Sharing Care, Shaping Careers: Paternity Leave and the Motherhood Penalty in Spain

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Abstract

This study examines whether the labour-market consequences of motherhood differ across sectoral environments in Spain and whether these differences changed following the 2021 equalisation of paid parental leave. Using administrative data from the Spanish Continuous Sample of Working Lives (MCVL), we compare mothers employed in Competitive and Non-competitive sectors. Competitive sectors are characterised by stronger career-progression incentives and higher expected costs of employment interruptions, whereas Non-competitive sectors are more institutionalised and temporary absences are expected to entail lower career costs.

We analyse two complementary margins of post-childbirth adjustment. First, we study labour-market trajectories around first childbirth using monthly days worked and Social Security contribution bases. Second, we examine voluntary childcare leave during the first year after childbirth, considering both take-up and duration.

The results reveal substantial sectoral heterogeneity. Mothers in Non-competitive sectors experience a larger and more persistent reduction in days worked and are more likely to take voluntary childcare leave for longer periods. For contribution bases, the pre-reform pattern is reversed: mothers in Competitive sectors experience a more persistent decline after childbirth. Post-reform contribution-base patterns are harder to interpret because sectoral differences are already present before childbirth. Overall, the full-sample results provide limited evidence that the 2021 reform significantly altered these sectoral differences. Among Spanish mothers, however, the post-reform sectoral gap in days worked increases significantly, with mothers in Competitive sectors showing a relatively stronger labour-supply recovery.

Overall, the findings document meaningful heterogeneity in the motherhood penalty across sectoral environments, while providing more limited evidence that the 2021 reform changed this heterogeneity.

1 Introduction

The motherhood penalty refers to the labour-market disadvantages associated with becoming a mother, which may be reflected in lower earnings, reduced working hours, weaker employment attachment, or slower career progression. A large literature has documented that labour-market trajectories often diverge sharply between mothers and fathers after childbirth: while mothers experience substantial and persistent declines in several labour-market outcomes, the corresponding effects for fathers tend to be much smaller. In Spain, Quinto et al. (2021) show that mothers' earnings fall substantially after the birth of the first child, while fathers' earnings remain broadly unchanged, with the resulting child penalty persisting for at least a decade.

These labour-market consequences of motherhood may differ substantially across employment environments. Career interruptions can entail very different costs depending on the occupation or sector in which a woman works. In more competitive environments, career progression may depend more strongly on continuous labour-market attachment, long working hours, accumulation of firm-specific experience, and availability for promotion. Temporary absences may therefore have larger professional costs than in more institutionalised or family-friendly environments. Consistent with this idea, Yu and Kuo (2017) document substantial heterogeneity in the motherhood wage penalty across occupations, finding smaller penalties in occupations characterised by greater autonomy, lower teamwork requirements, and lower competitive pressure.

Understanding this heterogeneity is particularly relevant when evaluating family policies intended to reduce the labour-market costs of motherhood. Governments have introduced a wide range of policies aimed at facilitating the combination of work and family responsibilities, including subsidised childcare, financial incentives for working mothers, and more equal parental-leave policies (Hupkau and Ruiz-Valenzuela, 2022). The latter may be especially relevant because increasing fathers' involvement in childcare can redistribute care responsibilities within the household and potentially reduce the career costs borne disproportionately by mothers.

Against this background, this study focuses on the 2021 Spanish parental-leave reform, which equalised paid leave entitlements for mothers and fathers at 16 weeks. Six weeks became mandatory immediately after childbirth for fathers, while the remaining ten weeks could be taken flexibly and were non-transferable. Since mothers' paid leave entitlement remained unchanged, the reform mainly increased fathers' potential involvement in childcare. If greater paternal involvement reduces the burden of childcare on mothers, the reform may facilitate women's return to work and reduce some of the labour-market costs associated with motherhood.

Some research has already examined how expansions in fathers' parental leave affect paternal involvement in childcare and child development. More recent evidence also considers mothers' labour-market responses to the 2021 reform: Marinova and Bellón-Jiménez (2025) find limited average effects,

with more favourable responses among mothers whose earnings are similar to those of their partners. However, much less is known about whether these effects vary across labour-market environments. We therefore study two related questions. First, do motherhood-related labour-market trajectories differ systematically between mothers employed in Competitive and Non-competitive sectors? Second, did these sectoral differences change following the 2021 equalisation of paid parental leave in Spain?

Using administrative data from the Spanish Continuous Sample of Working Lives (MCVL), we address these questions through two complementary empirical strategies. Our first analysis examines labour-market trajectories around first childbirth using monthly days worked and Social Security contribution bases. We estimate dynamic effects separately for mothers employed in Competitive and Non-competitive sectors using the staggered difference-in-differences framework of Callaway and Sant'Anna (2021), with not-yet-treated mothers as the comparison group. We then compare these sectoral trajectories across the pre- and post-reform periods and test whether the average post-birth Competitive–Non-competitive gap changed after the reform.

Our second analysis uses a difference-in-differences design focusing on childcare-related voluntary unpaid leave. Since mothers' paid parental-leave entitlement remained unchanged, voluntary childcare leave provides an additional margin through which mothers may adjust the amount of time spent away from the labour market after childbirth. We compare changes in both the probability of taking such leave and the number of leave days across Competitive and Non-competitive sectors before and after the reform.

The results reveal substantial sectoral heterogeneity in post-childbirth labour-market adjustment. Mothers in Non-competitive sectors experience a larger and more persistent reduction in monthly days worked. For Social Security contribution bases, we observe the opposite pattern in the pre-reform period, with mothers in Competitive sectors experiencing a larger and more persistent post-birth decline. This result should be interpreted with caution, however, because the post-reform contribution-base trajectories already differ across sectors before childbirth. We also observe clear sectoral differences in voluntary childcare-leave use, with mothers in Non-competitive sectors taking more leave days on average.

Nevertheless, evidence that the 2021 reform altered these sectoral differences is more limited. In the full sample, the average post-birth Competitive–Non-competitive gap does not change significantly across reform periods for either days worked or contribution bases. Similarly, the voluntary childcare-leave analysis shows no statistically significant differential change across sectors in either the probability of taking leave or the number of leave days following the reform. Robustness analyses restricted to Spanish mothers provide some evidence of stronger post-reform differences, although these results are more sensitive to sample composition.

2 Institutional Background

In recent decades, paternity-leave policies in Spain have undergone substantial reforms aimed at promoting a more equal distribution of childcare responsibilities. The first major step was introduced in 2007, when fathers obtained an individual and non-transferable paternity-leave entitlement of approximately two weeks (Boletín Oficial del Estado, 2007).

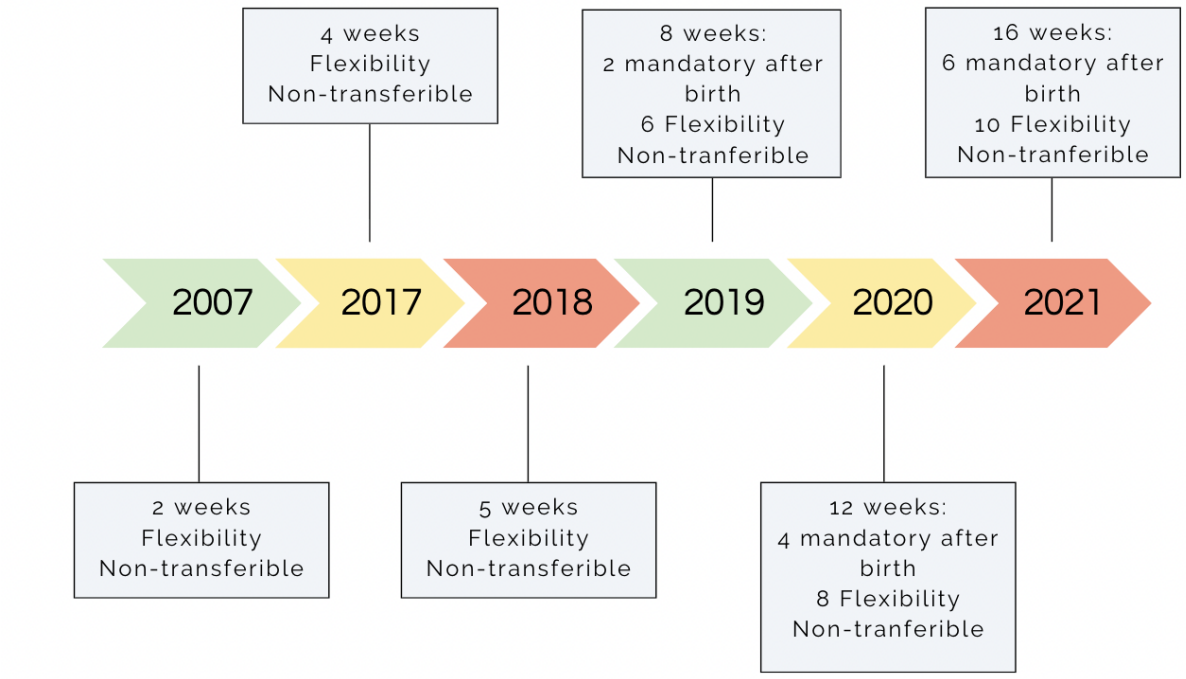
Subsequent reforms progressively increased the duration of fathers' leave. The entitlement was extended to four weeks in 2017 and to five weeks in 2018. From 2019 onwards, the reform process accelerated substantially. Fathers became entitled to eight weeks of paid leave in 2019, twelve weeks in 2020, and sixteen weeks from January 2021, thereby equalising the duration of paid leave available to mothers and fathers (Farré et al., 2025; Boletín Oficial del Estado, 2019).

