their choices expire. The extension adds ω_p, prior voluntary take-up, and the realised markdown.

Subsequent phases. In months 12–35, leave expires but work and childcare decisions continue. Caregiving productivity is fixed, and flow utility is

$$u_t^{(1b)} = \log c_t + \sum_i \psi_i e^{\nu_{i,t}} \log l_{i,t} + \alpha_Q \log Q_t. \tag{B10}$$

After age three, childcare production and caregiving productivity drop out, as do childcare fees and job and coverage frictions. Both annual phases retain market-work choices and market human capital. Phase 2 covers ages 3–18; Phase 3 covers ages 18–38. The annual discount factor is β^{12}. One annual flow represents twelve monthly utilities, with weight

$$\Lambda = \sum_{j=0}^{11} \beta^j = \frac{1-\beta^{12}}{1-\beta}. \tag{B11}$$

The flow utility has the same form in both annual phases:

$$u_o^{(2)} = \Lambda \left[\log c_o^{\text{ann}} + \sum_i \psi_i e^{\nu_{i,o}} \log l_{i,o}^{\text{ann}} \right], \tag{B12}$$

$$u_o^{(3)} = \Lambda \left[\log c_o^{\text{ann}} + \sum_i \psi_i e^{\nu_{i,o}} \log l_{i,o}^{\text{ann}} \right]. \tag{B13}$$

The minimum-income transfer remains in Phase 2 but expires at age eighteen:

$$\mathcal{B}_o^{\text{ann}} = \max \left\{ 0, 12\bar{y} - (1-\tau) \sum_i y_{i,o}^{\text{ann}} \right\}, \quad o = 0, \ldots, 14. \tag{B14}$$

At annual decision dates, the leisure-taste transition preserves the monthly persistence. For stationary taste-node probabilities $\boldsymbol{\pi}_\nu$,

$$P_\nu^{12} = (1-\lambda_\nu)^{12} I + \left[1 - (1-\lambda_\nu)^{12}\right] \mathbf{1}\boldsymbol{\pi}_\nu'. \tag{B15}$$

Phases are solved backward; retirement value is zero.

B.4 Firm-Side Details

In this separately calibrated extension, the paternal leave taste is

$$\omega_p \sim \mathcal{N}(0, \sigma_\omega^2). \tag{B16}$$

This type affects the first voluntary leave decision, not the estimated benchmark. The firm regards higher ω_p as a signal of lower attachment. A simple signal structure is

$$A_{f,d+1} = A_0 - A_1\omega_p + \varepsilon^A_{f,d+1}, \qquad A_1 > 0. \tag{B17}$$

Let $\bar{A}_d^{\text{take}}$ denote mean observed attachment among cohort-d leave-takers. The corresponding signal is

$$z_d = (A_0 - \bar{A}_d^{\text{take}})/A_1 = \bar{\omega}_d + \varepsilon^z_d. \tag{B18}$$

In simulations, the update in equation (16) uses $z_d = \bar{\omega}_d$. Each cohort faces beliefs formed before its leave decisions.

Let $a^{\text{vl}}_{p,t}$ track prior voluntary take-up and $\mu_{p,t}$ the father-specific markdown. They evolve as

$$a^{\text{vl}}_{p,t+1} = \max\{a^{\text{vl}}_{p,t}, \mathbb{1}\{k^v_{p,t} > 0\}\}, \tag{B19}$$

$$\mu_{p,t+1} = \begin{cases} \kappa_d, & D_{p,t} = 1, \\ \mu_{p,t}, & D_{p,t} = 0. \end{cases} \tag{B20}$$

The new markdown applies immediately through

$$r_{p,t} = r_p^{\text{init}} - \mu_{p,t+1}. \tag{B21}$$

Let the value difference excluding the one-off type payoff be

$$\Delta V_t = V_t^{\text{take}} - V_t^{\text{no take}}. \tag{B22}$$

First take-up occurs when $\Delta V_t + \omega_p > 0$. The type changes the first take-up decision, while subsequent leave timing remains part of household optimisation.

Wage-setting derivation. Suppose a firm has fixed employment cost F, marginal product MP per hour, and expected hours $\bar{h}$. Zero profit implies $w = \text{MP} - F/\bar{h}$. If leave-takers are expected to supply a fraction Δ fewer hours, their zero-profit wage is

$$w^T = \text{MP} - \frac{F}{(1-\Delta)\bar{h}}. \tag{B23}$$

The proportional markdown is

$$\kappa \equiv \frac{w - w^T}{w} = \frac{F}{w\bar{h}} \frac{\Delta}{1-\Delta}. \tag{B24}$$

With $\Delta = A_1 \hat{\omega}_d / \bar{h}$, its first-order approximation gives

$$\kappa_d \simeq \underbrace{\frac{F}{w\bar{h}} \frac{A_1}{\bar{h}}}_{\Gamma} \hat{\omega}_d. \tag{B25}$$

For small markdowns, proportional and log-wage changes agree to first order. Only new takers face updated beliefs.