The reforms also modified the way fathers could use their leave. In 2019, the first two weeks after childbirth became mandatory. The mandatory period increased to four weeks in 2020 and to six weeks in 2021, while the remaining weeks could be taken more flexibly. From 2021 onwards, each parent became entitled to sixteen weeks, including six mandatory weeks immediately following childbirth, and the entitlement became fully individual and non-transferable (Boletín Oficial del Estado, 2019; Farré et al., 2025).

These institutional changes were accompanied by substantial changes in fathers' leave-taking behaviour. Farré et al. (2025) show that fathers' participation increased markedly following the introduction of mandatory leave, with the 2019 reform producing an increase of around 20 percentage points in take-up. They also document that fathers increasingly use almost the full duration of their entitlement. The introduction of mandatory and non-transferable leave therefore appears to have been particularly important in increasing fathers' participation in parental leave.

Figure 1 summarises the main changes in the duration and structure of fathers' paid parental leave between 2007 and 2021.

Figure 1: Evolution of Paternity Leave in Spain, 2007–2021 for fathers



Notes: The figure shows the evolution of the duration of paid paternity leave in Spain for fathers between 2007 and 2021. The 2021 reform equalised paid parental leave entitlements for mothers and fathers at 16 weeks.

3 Literature Review

A large literature documents substantial labour-market penalties following the birth of the first child. Kleven et al. (2019) show that childbirth generates persistent differences in earnings and labour supply between women and men, providing a widely used framework for analysing the dynamics of child penalties around first birth.

A similar analysis for Spain is provided by Quinto et al. (2021), who use Social Security records to document a substantial and persistent decline in mothers' earnings after the birth of the first child, together with reductions in working days and shifts toward part-time and fixed-term employment. They also show that these effects are heterogeneous across educational groups. However, their analysis does not distinguish between sectoral environments or examine whether motherhood-related labour-market trajectories changed following the 2021 parental-leave reform.

More recent evidence directly examines the implications of the 2021 reform for the motherhood penalty. Using survey data from mothers whose children were born before and after the reform, Marinova and Bellón-Jiménez (2025) analyse whether equal and non-transferable paternity leave affected mothers' return to work, labour-market re-entry, and perceived professional sacrifice. They find limited average effects, with more favourable responses among mothers whose earnings are similar to those of their partners, highlighting the importance of within-couple economic conditions in shaping

the effects of the reform.

While this evidence points to important heterogeneity according to household and individual characteristics, less is known about whether motherhood-related labour-market adjustments differ across sectoral environments. Differences in job flexibility, promotion structures, employment protection, and the cost of career interruptions can shape how women adjust their labour supply after childbirth. Consistent with this idea, Yu and Kuo (2017), using U.S. data, document substantial heterogeneity in the motherhood wage penalty across occupations, finding smaller penalties in occupations characterised by greater autonomy, lower teamwork requirements, and lower competitive pressure.

Building on this literature, our first contribution is to study whether post-childbirth labour-market trajectories differ between mothers employed in Competitive and Non-competitive sectors in Spain. Rather than focusing on average motherhood penalties or on differences between women and men, we examine heterogeneity across sectoral environments in which the expected career costs of temporary employment interruptions may differ.

To estimate these dynamics, we use the staggered difference-in-differences framework of Callaway and Sant'Anna (2021), which accommodates variation in the timing of childbirth and uses not-yet-treated mothers as the comparison group. We estimate sector-specific event-study trajectories for monthly days worked and Social Security contribution bases around first childbirth.

A second strand of the literature examines how parental-leave policies affect the allocation of childcare and labour-market behaviour within households. Previous evidence has primarily focused on fathers' responses to parental leave reforms. One of the first studies analysing the 2007 Spanish reform is Castellanos-Serrano et al. (2024), who find that expanding fathers' leave is associated with a reduction in mothers' use of unpaid childcare leave. They also acknowledge, however, that this effect cannot be fully attributed to the reform, as other contemporaneous factors, such as the economic crisis, may also have influenced women's behaviour. Their findings nevertheless point to an important mechanism through which greater paternal involvement may affect mothers' labour-market decisions.

Building on this work, Farré et al. (2025) analyse the more recent 2019–2021 reforms, focusing not only on fathers' take-up of leave but also on how they use it. Their results show that making part of the leave mandatory and non-transferable substantially increased fathers' participation. They further distinguish between fathers who take leave simultaneously with the mother ("companion care") and those who take it after the mother's leave ends ("solo care"), allowing mothers to return to work earlier. They find that lower-income fathers are more likely to adopt the companion-care pattern, whereas higher-income fathers, who generally have greater job flexibility, are more likely to adopt the solo-care pattern.

A related approach is adopted by Gorjón and Lizarraga (2024), who use a Regression Discontinuity Design (RDD) to compare childbirths around the 2020 and 2021 policy changes. However, by focusing only on the final stage of the reform, their analysis captures a relatively small policy change and may

not fully reflect the overall impact of the 2019–2021 reform package.

Beyond labour-market outcomes, recent studies have also examined broader effects of paternity-leave reforms. For example, Farre et al. (2024) analyse the implications for child development, while Farré et al. (2023) study how these reforms contribute to changing social norms and promoting a more equal distribution of household responsibilities.

Despite this growing evidence, relatively little is known about whether policies that increase fathers' involvement in childcare affect mothers differently across labour-market environments. This question is particularly relevant when career interruptions entail different professional costs across sectors.

Our second contribution is to examine whether the 2021 equalisation of paid parental leave changed mothers' use of voluntary childcare leave differently across sectoral environments. The underlying hypothesis is that greater paternal involvement may be particularly valuable for mothers employed in sectors where career interruptions are more costly. We use a difference-in-differences design to compare changes between Competitive and Non-competitive sectors in both the probability of taking voluntary childcare leave and the number of leave days following the reform. In addition, we examine whether the sectoral differences identified in the childbirth event-study analysis changed following the 2021 reform.

4 Data

4.1 Data source

The data used in this study come from the MCVL (Muestra Continua de Vidas Laborales) from the Spanish Social Security. The MCVL is an anonymised administrative dataset that contains information on approximately 4% of the Spanish population linked to the Social Security system. It provides detailed longitudinal records on individuals' employment histories, including contract durations, types of leave, and other labour-market characteristics.

The dataset covers the period 2014–2024. Birth cohorts included in the main analyses are drawn from 2015–2023; however, they are not identical across the two empirical strategies. Records from 2014 and 2024 are used to construct complete pre- and post-birth observation windows for adjacent cohorts: 2014 provides pre-birth information for women giving birth in 2015, while 2024 provides post-birth information for women giving birth in 2023. In addition, women whose first childbirth occurs in 2024 may contribute as not-yet-treated comparison units in the event-study analysis.

4.2 Sample construction

We construct the analysis sample by selecting women observed in the MCVL between 2014 and 2024 who experience at least one parenthood event during the period 2015–2024. The exact birth cohorts included depend on the empirical strategy. In the difference-in-differences analysis of voluntary

childcare leave, the pre-reform cohorts are 2015–2018 and the post-reform cohorts are 2021–2023; birth cohorts from 2019–2020 are excluded because the reform was implemented gradually during those years. By contrast, the childbirth event-study uses 2015–2018 as the main pre-reform treated cohorts and 2022–2023 as the main post-reform treated cohorts. The 2021 birth cohort is excluded from the post-reform event study because constructing its 12-month pre-birth trajectory would require using observations from 2020, when labour-market outcomes were heavily affected by the COVID-19 pandemic.

In the staggered event-study analysis, women whose first childbirth occurs in 2019 may still contribute observations as not-yet-treated controls before their treatment month, when applicable. Similarly, women giving birth in 2024 are not included as treated cohorts because a complete post-birth window is unavailable, but they may contribute as not-yet-treated comparison units prior to childbirth. Table A2 in the Appendix reports the distribution of births by year before excluding Neutral sectors or women without an identifiable pre-birth sector classification.

Since the dataset does not directly identify birth events, we construct a proxy using the variable $famsize\_06$, which captures the number of children aged 0–6 in the household. A transition from 0 to 1 is interpreted as the occurrence of a birth event. We do not consider transitions from one to two children, which are also present in the dataset, because leave-taking decisions following a second child may be influenced by the experience of the first. We therefore focus on first childbirths. However, we acknowledge that, in some cases, the proxy may capture higher-order births when the spacing between children exceeds six years.

Before proceeding to the analysis, several sample restrictions are applied to ensure that childbirth events, sector classification, and childcare-leave spells can be consistently identified. In particular, observations with inconsistent leave durations or missing sector information are excluded, as are women older than 45 or with missing age information. Birth cohorts for which a complete pre- or post-birth observation window is unavailable are also excluded. Finally, zero-day childcare-leave spells are removed. Appendix B provides further details on the data-cleaning procedure and includes Table A1, which reports the number of observations affected by each sample restriction.

The final data are organised into two analytical datasets, corresponding to the two empirical strategies used in the paper.