B.5 Government Budget and Equilibrium

Let $o = 0, \ldots, 34$ index the annual periods following the first 36 months, and let $y_{i,o}^{\text{ann}}$ be gross labour earnings. The balanced payroll rate satisfies

$$\tau \left[\sum_{t=0}^{35} \beta^t \mathbb{E} \left(\sum_i w_{i,t} h_{i,t} \right) + \beta^{36} \sum_{o=0}^{34} \beta^{12o} \mathbb{E} \left(\sum_i y_{i,o}^{\text{ann}} \right) \right] = \sum_{t=0}^{11} \beta^t \mathbb{E} \left(\sum_i b_{i,t} \right) + \sum_{t=0}^{35} \beta^t \mathbb{E}(\mathcal{B}_t) + \beta^{36} \sum_{o=0}^{14} \beta^{12o} \mathbb{E}(\mathcal{B}_o^{\text{ann}}). \tag{B26}$$

All terms respond to τ through household choices. For estimation, the payroll tax is zero. The balanced rate is solved for counterfactual evaluations. A lump-sum financing robustness check uses a levy $T^* = B/M$, where M is the number of charged household periods. This removes the payroll substitution distortion but retains an income effect under the hand-to-mouth assumption.

Stationary equilibrium. Given a policy, an equilibrium consists of household policy functions, their induced distribution, and a balanced contribution rate. In the signalling extension it also includes beliefs $\hat{\omega}^*$ and a markdown $\Gamma\hat{\omega}^*$ satisfying equation (17). Households take the wage schedule and other transition probabilities as given.

B.6 Firm-Side Rest Point

I evaluate $\hat{\omega} \mapsto \bar{\omega}(\Gamma\hat{\omega}; \mathcal{P})$ on a fine grid for each historical entitlement regime. Each calibrated regime has one crossing with the diagonal; the local slope is at most 0.11. The stationary markdown is small at the estimated parameters.

B.7 Calibration Details

For the mother, $L_m^c = 16$ and $L_m^v = 0$ impose the observed continuous spell; these are model timing restrictions, not the legal compulsory entitlement. The principal institutional conventions are:

Table B1: Firm-side rest point by entitlement regime

Regime	m^* (s.d.)	κ^* (% of wage)	Slope at m^*	Pass-through for second crossing
Two weeks	0.27	0.11	≤ 0.11	$9 \times \Gamma$
Four to eight weeks	0.08	0.03	≤ 0.11	$15 \times \Gamma$

Table B2: Institutional rules and normalisations

Object	Value	Note
Institutions (Spain, 2020)		
$L_p^c,\ L_p^v$	4, 8 weeks	father's entitlement, Real Decreto-ley 6/2019
$L_m^c,\ L_m^v$	16, 0 weeks	mother's entitlement
$\bar{g}$	12 months	statutory take-up deadline
$\theta_p,\ \theta_m$	1	full replacement of the *base reguladora*
τ	0	zero in estimation; τ^* solved per design (Section 4.5)
Time		
W	4	weeks per month
T^{wk}	80 hours	weekly time endowment
$\bar{n}$	40 hours	caregiving load of a leave week
T_{1a}, T_{1b}, T_2, T_3	12m, 24m, 15y, 20y	child age 0–1, 1–3, 3–18, 18–38
Normalisations		
Consumption weight	1	normalised in equation (3)
$r_p^{\text{init}},\ \partial \log w / \partial \log H$	0, 1	initial wage intercept and human-capital elasticity
r_m^{init}	-0.2	initial maternal intercept
σ_η	1	joint-taste scale normalisation
CES share	1/2	equation (7)
$\delta_p^\phi,\ \delta_m^\phi$	0	home-production capital does not depreciate
Coverage block (Section B.1)		
x_t when uncovered	0	hours cap when uncovered
$\underline{g}^{\text{cc}}$	4 months	earliest age for care arrival

The maternal separation hazard is restricted to $\delta_m^{\text{sep}} = 0.1576\lambda_m^{\text{find}}$, giving 0.00764 at the estimated job-finding rate. The father's job-finding probability is 0.1019. The maternal job-finding rate and firm-side taste dispersion are calibrated separately to maternal re-entry and paternal leave take-up, holding the SMM estimates fixed.