For the childbirth event-study analysis, the resulting analytical sample is transformed into a monthly panel centred around the inferred month of first childbirth. For each woman, we construct observations from 12 months before to 12 months after childbirth. Months in which no employment record is observed are retained in the panel and assigned a value of zero for the corresponding labour-market outcomes. This allows us to follow mothers' labour-market trajectories continuously around childbirth rather than restricting the analysis to months in which an employment spell is recorded.

For the voluntary childcare-leave analysis, the data are instead collapsed to the individual level.

Each mother contributes one observation, and the outcomes capture whether she takes any voluntary childcare leave and the total number of leave days accumulated during the first 12 months after childbirth. This structure is used in the difference-in-differences analysis comparing Competitive and Non-competitive sectors before and after the 2021 reform.

4.3 Outcome variables

The analysis considers two sets of labour-market outcomes, corresponding to the two empirical strategies used in the paper. The first set captures mothers' labour-market trajectories around first childbirth, while the second focuses on the use of voluntary childcare leave during the first 12 months after childbirth.

For the childbirth event-study analysis, we focus on two monthly labour-market outcomes: days worked and Social Security contribution bases. Monthly days worked provides a measure of labour-supply adjustment around childbirth, while Social Security contribution bases provide an earnings-related measure of labour-market attachment. These outcomes are constructed from the monthly employment histories described in the previous subsection.

The second set of outcomes concerns voluntary childcare leave. We examine both the probability of taking any childcare-related voluntary leave and the total number of leave days accumulated during the first 12 months after childbirth. We focus on mothers' voluntary leave because the 2021 reform changed fathers' paid parental leave while leaving mothers' paid leave entitlement unchanged, making voluntary leave an additional margin through which mothers may adjust the amount of time spent away from the labour market after childbirth. Importantly, this type of leave is unpaid, so its use may entail an additional short-term income cost for mothers and may therefore contribute to the economic inequalities associated with motherhood.

We identify voluntary childcare leave using the variable $reasondimissal = 68$, which corresponds to "excedencia para el cuidado de hijos". This category is distinct from other family-related leave types recorded in the dataset ($reasondimissal = 73$, excedencia cuidado familiares).

Restricting the childcare-leave analysis to the first 12 months after childbirth ensures comparability across birth cohorts and reduces censoring concerns. We choose this time window because publicly funded childcare often becomes more widely available after the child's first year, making it easier for mothers to return to the labour market.

Paid parental leave is not directly observed as a period of absence from employment in our data. Since it is a Social Security benefit, mothers remain affiliated with the Social Security system during the leave period. By contrast, childcare-related voluntary leave is unpaid and can be identified as a period in which the individual temporarily disappears from the employment records. We therefore interpret childcare-related voluntary leave as an observable and discretionary margin of mothers' post-birth labour-market adjustment, reflecting the decision to extend time away from work beyond the

paid parental leave entitlement.

Our analytical sample focuses on women employed in Competitive and Non-competitive sectors, excluding Neutral sectors. In the childcare-leave sample, the share of women taking voluntary childcare leave ranges between 6.6% and 7.4% across birth cohorts, as shown in Table 1.

Table 1: Childcare Leave Take-Up by Birth Cohort

Birth year	Number of women	Share taking leave (%)
2015	5,704	6.70
2016	5,311	7.29
2017	5,389	7.61
2018	5,381	7.34
2021	4,276	6.83
2022	4,568	6.72
2023	4,434	7.10

Notes: The table reports the number of women and the share taking voluntary childcare leave within 12 months after childbirth, by birth cohort. The analytical sample is restricted to women classified as working in Competitive or Non-competitive sectors before childbirth and satisfying the sample-selection criteria reported in Table A1.

4.4 Sector Classification

The main analysis of this study focuses on differences in motherhood-related labour-market adjustment across sectoral environments. We therefore classify sectors according to the expected career costs associated with temporary employment interruptions.

At one end, some sectors are characterised by stronger promotion incentives, greater reliance on continuous labour-market attachment, performance-based remuneration, and higher expected professional costs of career interruptions. At the other end, employment is more institutionalised, career progression is less dependent on uninterrupted employment, and temporary absences are expected to entail lower long-term career costs.

For ease of exposition, we refer to the first group as competitive sectors and to the second as non-competitive sectors. A third group, labelled neutral, includes sectors whose characteristics are too heterogeneous to assign consistently to either category.

Competitive sectors are characterised by stronger career-progression incentives and greater reliance on continuous labour-market attachment, such that temporary career interruptions are expected to entail higher professional costs. Importantly, this classification does not imply that workers in competitive sectors have higher average wage levels. Rather, competitive environments may offer greater scope for wage and career progression, meaning that the costs of an interruption may arise through forgone wage growth or promotion opportunities rather than through current wage levels. Typical examples include financial services, professional and technical services, legal activities, consulting, research, real estate, wholesale trade, temporary employment agencies, and occupations where career

progression strongly depends on continuous participation in the labour market.

By contrast, non-competitive sectors include activities where employment is generally more institutionalised, career progression is less dependent on uninterrupted employment, and maternity-related absences are expected to impose lower long-term career penalties. Workers in these sectors may have greater access to institutionalised leave arrangements and employment protections. This category mainly comprises public administration, education, health and social services, as well as activities largely organised within public or quasi-public institutions. Education and health-related activities are classified as non-competitive regardless of whether employment is in the public or private sector, since the classification is based on sectoral characteristics. Distinguishing between public and private employment would introduce an additional source of heterogeneity that is beyond the scope of this analysis.

Finally, we classify as neutral sectors those whose activities are not clearly classified. These sectors are characterised by substantial heterogeneity in occupations, employment arrangements, or organisational structures, making it difficult to assign them consistently to either of the previous groups.

The sectors in our dataset are classified according to the CNAE-09 classification. While many CNAE-09 sectors are relatively homogeneous and can be assigned to a single category, others include occupations with very different characteristics. As a result, some sectors contain activities that could plausibly belong to different groups.

Our classification is primarily based on the O*NET occupational characteristics, which were originally developed for the United States, and is complemented with evidence from the Spanish National Statistics Institute (INE) labour cost statistics. We acknowledge that labour costs may also reflect factors unrelated to career competitiveness, such as occupational risk or working conditions. Therefore, we additionally reviewed each CNAE-09 activity individually to ensure that the final classification was as consistent as possible despite the heterogeneity across sectors (the complete classification is reported in Appendix A).

Table A3 shows the composition of the sample across sector groups before and after the reform. Competitive and Neutral sectors represent the largest shares of employment, while Non-competitive sectors account for a smaller but substantial fraction of the sample. The distribution of women across sector groups remains relatively stable over time, with only minor changes between the pre- and post-reform periods. Section 5.2.6 further examines mobility across sectors around childbirth.

4.5 Descriptive Statistics

Before presenting the main results, we compare the characteristics of women employed in Competitive and Non-competitive sectors during the pre-reform period. This descriptive analysis identifies systematic differences between the two groups before the policy was implemented and helps motivate the

choice of controls in the difference-in-differences specification. Table 2 reports this comparison for age at childbirth, pre-birth wages, firm size, contract type, the percentage of civil servants (funcionarios) and part-time employment, separately for all mothers and for the subsample of mothers who take childcare leave during the first 12 months after childbirth.

Table 2: Characteristics of Women by Sector, Pre-Reform (2015–2018)

Variable	Competitive	Non-competitive	Difference	p-value
Panel A: Full sample				
Age at childbirth	33.36	34.18	-0.82	< 0.001
Spanish nationality (%)	83.59	95.41	-11.82	< 0.001
Pre-birth contribution base	54.55	70.76	-16.21	< 0.001
Firm size	2342.63	2557.85	-215.22	0.040
Permanent contract (%)	64.91	41.23	23.68	< 0.001
Public/statutory employment (%)	0.06	17.70	-17.64	< 0.001
Part-time (%)	21.29	25.51	-4.22	< 0.001
Any childcare leave, 12m (%)	5.51	10.25	-4.74	< 0.001
Leave days, 12m	7.08	13.19	-6.11	< 0.001
Total leave days	14.10	27.95	-13.85	< 0.001
Observations	13,905	7,880		
Panel B: Childcare-leave takers				
Age at childbirth	34.95	34.95	0.00	0.987
Spanish nationality (%)	93.99	96.91	-2.91	0.006
Pre-birth contribution base	67.34	75.85	-8.51	0.005
Firm size	1048.68	1458.90	-410.22	0.002
Permanent contract (%)	95.13	61.34	33.78	< 0.001
Public/statutory employment (%)	0.26	21.41	-21.15	< 0.001
Part-time (%)	21.54	18.19	3.35	0.097
Leave days, 12m	128.54	128.62	-0.08	0.982
Total leave days	226.85	244.53	-17.68	0.121
Observations	766	808		

Notes: The table reports characteristics of women giving birth between 2015 and 2018, separately for Competitive and Non-competitive sectors. Panel A includes all women in the analytical sample, while Panel B is restricted to women taking voluntary childcare leave within 12 months after childbirth. Differences are calculated as Competitive minus Non-competitive. Reported p-values correspond to tests of equality of means between the two sector groups. Sample sizes may vary across variables because of missing information.

The most notable pre-reform difference concerns employment arrangements. Women in Competitive sectors are substantially more likely to be classified as holding a permanent contract than women in Non-competitive sectors (64.91% versus 41.23%). However, the permanent-contract indicator should be interpreted with caution in the MCVL. On the one hand, *funcionarias* are not systematically classified through the standard permanent-contract indicator, as they are identified through separate employment-relation codes. On the other hand, the Spanish labour-market reform introduced at the end of 2021 substantially restricted the use of temporary contracts and modified the contractual composition of employment from 2022 onwards.