B.8 Firm-Side Calibration

The extension is calibrated to conditional paternal leave take-up during 2007–18. I first set $\kappa = 0$ in the five-week regime and choose $\sigma_\omega = 2.30$ to match 2018 take-up of 0.95. Next, for each historical entitlement regime, I solve the household model over $\kappa \in \{0, 0.3, 0.6, 0.9, 1.4, 2.0, 3.0\}\%$. Simulations yield the take-up share $T(\kappa, \mathcal{P})$ and the mean type $\bar{\omega}(\kappa, \mathcal{P})$; I interpolate between grid points.

Given initial belief $\hat{\omega}_0$, the pricing rule and equation (16) generate the annual path of markdowns and take-up. I choose $(\hat{\omega}_0, \Gamma, K)$ to minimise squared deviations from the observed 2007–18 take-up rates. The fit is:

Table B3: Firm-side Fit

Year	Entitlement	Take-up, data	Take-up, model	κ_t (%)
2007	13 days	0.628	0.630	0.800
2008	13 days	0.743	0.739	0.374
2009	13 days	0.762	0.770	0.245
2010	13 days	0.783	0.779	0.206
2011	13 days	0.790	0.782	0.194
2012	13 days	0.748	0.783	0.190
2013	13 days	0.776	0.783	0.189
2014	13 days	0.766	0.783	0.189
2015	13 days	0.790	0.783	0.189
2016	13 days	0.828	0.783	0.188
2017	4 weeks	0.934	0.897	0.188
2018	5 weeks	0.950	0.939	0.112

B.9 Untargeted Moments

Table B4: Model fit: Untargeted moments

Moment	Data	Model
Leave timing		
Simultaneous leave share	0.690	0.665
Reform effect on simultaneous leave share	−0.067	−0.097
Reform effect on father on leave, month 1	0.400	0.334
Maternal labour supply		
Part-time share, 12m	0.193	0.408
36m	0.187	0.446
Re-entry, 18m | out at 12m	0.576	0.657
Maternal days, sequential − simultaneous	2.25	2.53
Maternal earnings		
Earnings relative to pre-birth, 6m	0.735	0.639
12m	0.775	0.651
Father's outcomes		
Days worked per month, year 3	27.15	27.95
Raw relative earnings, 24m	1.042	0.904
36m	1.110	0.907

Notes: The table reports model and data values for untargeted moments.

B.10 Robustness to Alternative Parameter Specifications

C Counterfactuals

C.1 Welfare criterion and financing

I compare each counterfactual to the 2021 policy using consumption-equivalent welfare at the birth of the child. The measure is the permanent percentage change in consumption under the benchmark policy that would make households indifferent between the benchmark and the alternative policy.

Let $V_0(s_0; \mathcal{P}, \Delta)$ denote the value at birth of a household with initial state s_0 under policy $\mathcal{P}$, when consumption in each period is scaled by $(1 + \Delta)$ and behaviour is held fixed. Each policy is evaluated at its balanced-budget payroll tax, $\tau^*(\mathcal{P})$, and, when leave-taking is informative to firms, at the corresponding equilibrium wage markdown, $\kappa^*(\mathcal{P})$. Expected welfare is

$$\mathcal{W}(\mathcal{P}, \Delta) = \int V_0\big(s_0; \mathcal{P}, \Delta\big)\, dG(s_0),$$

where G is the distribution of household states at the birth of the child. For the 2021 policy $\mathcal{P}^0$, the consumption-equivalent welfare change Δ_c satisfies

$$\mathcal{W}(\mathcal{P}^0, \Delta_c) = \mathcal{W}(\mathcal{P}, 0). \tag{C1}$$

A positive Δ_c therefore indicates a welfare gain relative to the 2021 policy.

The leave system is financed by the households represented in the model. In practice, parental-leave benefits are financed by a broader tax base, including households without young children. The payroll tax in the model should therefore be interpreted as an upper bound on the financing burden borne by parents. The welfare comparison does not capture transfers from childless households to parents, a consideration also discussed by Erosa et al. (2010) for maternity leave.

C.2 Leave length

The detailed experiments vary the father's and mother's entitlements separately and together. When paternal leave is extended, the compulsory and voluntary components change as shown in Table C1; the 24-week entitlement consists of nine compulsory and fifteen voluntary weeks.

When fathers' childcare-specific learning is switched off, an eight-week paternal extension still raises maternal employment, but no longer raises welfare. Table C2 isolates this mechanism. Because the learning-off economy has a different benchmark, its CEV values are measured relative to that benchmark rather than to the baseline economy.

C.3 Leave timing

Tables C3 and C4 show the effects of joint-only and sequential voluntary leave under the 12- and 16-week paternal entitlements, in the baseline economy and without fathers' childcare learning.