Focusing on public and statutory employment, 17.7% of women in Non-competitive sectors are classified as *funcionarias*, compared with only 0.06% in Competitive sectors. Among childcare-leave takers, the corresponding shares are 21.41% and 0.26%, respectively. This pattern provides additional descriptive support for the sector classification, as Non-competitive sectors contain a substantially larger share of public and statutory employment relationships.

A second relevant difference concerns pre-birth wages. Average wages are lower in Competitive sectors both before and after the reform. This does not necessarily contradict the sector classification, since our measure is intended to capture differences in competitive pressure and the potential career costs of temporary interruptions rather than differences in current wage levels. Non-competitive sectors tend to be characterised by more institutionalised employment arrangements and relatively stable career and wage progression, whereas Competitive sectors may offer greater scope for wage growth and promotion over the career. In the latter, the costs of an interruption may therefore arise through forgone wage growth, promotion opportunities, or slower career progression rather than through lower current wages.

The characteristics of childcare-leave takers also reveal substantial selection into leave use. In the pre-reform period, women taking childcare leave have higher average pre-birth wages than the full sample in both sector groups. They are also considerably more likely to be classified as holding permanent contracts. In Non-competitive sectors, *funcionarias* account for 21.41% of leave takers, compared with 17.7% of all mothers in the group. These patterns suggest that access to, or take-up of, extended unpaid childcare leave is concentrated among women with particular pre-birth employment arrangements. They should nevertheless be interpreted as descriptive differences rather than as evidence that these employment characteristics causally increase leave take-up.

For completeness, Table A4 in the Appendix reports the same descriptive comparison for the post-reform period (2021–2023). Unlike the pre-reform table, this comparison is not intended as a balance assessment and is therefore presented as descriptive evidence only.

Finally, Table 3 reports descriptive statistics of childcare leave by sector group and reform period. Several patterns are worth highlighting before estimating differential post-reform changes across sectors. First, childcare leave is more common among women employed in Non-competitive sectors: around 10% of women take leave compared with approximately 5% in Competitive sectors. Similarly, the average number of leave days is higher in Non-competitive sectors, suggesting differences in leave usage across sectors even before the reform.

Overall, the descriptive evidence points to meaningful differences between Competitive and Non-competitive sectors in both employment characteristics and childcare-leave behaviour. These differences provide initial evidence that the two sector groups represent distinct labour-market environments and motivate the analysis of heterogeneous motherhood-related labour-market trajectories across sectors. We then examine whether the 2021 reform altered these sectoral gaps.

Table 3: Childcare Leave Outcomes by Sector and Reform Period

Sector group	Period	N	Mean leave days	% taking leave	Pre-birth contribution base
Competitive	Pre-reform	13,905	7.08	5.51	54.6
Competitive	Post-reform	7,806	5.63	4.61	65.4
Non-competitive	Pre-reform	7,880	13.2	10.3	70.8
Non-competitive	Post-reform	5,472	12.3	10.1	82.8

Notes: The table reports descriptive statistics for mothers in Competitive and Non-competitive sectors before and after the parental leave reform. The pre-reform period includes birth cohorts from 2015–2018, while the post-reform period includes birth cohorts from 2021–2023. Mean leave days and the share taking leave refer to voluntary childcare leave within 12 months after childbirth. The pre-birth contribution base is observed in the Social Security records and is used as a proxy for wages.

4.6 Data limitations

4.6.1 Measurement of birth events

A key limitation is that the dataset does not directly identify childbirth dates. To address this, we use the $famsize\_06$ variable as a proxy. A change from 0 to 1 is interpreted as a birth event.

This proxy may introduce measurement error, as it can also capture adoption, household composition changes, or delayed updates in administrative records.

4.6.2 Validation of the birth proxy

We perform several validation checks. First, we restrict the sample to plausible fertility ages, excluding women aged 45 or older at childbirth, which removes around 14% of the sample.

Second, we examine the timing of voluntary leave relative to the birth proxy event. Despite some administrative inconsistencies in the underlying data, we observe that most women who take leave do so between months 4 and 7 after childbirth. This pattern is consistent with the fact that paid maternity leave covers the first four months, after which some mothers transition into voluntary unpaid leave. A smaller share of women appear to take leave before the recorded childbirth month; this could reflect leave taken during pregnancy, or a delay in how the childbirth event is administratively recorded.

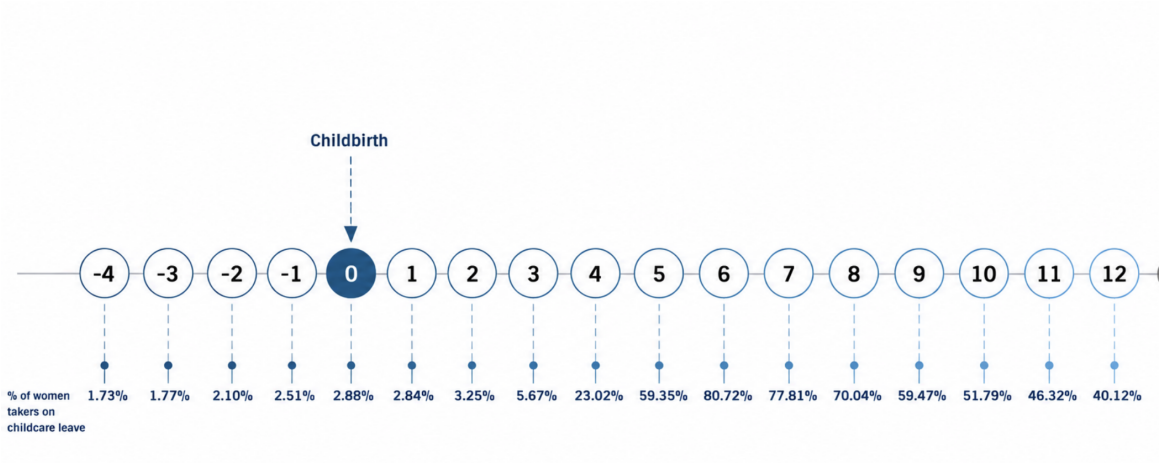
Figure 2 shows the distribution of leave-taking across months before and after childbirth.

4.6.3 Construction of leave duration

The dataset does not directly report leave duration. Instead, we infer it from monthly employment records, observing reductions in days worked and gaps in employment histories.

We reconstruct leave spells by combining partial-month information and gaps in administrative records. As indicated in Table A1, we remove 1.66% of women with negative recorded leave durations as well as 0.08% whose recorded leave duration is zero days.

Figure 2: Distribution of Voluntary Childcare Leave Take-Up Across Months Relative to First Childbirth



Notes: The figure shows, among mothers who take voluntary childcare leave, when they take this leave relative to first childbirth. The month of childbirth is not directly observed in the administrative data and is inferred using the first observed increase in the number of children aged 0–6 in the household. Paid maternity/parental leave lasts 16 weeks, approximately four months after childbirth, after which voluntary childcare leave may begin.

4.6.4 Panel Construction Limitations

A relevant limitation concerns the construction of the monthly labour-market outcomes used in the event-study analysis. Missing values are particularly important for the Social Security contribution-base variable. Approximately 80% of missing observations arise because contribution information is not available in the administrative records. The remaining 20% are associated with administratively inconsistent working-day records, mainly cases in which the sum of reported working days within a month exceeds 31, affecting around 10% of the sample. These missing observations are not imputed.

4.6.5 Additional limitations

An additional limitation is that, while the administrative records include women who did not give birth during the sample period, computational constraints arising from the size of the dataset prevent us from constructing a comparable control group of non-mothers. As a result, our analysis focuses exclusively on women who experience childbirth. However, the expansion of fathers' parental leave may itself have affected fertility decisions or the timing of childbirth. If the reform changed the composition of women becoming mothers, particularly if this occurred differently across Competitive and Non-competitive sectors, part of the observed post-reform changes could reflect compositional changes rather than behavioural responses among otherwise comparable mothers. The empirical strategy does not separately identify this potential fertility response.

Furthermore, childcare-related voluntary leave can last for up to three years. However, when a woman does not return to employment, the data do not allow us to determine when the leave ends and a subsequent period of non-employment begins. Consequently, our analysis focuses on the first 12 months after childbirth, and we do not attempt to estimate longer-term effects.

5 Empirical Strategy

5.1 Childbirth Event-Study Strategy

The first empirical approach examines whether labour-market trajectories around first childbirth differ between mothers employed in Competitive and Non-competitive sectors, and whether these sectoral differences changed following the 2021 parental-leave reform.

The analysis builds on the child-penalty event-study literature, which typically studies labour-market outcomes around childbirth using the period immediately preceding birth as the reference category. Much of this literature relies on annual event time, taking the year before childbirth as the reference period (Kleven et al., 2019). The monthly frequency of the MCVL allows us instead to construct a higher-frequency event study. Our approach combines this monthly structure with a sectoral comparison: the event study is estimated separately for mothers employed in Competitive and Non-competitive sectors, using not-yet-treated mothers within each sector as the comparison group, and the resulting sector-specific trajectories are then compared. The outcomes considered, monthly days worked and Social Security contribution bases, capture labour-supply and earnings-related dimensions commonly studied in the child-penalty literature. For Spain, Quinto et al. (2021) apply an annual event-study approach to compare women's and men's labour-market trajectories around the birth of the first child, analysing outcomes such as earnings, working days, and part-time or fixed-term employment.

To account for staggered treatment timing, we use the framework of Callaway and Sant'Anna (2021). Mothers are treated when they experience their first childbirth, while women who have not yet given birth but will do so later serve as not-yet-treated controls. Group-time treatment effects are aggregated according to event time,

$$e = t - g, \tag{1}$$

over the window $e \in [-12, 12]$. We use a universal base period so that all dynamic coefficients are expressed relative to $e = -1$. The aggregation is also balanced over the full event-time window, ensuring that changes in the estimated trajectory are not mechanically driven by different childbirth cohorts contributing at different event times.

This sectoral comparison constitutes the main extension of the standard event-study framework in our application. Sector status is fixed according to the mother's last observed sector before childbirth. We test whether the Competitive and Non-competitive trajectories differ jointly before childbirth ($e = -12, \ldots, -2$) and after childbirth ($e = 0, \ldots, 12$), and subsequently assess whether the average post-birth sector gap changes between the pre- and post-reform periods.

In the preferred specification, we condition on the mother's contemporaneous age, measured monthly. Using age at first childbirth instead produces virtually unchanged dynamic profiles and

joint Wald tests. Nationality was also considered as an additional covariate, but its inclusion generated limited-support and singularity problems in some cohort–time comparisons.

A key limitation is that childbirth is anticipated. Mothers may adjust their labour-market behaviour during pregnancy, and some women serving as not-yet-treated controls may themselves already be pregnant. Therefore, $e = -1$ should not be interpreted as a fully unaffected pre-pregnancy baseline. Moreover, comparing Competitive and Non-competitive sectors only mitigates this concern if pregnancy-related adjustments are similar across sectors. If mothers in one sector adjust earlier or more strongly during pregnancy, these differences may already enter the estimated sectoral gap.

The `did` package allows explicit anticipation windows to account for this issue. As a robustness exercise, we attempted specifications allowing for three-, six-, and nine-month anticipation periods. However, given the monthly frequency and size of the panel, these specifications proved computationally infeasible. A formal anticipation-adjusted event study therefore remains an extension for further work. As a complementary diagnostic, rather than as a substitute for such an adjustment, we examine the Competitive–Non-competitive gap at $e = -9$, $e = -6$, and $e = -3$ to assess whether sectoral divergence is already visible during the pre-birth period. These pointwise tests complement the joint pre-birth Wald test but do not constitute a formal correction for anticipation.

The event study is estimated separately for the pre- and post-reform periods. Pre-reform treated cohorts correspond to first births in 2015–2018, with 2019 retained as a future not-yet-treated cohort when applicable. Post-reform treated cohorts are 2022–2023, with 2024 retained as a future comparison cohort. The 2021 childbirth cohort is excluded because constructing its 12-month pre-birth window would require observations from 2020, when labour-market outcomes were heavily affected by the COVID-19 pandemic. A longer pre-birth window would provide a cleaner pre-pregnancy benchmark and allow a more detailed assessment of anticipation, but would substantially reduce the number of cohorts for which a balanced event-study window can be constructed.

Finally, fathers are analysed as a descriptive benchmark for the Social Security contribution-base outcome. We estimate fathers' contribution-base trajectories around childbirth separately for Competitive and Non-competitive sectors. The purpose is to assess whether the sectoral patterns observed among mothers could reflect broader sector-specific movements in contribution bases rather than motherhood-related adjustment. This comparison is descriptive and is not used as an additional identification strategy.

5.2 Difference-in-Differences Strategy

5.2.1 Empirical Specification

Although the underlying Social Security records provide monthly information on women's employment histories, the main analysis is conducted at the individual level. The monthly records are used to

construct post-birth outcomes for each woman over a fixed 12-month window following childbirth. In particular, the intensive-margin outcome measures the total number of days of childcare-related voluntary leave accumulated during these 12 months, while the extensive-margin outcome indicates whether the woman takes any such leave during the same period. Thus, each woman contributes one observation to the main regression, rather than a panel of monthly observations.

We estimate three nested specifications. The first specification includes the interaction of interest and fixed effects, the second additionally controls for age at childbirth and nationality, and the third further includes pre-birth wages as a robustness check:

$$Y_{isrt} = \alpha + \beta(Post_t \times Competitive_s) + \delta_t + \mu_s + \lambda_r + \varepsilon_{isrt}, \tag{2}$$

$$Y_{isrt} = \alpha + \beta(Post_t \times Competitive_s) + \delta_t + \mu_s + \lambda_r + \gamma_1 Age_i + \gamma_2 Nationality_i + \varepsilon_{isrt}, \tag{3}$$

$$Y_{isrt} = \alpha + \beta(Post_t \times Competitive_s) + \delta_t + \mu_s + \lambda_r + \gamma_1 Age_i + \gamma_2 Nationality_i + \gamma_3 PreWage_i + \varepsilon_{isrt}. \tag{4}$$

The same three specifications are estimated for both outcome variables: the number of childcare leave days taken during the first 12 months after childbirth and an indicator for whether the mother takes any childcare leave during this period. The main effects of $Post_t$ and $Competitive_s$ are absorbed by the birth-year and pre-birth industry fixed effects, respectively.
where:

- Y_{isrt} denotes the outcome variable for mother i, employed in pre-birth industry s and region r, whose child is born in year t. We consider two main outcome variables: the total number of days of childcare leave taken during the first 12 months after childbirth (mothers who do not take any childcare leave are therefore assigned a value of zero), and a binary indicator equal to one if the mother takes any childcare leave during this period and zero otherwise.
- $Post_t$ is an indicator equal to one for births occurring after the reform, corresponding to the 2021–2023 period, and zero for childbirths occurring before the reform.
- $Competitive_s$ is an indicator equal to one if the mother was employed in a Competitive sector before childbirth.
- δ_t, μ_s, and λ_r denote birth-year, pre-birth industry, and region fixed effects, respectively. Birth-year fixed effects absorb shocks common to mothers giving birth in a given year, including aggregate macroeconomic conditions. Pre-birth industry fixed effects account for time-invariant differences across industries, while region fixed effects capture persistent regional differences in labour-market conditions and access to childcare.

- Age_i denotes the mother's age at childbirth, $Nationality_i$ her nationality, and $PreWage_i$ her pre-birth wage.
- β is the coefficient of interest and captures the differential post-reform change in childcare-leave outcomes between Competitive and Non-competitive sectors. A negative coefficient indicates that leave decreased more, or increased less, in Competitive sectors relative to Non-competitive sectors after the reform, while a positive coefficient indicates the opposite.

The coefficient β captures whether childcare-leave outcomes changed differently across Competitive and Non-competitive sectors after the reform. A causal interpretation of this differential change requires that, in the absence of the reform, the gap between the two groups would have evolved similarly over time. Because the reform was implemented nationwide and coincided with other major institutional and economic changes, the estimates are interpreted as differential post-reform changes across sectors rather than as the overall effect of the reform itself.

5.2.2 Control Variables

The choice of control variables is guided by the need to account for observable differences across mothers while avoiding controls that may themselves respond to the reform or to contemporaneous shocks.

- *Age at childbirth:* Age may affect both the timing of motherhood and the use of childcare leave. We therefore include age at childbirth as an individual control.
- *Nationality:* Nationality is included to account for systematic differences in labour-market participation, family characteristics, and the use of childcare leave across groups of mothers. While the descriptive statistics report nationality as a binary indicator distinguishing Spanish from non-Spanish mothers, the regression specifications use more detailed nationality categories, treating different foreign nationalities separately.
- *Pre-birth wage:* Pre-birth wage is used as a robustness control to capture earnings potential and the opportunity cost of taking childcare leave. Women with different earnings may face different incentives to take leave. For example, women with relatively low wages may have weaker financial incentives to remain in employment if childcare costs are high. Importantly, the wage measure refers to the period before childbirth, reducing concerns that it is directly affected by the post-birth leave decision. In addition, our placebo analysis does not find evidence of a differential change in pre-birth wages across competitive and non-competitive sectors after the reform ($\hat{\beta} = -0.497$, $p = 0.826$).

We do not include pre-birth contract type, public employee (percentage of *funcionarios*) or firm size in the baseline specification. While these variables are likely to be related to mothers' leave-taking

decisions, they may themselves have changed differentially across competitive and non-competitive sectors during the study period. Controlling for them could therefore absorb part of the variation associated with the reform. We formally assess this issue in the following subsection (5.2.3).

5.2.3 Validation of Control Variables

We estimate placebo regressions using pre-birth characteristics as dependent variables. Specifically, we regress pre-birth permanent-contract status, firm size, public/statutory employment, and pre-birth contribution base on the same $Post \times Competitive$ interaction used in the main specifications. All regressions include birth-year, pre-birth industry, and region fixed effects, with standard errors clustered at the pre-birth three-digit industry level.

The results indicate that permanent-contract status, public/statutory employment, and firm size exhibit significant differential changes across Competitive and Non-competitive sectors and are therefore not included as baseline controls. By contrast, the pre-birth contribution base does not display a statistically significant differential change and is included separately as a robustness control.

The corresponding specification and results are reported in Appendix D.

5.2.4 Extensive and Intensive Margins

Because the main outcome assigns a value of zero to mothers who do not take childcare leave, the analysis combines two conceptually distinct margins. The *extensive margin* captures whether a mother takes any childcare leave during the first 12 months after childbirth. The *intensive margin* captures the number of days of leave taken.