Table C1: Parental leave length: additional entitlements and labour-market outcomes

Design	Welfare and cost		Maternal outcomes		Paternal outcomes			Timing
	CEV vs. 2021	τ	y_m rel. 24m	emp_m 12m	emp_p 12m	y_p rel. 24m	Vol. weeks_p	Non-overlap share
Panel A: Increasing Paternal Leave								
0 weeks $(0+0)$	-2.900%	1.211%	0.632	0.730	0.863	0.883	0.00	0.000
4 weeks $(2+2)$	-1.585%	1.546%	0.652	0.782	0.893	0.895	1.99	0.252
8 weeks $(3+5)$	-0.817%	1.881%	0.667	0.815	0.922	0.900	4.97	0.318
12 weeks $(4+8)$	-0.340%	2.228%	0.669	0.823	0.930	0.904	7.97	0.310
16 weeks $(6+10)$	**0.000%**	**2.578%**	**0.672**	**0.826**	**0.937**	**0.906**	**9.98**	**0.279**
20 weeks $(8+12)$	$+0.219\%$	2.927%	0.678	0.836	0.940	0.902	11.98	0.359
24 weeks $(9+15)$	$+0.356\%$	3.264%	0.678	0.842	0.907	0.904	14.88	0.416
32 weeks $(12+20)$	$+0.434\%$	3.947%	0.679	0.850	0.806	0.910	19.66	0.516
Panel B: Increasing Maternal Leave								
20 weeks	$+0.219\%$	2.868%	0.671	0.828	0.939	0.912	9.97	0.207
24 weeks	$+0.349\%$	3.159%	0.673	0.833	0.940	0.913	9.97	0.133
32 weeks	$+0.372\%$	3.741%	0.674	0.840	0.940	0.915	9.97	0.045
Panel C: Increasing Both Parents' Leave								
20 weeks	$+0.434\%$	3.220%	0.672	0.833	0.944	0.910	11.97	0.215
24 weeks	$+0.655\%$	3.860%	0.673	0.840	0.922	0.914	14.91	0.143

Notes: The shaded row is the 2021 benchmark (16 paternal weeks: 6 compulsory, 10 voluntary). CEV is consumption-equivalent variation at birth relative to 2021; τ is the balanced-budget payroll tax. emp_j is parent j's employment; y_j rel. is earnings relative to the no-birth control. Vol. weeks_p is the father's voluntary leave taken; non-overlap is the share of his leave taken without the mother.

Table C2: Extending leave without paternal childcare learning

Design	Maternal emp. 12m (%)	Non-overlap share (%)	Payroll tax (%)	CEV (%)
2021 benchmark	82.5	31.7	2.556	0.000
Father +8 weeks	83.8	43.2	3.240	-0.141
Mother +8 weeks	83.5	17.7	3.143	+0.453
Both parents +8 weeks	83.8	18.0	3.846	+0.283

Notes: The father's childcare-learning parameter is set to zero ($\xi_p^{\varphi} = 0$), with the remaining parameters held fixed. Outcomes and CEV are measured relative to the learning-off economy's 2021 benchmark. Other definitions follow Table 7.

Table C5 increases the minimum number of voluntary weeks that must be taken after maternity leave, and then considers a separate experiment in which all 16 paternal weeks are sequential.

Table C3: Leave timing: baseline and restrictions

Design	Welfare and cost		Maternal outcomes		Paternal outcomes			Timing
	CEV (%)	τ	emp_m 12m	y_m rel. 24m	emp_p 12m	y_p rel. 24m	Vol. weeks_p	Non-overlap share
Pre-reform (12 wk)	−0.340%	2.228%	0.823	0.669	0.930	0.904	7.97	0.310
Pre-reform: vol. overlap	−1.043%	2.268%	0.747	0.642	0.872	0.884	8.00	0.000
Pre-reform: vol. after mother	−0.514%	2.214%	0.830	0.671	0.928	0.905	7.92	0.664
Benchmark	**0.000%**	**2.578%**	**0.826**	**0.672**	**0.937**	**0.906**	**9.98**	**0.279**
Benchmark: vol. overlap	−0.742%	2.619%	0.748	0.643	0.875	0.886	10.00	0.000
Benchmark: vol. after mother	−0.209%	2.564%	0.835	0.674	0.938	0.907	9.94	0.624

Notes: The 2021 benchmark provides 16 paternal weeks; pre-reform designs provide 12. Overlap and after mother restrict the father's voluntary weeks to within or after maternal leave. CEV is consumption-equivalent variation at birth relative to 2021; τ is the balanced-budget payroll tax. emp_j is employment and y_j rel. is earnings relative to the no-birth control; vol. weeks_p is paternal voluntary leave taken and non-overlap is the share taken without the mother.