To distinguish between these mechanisms, we estimate two complementary specifications. First, we estimate the probability of taking any childcare leave using the binary outcome $AnyLeave_i$. Second, we estimate the total number of leave days using $DaysLeave_i$. The latter includes mothers who do not take leave, assigning them a value of zero.

This distinction allows us to assess whether the reform is associated with a change in the decision to take voluntary leave, a change in the duration of leave conditional on the broader population of mothers, or both.

5.2.5 Standard Errors

Standard errors are clustered at the pre-birth three-digit industry level to allow for arbitrary correlation in the error term among women employed in the same industry. This accounts for the fact that workers within an industry may be exposed to common shocks or share unobserved characteristics, which would otherwise lead to underestimated standard errors.

5.2.6 Sector mobility

We also examine whether mothers change sector around childbirth, since substantial post-birth mobility could complicate the interpretation of the pre-birth sector classification. Overall, sector mobility is relatively limited: approximately 7.4% of mothers change sector group within the 12 months before and after childbirth. Among mothers taking voluntary childcare leave, however, sector mobility is particularly low, as shown in Table A5 in the Appendix. Around 99% remain within the same broad sector group, providing reassurance that fixing sector classification before childbirth is unlikely to generate substantial misclassification due to immediate post-birth sector switching.

6 Results

6.1 Child-Penalty Event-Study Results

6.1.1 Sectoral Heterogeneity in Motherhood Penalties

The event-study analysis first examines whether post-childbirth labour-market trajectories differ between mothers employed in Competitive and Non-competitive sectors. We then assess whether these sectoral differences changed following the 2021 reform.

In our analysis, we focus on two dimensions: monthly days worked and Social Security contribution bases, which provide information on labour supply and earnings-related labour-market attachment.

As shown in the figures, in the pre-reform period both sectors experience a decline in monthly days worked after childbirth, and their trajectories gradually converge over the following year. The post-reform pattern is somewhat different. Although both groups show a similar initial decline immediately after childbirth, mothers in Competitive sectors appear to recover their number of working days more rapidly over the subsequent months. This pattern is consistent with the hypothesis that mothers employed in more competitive sectors face stronger incentives to maintain labour-market attachment after childbirth.

The joint Wald tests indicate no statistically significant sectoral differences in the pre-birth period, either before or after the reform ($p = 0.595$ and $p = 0.265$, respectively). In contrast, post-birth differences are jointly significant in both periods ($p < 0.001$ in both cases), suggesting that sectoral differences in labour-market trajectories emerge primarily after childbirth. However, when using the full sample, the change in the average post-birth Competitive–Non-competitive gap between the pre- and post-reform periods is not statistically significant ($p = 0.412$) (see Table 4).

As an additional pre-birth diagnostic, we examine the Competitive–Non-competitive gap at $e = -9$, $e = -6$, and $e = -3$. No statistically significant sectoral differences are detected at any of these event times, either before the reform ($p = 0.811$, $p = 0.790$, and $p = 0.452$, respectively) or after the reform ($p = 0.718$, $p = 0.611$, and $p = 0.355$). This reinforces the conclusion that, for monthly days worked,

there is no clear evidence of sectoral divergence during the observed pre-birth period.

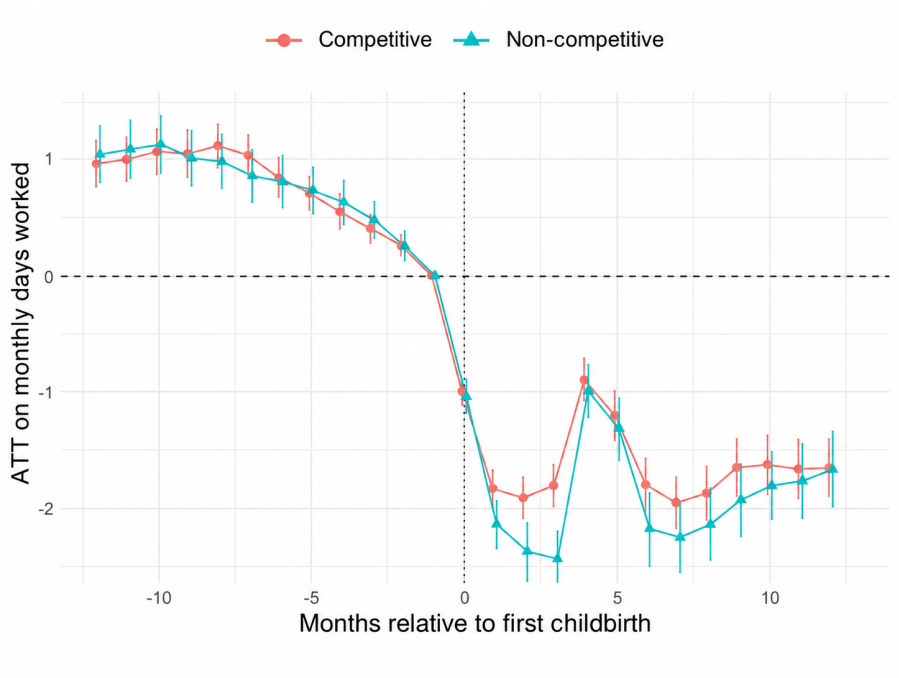
One possible concern is that the inclusion of foreign mothers may affect this comparison if some women leave Spain after childbirth and therefore disappear from the Social Security records. To address this issue, the appendix replicates the analysis restricting the sample to Spanish mothers. In this subsample, the average post-birth sector gap increases from 0.346 days in the pre-reform period to 0.935 days in the post-reform period. The resulting increase of 0.588 days is statistically significant ($p = 0.0115$). Since the gap is defined as the effect for Competitive mothers minus the effect for Non-competitive mothers, the positive change indicates that the relative post-childbirth labour-supply trajectory becomes more favourable for mothers in Competitive sectors in the post-reform period. This result is consistent with a relatively stronger post-reform labour-supply recovery among Spanish mothers employed in Competitive sectors.

It is important to distinguish the days-worked outcome used in the event-study analysis from the childcare-leave duration analysed in the voluntary-leave specification. The former captures total monthly labour supply and may therefore reflect absences or employment interruptions unrelated to childbirth, whereas the latter specifically measures days of identified voluntary childcare leave.

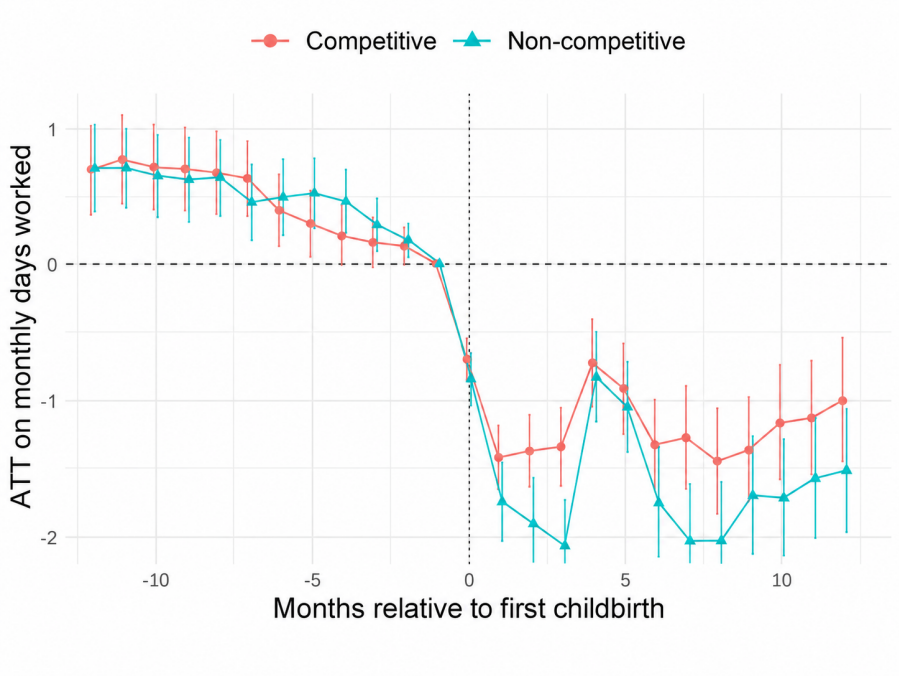
The contribution-base results reveal a different pattern. Mothers in both sectors experience a decline in Social Security contribution bases after childbirth, particularly around the fourth month, when paid parental leave typically ends. In the pre-reform period, the decline is more persistent among mothers in Competitive sectors, whereas the contribution-base penalty in Non-competitive sectors gradually narrows over the following months. Importantly, this pattern is not mirrored by a larger reduction in days worked among mothers in Competitive sectors. In fact, the immediate decline in days worked is more pronounced in Non-competitive sectors.

The joint Wald tests provide evidence on whether the Competitive and Non-competitive trajectories differ over the pre- and post-birth periods as a whole. In the pre-reform sample, the joint pre-birth test does not reject equality of the sectoral trajectories ($p = 0.120$), whereas the post-birth trajectories differ strongly across sectors ($p < 0.001$). In the post-reform sample, by contrast, the pre-birth sectoral difference is statistically significant at the 5% level ($p = 0.0346$), while the post-birth trajectories are statistically indistinguishable ($p = 0.962$). These results suggest that the contribution-base outcome requires greater caution, particularly in the post-reform period, where sectoral differences are already detectable before childbirth.