Table C4: Leave timing without paternal caregiving learning

Design	Welfare and cost		Maternal outcomes		Paternal outcomes			Timing
	CEV (%)	τ	emp_m 12m	y_m rel. 24m	emp_p 12m	y_p rel. 24m	Vol. weeks_p	Non-overlap share
Pre-reform (12 wk)	+0.015%	2.209%	0.822	0.670	0.905	0.909	7.76	0.356
Pre-reform: vol. overlap	−0.778%	2.262%	0.742	0.640	0.872	0.888	7.86	0.000
Pre-reform: vol. after mother	−0.095%	2.183%	0.830	0.671	0.856	0.910	7.58	0.654
Benchmark	**0.000%**	**2.556%**	**0.825**	**0.671**	**0.911**	**0.912**	**9.72**	**0.317**
Benchmark: vol. overlap	−0.823%	2.611%	0.743	0.640	0.876	0.890	9.78	0.000
Benchmark: vol. after mother	−0.129%	2.527%	0.835	0.672	0.893	0.912	9.50	0.613

Notes: Designs as in Table C3, with the father's home-production learning set to zero ($\xi_p^{\varphi} = 0$); all other parameters are fixed. CEV is relative to this economy's 2021 benchmark; τ is the balanced-budget payroll tax. emp_j is employment; y_j rel. is earnings relative to the no-birth control. Vol. weeks_p is paternal voluntary leave taken; non-overlap is the share taken without the mother.

Table C5: Restrictions on paternal leave timing

Design	Welfare and cost		Maternal outcomes		Paternal outcomes			Timing
	CEV vs. 2021	τ	emp_m 12m	y_m rel. 24m	emp_p 12m	y_p rel. 24m	Vol. weeks_p	Non-overlap share
Panel A. Timing at fixed entitlement ($L_p^c = 6,\ L_p^v = 10$)								
Benchmark	**0.000%**	**2.578%**	**0.826**	**0.672**	**0.937**	**0.906**	**9.98**	**0.279**
2 weeks forced apart	−0.057%	2.576%	0.830	0.673	0.938	0.906	9.97	0.344
4 weeks forced apart	−0.091%	2.573%	0.831	0.673	0.935	0.906	9.97	0.417
6 weeks forced apart	−0.123%	2.570%	0.832	0.673	0.936	0.906	9.96	0.473
8 weeks forced apart	−0.165%	2.567%	0.833	0.674	0.935	0.907	9.95	0.549
10 weeks forced apart	−0.209%	2.564%	0.835	0.674	0.938	0.907	9.94	0.624
All 16 weeks apart	−0.737%	2.534%	0.845	0.676	0.932	0.910	15.85	1.000
Panel B: Father childcare learning off ($\xi_p^\varphi = 0$)								
Benchmark	**0.000%**	**2.556%**	**0.825**	**0.671**	**0.911**	**0.912**	**9.72**	**0.317**
2 weeks forced apart	−0.028%	2.548%	0.828	0.671	0.920	0.912	9.68	0.376
4 weeks forced apart	−0.049%	2.544%	0.830	0.671	0.892	0.912	9.64	0.435
6 weeks forced apart	−0.068%	2.538%	0.831	0.671	0.910	0.912	9.60	0.484
8 weeks forced apart	−0.098%	2.534%	0.832	0.671	0.871	0.912	9.56	0.547
10 weeks forced apart	−0.129%	2.527%	0.835	0.672	0.893	0.912	9.50	0.613
All 16 weeks apart	−0.518%	2.488%	0.844	0.673	0.781	0.915	15.17	1.000

Notes: Panel A starts from the 2021 entitlement (six compulsory and ten voluntary weeks). The intermediate designs require increasing numbers of voluntary weeks after maternal leave. The final design makes all 16 weeks voluntary and sequential. Panel B repeats these designs without the father's caregiving-productivity accumulation. CEV is relative to the respective 2021 benchmark; τ balances the government budget. Employment and relative earnings are defined as in Table C3.