Figure 3: Dynamic Childbirth Effects on Monthly Days Worked by Sector



(a) Pre-reform (2015–2018)



(b) Post-reform (2022–2023)

Notes: The figure reports dynamic average treatment effects on monthly days worked around first childbirth for mothers in Competitive and Non-competitive sectors. Estimates are obtained using the Callaway and Sant'Anna (2021) difference-in-differences estimator with not-yet-treated mothers as the comparison group and contemporaneous age, measured monthly, included as a covariate. Event time is measured in months relative to first childbirth, with $e = -1$ as the reference period. The pre-reform treated cohorts are 2015–2018, with the 2019 cohort retained as not-yet-treated when applicable. The post-reform treated cohorts are 2022–2023, with the 2024 cohort retained as not-yet-treated when applicable. The 2021 birth cohort is excluded from the post-reform event study because constructing its 12-month pre-birth trajectory would require using observations from 2020, when labour-market outcomes were heavily affected by the COVID-19 pandemic. Days worked are measured as the number of days worked in each month. Sector classification is based on the mother's pre-birth sector. Vertical bars report 95% confidence intervals. Observations with missing or administratively inconsistent days-worked information are excluded from the estimation rather than imputed.

To better understand where within the pre-birth window these differences arise, we also examine selected event times. In the pre-reform sample, the Competitive–Non-competitive difference is borderline at $e = -9$ ($p = 0.050$), marginally insignificant at $e = -6$ ($p = 0.067$), and clearly insignificant at $e = -3$ ($p = 0.859$). In the post-reform sample, the difference is statistically significant at $e = -9$ ($p = 0.004$) and $e = -6$ ($p = 0.032$), but not at $e = -3$ ($p = 0.748$). Since all event-study coefficients are expressed relative to $e = -1$, this pattern suggests that some differential adjustment across sectors may occur earlier in the pre-birth period, while the trajectories become more similar closer to childbirth. However, these estimates do not allow us to determine precisely when this adjustment begins or whether it reflects anticipation, pre-existing sectoral differences, or another mechanism. We therefore interpret this pattern cautiously and do not draw causal conclusions from it.

Most importantly, the test comparing the average post-birth Competitive–Non-competitive gap between the pre- and post-reform periods does not indicate a statistically significant change. The estimated gap is approximately -12.7 euros in the pre-reform period and -8.8 euros in the post-reform period, corresponding to a change of approximately 3.9 euros ($p = 0.872$). Hence, there is no evidence that the reform significantly altered the average post-childbirth sectoral gap in Social Security contribution bases.

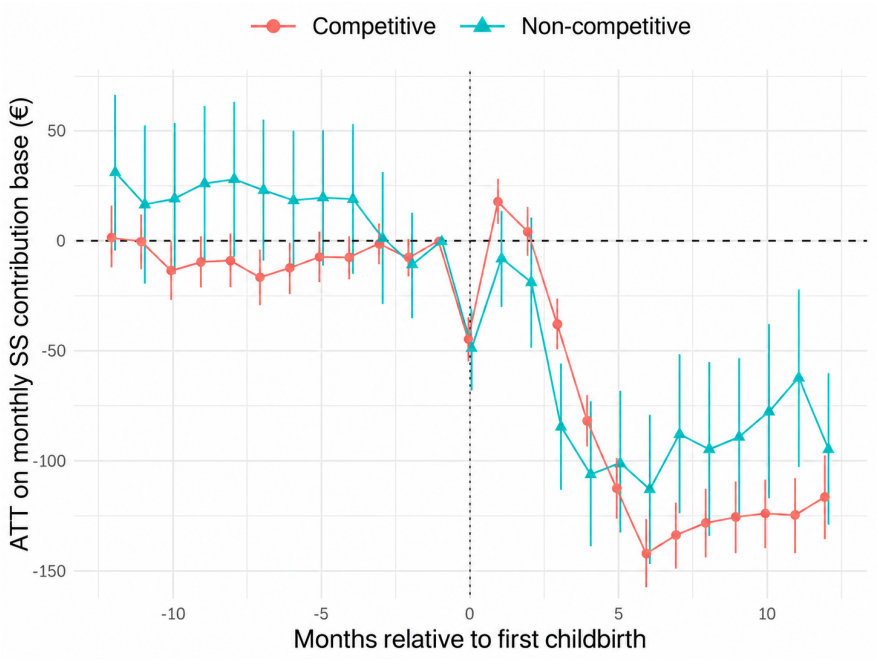
As an additional robustness check, we restrict the event-study analysis to Spanish mothers. For Social Security contribution bases, sectoral differences are already present before childbirth in the pre-reform sample ($p = 0.0306$), while the corresponding pre-birth difference in the post-reform sample is marginally insignificant ($p = 0.0530$). Post-birth sectoral differences are significant before the reform ($p < 0.001$) but not after it ($p = 0.685$). Nevertheless, the average post-birth Competitive–Non-competitive gap does not change significantly across reform periods, moving from approximately -8.9 euros to -2.7 euros ($p = 0.794$).

Table 4: Joint Tests of Sectoral Differences in Dynamic Childbirth Effects

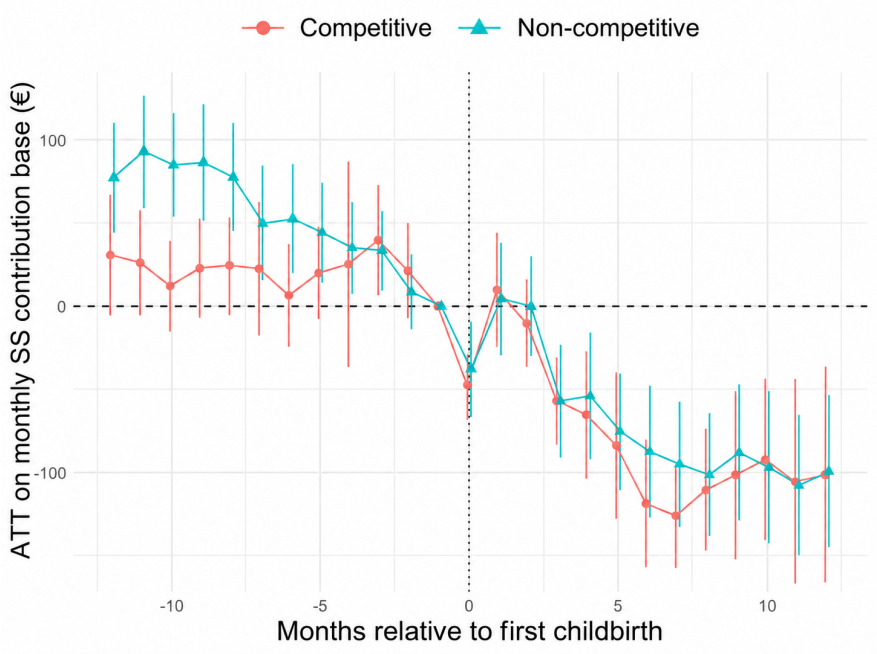
	Days worked	**Contribution base**
Pre-reform: Pre-birth	0.595	0.120
Pre-reform: Post-birth	< 0.001	< 0.001
Post-reform: Pre-birth	0.265	0.035
Post-reform: Post-birth	< 0.001	0.962
Change in post-birth sector gap: Post vs. Pre	0.412	0.872

Notes: The table reports p-values from tests comparing the dynamic childbirth effects of mothers in Competitive and Non-competitive sectors. Pre-birth Wald tests jointly test the sectoral difference over event times $e = -12, \ldots, -2$, while post-birth Wald tests cover $e = 0, \ldots, 12$. The final row tests whether the average post-birth Competitive–Non-competitive gap differs between the pre-reform (2015–2018) and post-reform (2022–2023) birth cohorts. Dynamic effects are estimated using the Callaway and Sant'Anna (2021) estimator with not-yet-treated mothers as the comparison group and contemporaneous age, measured monthly, included as a covariate.

Figure 4: Dynamic Childbirth Effects on Monthly Social Security Contribution Bases by Sector



(a) Pre-reform (2015–2018)



(b) Post-reform (2022–2023)

Notes: The figure reports dynamic average treatment effects on monthly Social Security contribution bases around first childbirth for mothers in Competitive and Non-competitive sectors. Estimates use the Callaway and Sant'Anna (2021) estimator with not-yet-treated mothers as the comparison group and contemporaneous age, measured monthly, as a covariate. Event time is measured relative to first childbirth, with $e = -1$ as the reference period. Contribution bases are measured in euros per month and vertical bars report 95% confidence intervals. Sample construction, sector classification, and cohort definitions follow Figure 3. Observations with missing or administratively inconsistent contribution-base information are excluded rather than imputed.

6.1.2 Fathers as a Benchmark

Because Social Security contribution bases are used as a proxy for wages, we use fathers as a descriptive benchmark to assess whether the sectoral patterns observed for mothers could reflect features of the contribution-base measure itself rather than motherhood-related labour-market adjustments.

The corresponding event-study estimates for fathers do not show statistically significant differences between Competitive and Non-competitive sectors. The joint Wald tests fail to reject equality between sectors both before and after childbirth, in both the pre-reform and post-reform periods ($p = 0.661$ and $p = 0.363$ in the pre-reform period, and $p = 0.394$ and $p = 0.495$ in the post-reform period, respectively).