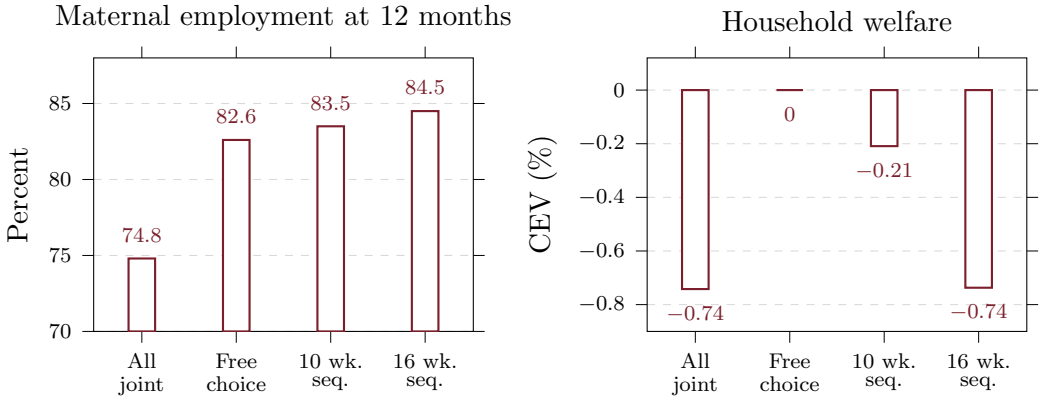


Figure C1: Maternal employment under alternative leave-timing arrangements

Notes: Maternal employment at six and twelve months under the 2021 entitlement, comparing joint leave, free choice and a requirement that the ten voluntary weeks be taken after maternity leave. The figure does not include the separate all-16-weeks-sequential policy.

The restriction on timing changes fathers' employment as well as mothers'. At 12 months, paternal employment is 87.5% when all voluntary leave must overlap, compared with 93.7% under free choice. Some fathers who would have covered childcare needs using leave after maternity leave instead exit employment when that option is removed and subsequently face re-entry frictions.

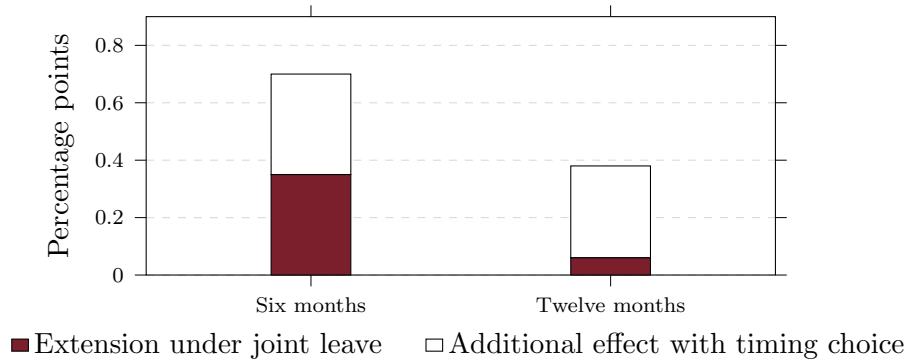


Figure C2: The 2021 reform effect under alternative timing rules

Notes: The effect of extending paternal leave from 12 to 16 weeks on maternal employment at six and twelve months, under mandatory joint leave and under free choice of voluntary leave timing.

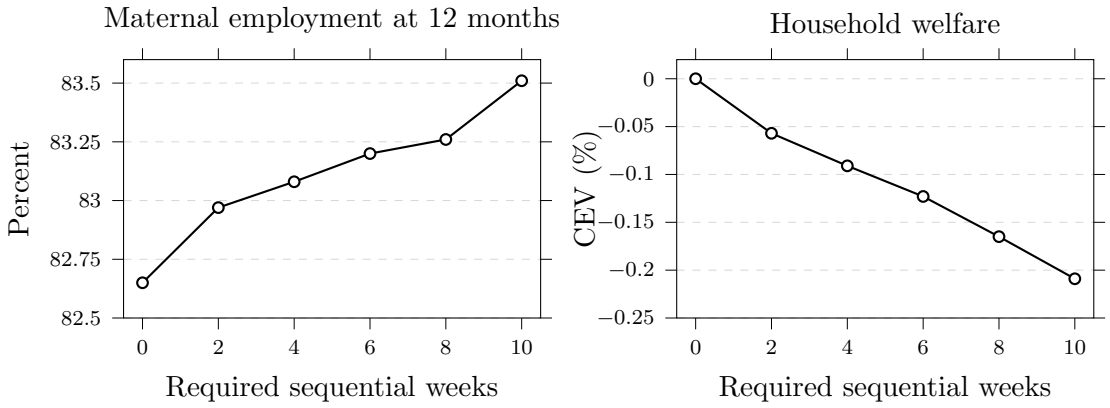


Figure C3: Requiring more voluntary paternal weeks after maternity leave

Notes: The minimum number of the father's ten voluntary weeks required after maternity leave rises from zero (free choice) to ten. The six compulsory joint weeks remain unchanged. The maternal-employment axis is truncated to show differences of less than one percentage point. The separate policy moving all 16 weeks after maternity leave is reported in Table C5, but is not plotted here.

Fathers use almost all of their voluntary weeks under either timing rule, so this result also reflects the timing of care rather than a change in entitlement take-up. Because the preference for joint leave is additively separable in utility, the employment difference is not driven mechanically by an income effect from the loss of joint-leave utility.

The role of childcare learning is more pronounced for welfare than for maternal employment. Without fathers' childcare learning, the welfare cost of requiring all ten voluntary weeks to be sequential falls from 0.21% to 0.13%. Under the baseline, earlier joint leave also allows fathers to benefit from childcare-specific learning over a longer period. Employment gains from sequential leave are similar with or without this channel.

A decomposition of the welfare change indicates that the loss of joint-leave utility is the main cost of mandating more sequential leave. Relative to the benchmark, its contribution is −0.238 percentage points when all ten voluntary weeks are sequential, and −0.855 percentage points when all 16 weeks are sequential. The corresponding contributions from consumption are positive (+0.100 and +0.275 percentage points), mostly through higher earnings; the remaining utility components make smaller negative contributions. Total CEV changes are −0.209% and −0.737%, respectively. These are accounting contributions to welfare, not separately estimated causal effects.

The 2021 reform also illustrates the importance of timing for the effect of leave extensions. Requiring all paternal weeks to overlap reduces the predicted effect on maternal employment at six months from 0.70 to 0.35 percentage points and at twelve months from 0.38 to 0.06 percentage points (Figure C2).

C.4 Transferability

The transferable policy preserves mothers' 16-week entitlement and fathers' six compulsory weeks, but makes their ten voluntary weeks available as a shared pool. The two shared-pool scenarios differ in the wage markdown: 5.54% at the 2021 point and 7.02% when firms' beliefs reach their rest point. Table C6 reports labour-market responses and, for the rest point, the allocation of the shared pool. The benchmark corresponds to the non-transferable 2021 policy.

Table C6: Transferable leave: additional household and firm-side outcomes

	Labour-market outcomes			Timing	Shared pool at rest		
Design	y_m rel. 24m	y_p rel. 24m	Emp.$_p$ 12m	Non-overlap share	Father's weeks	Mother's weeks	Paternal take-up (%)
2021 earmarked	0.6720	0.9060	0.937	0.279	–	–	–
Shared pool: 2021 point	0.6331	0.8878	0.879	0.026	–	–	–
Shared pool: rest point	0.6318	0.8876	0.878	0.016	0.09	8.86	1.21

Notes: y_i rel. denotes earnings relative to the corresponding no-birth control at 24 months; paternal employment is measured at 12 months. Non-overlap is the share of paternal leave taken outside maternal leave. Pooled-week take-up is the percentage of fathers using any of the ten transferable weeks, not the percentage using the six compulsory weeks. Pool allocation statistics are available for the rest point. The equilibrium is unique and locally stable.

The model does not include a shared-pool counterfactual with firms' wage markdown set to zero. The comparison of the two reported pool scenarios therefore captures the additional effect of belief updating from the initial to the stationary markdown, rather than separately identifying the entire contribution of firm signalling to the change from non-transferability to transferability.

C.5 Formal childcare and paternal leave

The childcare experiments vary access and fees separately. Universal availability sets the probability of access at birth to one ($\pi_0^{cc} = 1$), leaving fees unchanged. Free childcare removes the parental fee ($\chi = 0$). I also repeat these experiments without the father's entitlement to assess how far formal childcare substitutes for paternal leave.

Table C7: Formal childcare availability, fees and paternal leave

	Welfare and cost		Maternal outcomes		Timing
Design	CEV (%)	τ (%)	y_m rel. 24m	emp_m 12m	Non-overlap share (%)
2021 benchmark	**0.000**	**2.578**	**0.672**	**0.826**	**27.9**
Universal availability	+0.509	2.573	0.679	0.850	4.9
Free childcare	+0.047	3.073	0.656	0.839	27.1
Universal + free	+0.558	3.115	0.662	0.860	2.8
Without paternal leave					
No paternal leave	−2.900	1.211	0.632	0.730	–
No paternal leave + universal	−1.506	1.181	0.674	0.848	–
No paternal leave + free	−2.858	1.657	0.619	0.741	–
No paternal leave + universal + free	−1.451	1.709	0.658	0.857	–

Notes: Universal availability provides all households with access to childcare, while free childcare eliminates the parental fee. CEV denotes consumption-equivalent variation at birth relative to the benchmark, and τ is the payroll tax that balances the present value of leave and childcare outlays against the present value of revenue. emp_m denotes maternal employment, while y_m rel. denotes maternal earnings relative to the corresponding no-birth control. Non-overlap is the share of paternal leave taken while the mother is not on leave. It is not defined in the absence of paternal leave.

Eliminating childcare fees increases maternal employment, but reduces relative earnings after birth. In the model, households pay a fixed fee when both parents work and childcare is not covered, regardless of their hours. Removing this fee makes part-time work relatively more attractive. By contrast, guaranteed availability allows mothers to return to work even when paternal leave does not provide coverage. Without paternal leave, maternal employment at 12 months is 73.0%; with universal childcare availability it rises to 84.8%, close to the 82.6% benchmark with paternal leave. The welfare gains from childcare availability do not, however, replace the household value of time at home under paid paternal leave.

These experiments do not identify the full fiscal cost of expanding formal childcare. Universal availability does not incorporate the resource cost of building or expanding capacity. Under the fee-removal policy, the government finances the fee that households would otherwise pay, but that fee is not the resource cost of a formal childcare place. Moreover, the model applies the fee to all

effective childcare arrangements, including informal care. Consequently, the simulated tax rates under the childcare experiments should not be interpreted as a comprehensive comparison of the costs of childcare provision and parental leave.

C.6 Simulated Method of Moments

For each candidate vector θ of the 14 jointly estimated household parameters, I solve the model and simulate 50,000 households to calculate 24 model moments. The empirical targets combine pre-reform employment, wage and leave-taking moments with RDD estimates of the 2021 reform. Timing information enters through the two RDD responses of the within-couple days gap conditional on leave arrangement (moments 18–19), the non-overlapping share of paternal leave (moment 20), and four moments measuring the level and reform response of fathers' leave calendar (moments 21–24). I estimate θ by minimising

$$\hat{\theta} = \arg\min_{\theta} \sum_{k=1}^{24} a_k \left(\frac{\hat{m}_k(\theta) - m_k^{\text{data}}}{\max\{|m_k^{\text{data}}|,\, 0.20\}} \right)^2, \tag{C2}$$

where $\hat{m}_k(\theta)$ and m_k^{data} denote the simulated and empirical moments. The denominator scales differences by the magnitude of the empirical moment, with a floor of 0.20 to prevent very small reform effects from receiving excessively large implicit weights. All moments have $a_k = 1$, except the four maternal return-to-work rates, which have weight five, and the six-month within-couple full-time wage penalty, which has weight two. The multistart search and local minimisation are described in the main text.

The 14 parameters are jointly estimated using the full set of moments, rather than one-to-one equations. I impose $\xi_m = \xi_p = \xi$, $\delta_p^{\text{ne}} = \delta_m^{\text{ne}}$, and a restriction tying the maternal separation hazard to her job-finding hazard. Fathers' learning-by-doing rate ζ_p is set at each evaluation to reproduce their observed pre-birth earnings growth. The level difference in maternal days worked between sequential and simultaneous households is not a target. The separately reported RDD response of sequential classification is not counted as an additional moment in the objective. The joint-leave preference is $\eta \sim \text{Logistic}(\gamma, \sigma_\eta)$; γ is the location of the distribution, not an extra term added to η.

C.7 Historical Calibration of Firms' Beliefs

I calibrate the firm-side extension after estimating the household parameters and hold the latter fixed throughout. First, I choose $\sigma_\omega = 1.844$ to reproduce conditional paternal leave take-up of approximately 95% in 2018 under the five-week entitlement and a zero markdown. Next, I solve the household problem for a range of markdowns under the historical entitlement schedule: 13 days in 2007–2016, four weeks in 2017, and five weeks in 2018. Each solution determines both take-up and the mean leave taste of fathers who take voluntary leave, which enters firms' belief updating.

The initial markdown, firms' response to the composition of takers, and their updating gain are fitted jointly to the annual take-up path. The calibrated values are $\kappa_0 = 0.008$, $\Gamma = 0.006$ and $K = 0.83$. The implied initial belief is $\hat{\omega}_0 = 1.33$, consistent with $\kappa_0 = \Gamma\hat{\omega}_0$. The model-implied markdown declines to approximately 0.25% in 2009, 0.19% before the 2017 extension, 0.11% following the 2018 extension, and 0.06% by 2020. The main text reports the fit of annual take-up to the data in Figure 5.

For transferable leave, I use the 2006 fraction of maternity benefits with a transferred share, approximately 1.7%, as a separate target. I find the markdown κ_{pool} that reproduces this rate under the historical transferable policy and compute the resulting mean type among leave-takers. I then set the pool-specific wage response so that the markdown is consistent with stationary firms' beliefs:

$$\kappa_{\text{pool}} = \Gamma_{\text{pool}}\,\bar{\omega}(\kappa_{\text{pool}}, \mathcal{P}_{\text{pool}})\,. \tag{C3}$$

The shared-pool counterfactual starts from a wage markdown of 5.54% at the 2021 point. Updating firms' beliefs under the transferable policy yields a stationary markdown of 7.02%. The wage response is specific to the transferable-leave environment; I do not impose the same pass-through as under the earmarked entitlement. The corresponding leave allocation and labour-market outcomes are reported in Tables 9 and C6.