The estimates are relatively imprecise, particularly for fathers in Non-competitive sectors, as reflected in the wide confidence intervals. Although some visual differences between the sectoral trajectories remain, these differences are not statistically significant and do not display a clear childbirth-related pattern. The corresponding figures are reported in Appendix E. This descriptive benchmark therefore suggests that the sectoral patterns observed among mothers are unlikely to be explained solely by the behaviour of the contribution-base measure across sectors.

6.1.3 Discussion

Taken together, the event-study results point to meaningful sectoral heterogeneity in mothers' labour-market adjustment around childbirth. For monthly days worked, the evidence is relatively clear: mothers in Non-competitive sectors experience a larger and more persistent decline after childbirth, while mothers in Competitive sectors recover more rapidly. The absence of statistically significant pre-birth sectoral differences for this outcome provides greater support for interpreting the post-birth divergence as reflecting differences in motherhood-related labour-market adjustment across sectoral environments.

The contribution-base results reveal a different pattern. In the pre-reform period, the joint pre-birth test does not reject equality of the sectoral trajectories, although the pointwise diagnostics reveal some evidence of differences further from childbirth. The sectoral trajectories nevertheless diverge substantially after childbirth. Mothers employed in Competitive sectors experience a more persistent decline in Social Security contribution bases, whereas the decline among mothers in Non-competitive sectors narrows more rapidly. This suggests that the form of post-childbirth adjustment may differ across sectors: mothers in Non-competitive sectors appear to adjust more strongly through labour supply, while mothers in Competitive sectors experience a more persistent deterioration in contribution bases. However, this interpretation should be treated with some caution. As a robustness check, we replicate the event-study analysis restricting the sample to Spanish mothers; the corresponding estimates and tests are reported in Appendix F. In this restricted sample, statistically significant pre-

birth sectoral differences emerge in the pre-reform period. Since non-Spanish mothers represent only a relatively small share of the full sample, this suggests that the absence of pre-birth differences in the baseline specification may be partly driven by sample composition rather than reflecting complete pre-treatment similarity across sectors.

The post-reform contribution-base results are more difficult to interpret. Sectoral differences are detected during the earlier part of the pre-birth window, particularly at $e = -9$ and $e = -6$, although they are no longer statistically significant at $e = -3$. The existence of pre-birth differences limits our ability to interpret the subsequent evolution as a motherhood-specific sectoral effect. More generally, the post-reform period coincides with a different macroeconomic and institutional environment, and the event-study design cannot determine the source of these pre-existing differences.

Evidence that the 2021 reform altered these sectoral patterns is limited in the full sample. For both monthly days worked and Social Security contribution bases, the average post-birth Competitive–Non-competitive gap does not change significantly across reform periods. Hence, while the event-study results reveal important sectoral heterogeneity in how mothers adjust around childbirth, the full-sample estimates do not provide evidence that the 2021 reform significantly changed these sectoral differences.

6.2 Difference-in-Differences Results

6.2.1 Intensive Margin

Table 5 reports the results for the intensive margin, where the dependent variable is the number of days of childcare leave taken during the first twelve months after childbirth.

In the baseline specification, the coefficient on $Post \times Competitive$ is -0.318 days. After adding age and nationality in column (2), the estimate becomes -0.366 days, and after additionally controlling for pre-birth wage in column (3), it is -0.471 days. None of these estimates is statistically significant.

The coefficient on age at childbirth is positive and statistically significant in specifications (2) and (3). In column (2), an additional year of age is associated with approximately 0.32 additional days of leave, while the corresponding estimate in column (3) is approximately 0.36 days.

The pre-birth wage coefficient is small and statistically insignificant in column (3). Importantly, the inclusion of pre-birth wage changes the estimated treatment coefficient only moderately, from -0.366 to -0.471 days, although the sample falls from approximately 35,000 to 32,000 observations.

As a robustness check, we re-estimate the intensive-margin specification using only Spanish mothers. The estimated differential effect remains statistically insignificant, leaving the main conclusion unchanged.

Table 5: Difference-in-Differences Estimates for Childcare Leave Duration

	(1) Baseline	(2) + Individual Controls	(3) + Pre-Birth contribution base
Post × Competitive	-0.3178	-0.3663	-0.4709
	(0.7703)	(0.8142)	(0.8677)
Age at childbirth		0.3191***	0.3572***
		(0.0665)	(0.0688)
Pre-birth contribution base			0.0096
			(0.0132)
Birth-year FE	Yes	Yes	Yes
CNAE3 pre-birth FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes
Observations	35,063	35,062	32,009
R^2	0.03541	0.04006	0.03832
Within R^2	0.00000416	0.00482	0.00582

Notes: The dependent variable is the number of voluntary childcare-leave days taken within 12 months after childbirth, including zeros for mothers who do not take leave. *Post* identifies post-reform birth cohorts and *Competitive* identifies women working in Competitive sectors before childbirth. Column (1) reports the baseline specification, Column (2) adds individual controls, and Column (3) additionally includes pre-birth contribution base. All specifications include birth-year, pre-birth CNAE3 industry, and region fixed effects. Standard errors are clustered at the pre-birth CNAE3 level and reported in parentheses.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$.

6.2.2 Extensive margin

Table 6 reports the corresponding estimates for the extensive margin, where the dependent variable is an indicator equal to one if the woman takes any voluntary childcare leave during the first twelve months after childbirth.

The coefficient on $Post \times Competitive$ is negative in all three specifications. In the baseline model, the estimated coefficient is -0.0057, corresponding to a decrease of approximately 0.57 percentage points in the probability of taking leave in Competitive sectors relative to Non-competitive sectors. After adding individual controls, the coefficient is -0.0059, and after additionally controlling for the pre-birth contribution base it becomes -0.0068. However, none of these coefficients is statistically significant at conventional significance levels.

Thus, although the point estimates consistently indicate a negative differential change in the probability of taking voluntary childcare leave in Competitive sectors after the reform, the full-sample estimates do not provide sufficient statistical evidence to reject the null hypothesis of no differential change.

The coefficient on age at childbirth is positive and statistically significant in specifications (2) and (3). The estimate in column (2) implies that an additional year of age is associated with approximately a 0.23 percentage-point higher probability of taking childcare leave, while the corresponding estimate in column (3) is approximately 0.26 percentage points.

As a robustness check, we restrict the analysis to Spanish mothers with observed pre-birth contribution-

base information. In this subsample, the estimated differential change in leave take-up is approximately −1.05 percentage points and statistically significant at the 5% level. The estimate is virtually unchanged when the pre-birth contribution base is included as a control, suggesting that the difference relative to the full-sample results is driven by sample composition rather than by conditioning on the contribution measure itself. The corresponding estimates are reported in Appendix Table A7.

Table 6: Difference-in-Differences Estimates for Childcare Leave Take-Up

	(1) Baseline	(2) + Individual Controls	(3) + Pre-Birth contribution base
Post × Competitive	-0.0057	-0.0059	-0.0068
	(0.0046)	(0.0047)	(0.0049)
Age at childbirth		0.0023***	0.0026***
		(0.0005)	(0.0005)
Birth-year FE	Yes	Yes	Yes
CNAE3 pre-birth FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes
Observations	35,063	35,062	32,009
R^2	0.04264	0.04772	0.04470
Within R^2	0.0000278	0.00533	0.00643

Notes: The dependent variable equals one if the mother takes any voluntary childcare leave within 12 months after childbirth and zero otherwise. *Post* identifies post-reform birth cohorts and *Competitive* identifies women working in Competitive sectors before childbirth. Column (1) reports the baseline specification, Column (2) adds individual controls, and Column (3) additionally includes pre-birth contribution base. All specifications include birth-year, pre-birth CNAE3 industry, and region fixed effects. Standard errors are clustered at the pre-birth CNAE3 level and reported in parentheses.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$.

6.2.3 Robustness Checks

Although the baseline difference-in-differences estimates do not reveal statistically significant effects, we perform several additional robustness exercises.

First, we re-estimate the preferred specification using birth-year-by-month fixed effects instead of birth-year fixed effects. This more flexible specification accounts for monthly variation in the timing of childbirth and potential seasonal patterns in childcare-leave use. The results are virtually unchanged. The estimated coefficient on $Post \times Competitive$ changes from −0.0059 to −0.0062 for the extensive margin and from −0.3663 to −0.4673 days for the intensive margin. In both cases, the coefficients remain statistically insignificant and the standard errors are very similar to those obtained with birth-year fixed effects. The main findings are therefore robust to controlling more flexibly for monthly variation and seasonality.

Second, we conduct a placebo test for the intensive-margin outcome by assigning a fictitious reform date in 2018. The estimated interaction is statistically insignificant ($\beta = -1.04$, $p > 0.10$), providing no evidence of a detectable differential break in childcare-leave duration between Competitive and Non-competitive sectors prior to the actual reform. This result should not be interpreted as establishing

the parallel-trends assumption, but it does not reveal a clear pre-reform discontinuity in the intensive-margin outcome.

6.2.4 Discussion

Across all specifications, the confidence intervals remain relatively wide. To assess whether the absence of statistically significant effects reflects a genuine lack of heterogeneous responses or limited statistical power, we compute the Minimum Detectable Effect (MDE) for our preferred specifications (Table 7). For the intensive margin, our design can reliably detect differential effects of approximately 2.28 additional leave days or larger, while for the extensive margin the minimum detectable effect is around 1.3 percentage points in the probability of taking childcare leave. Consequently, although our point estimates are consistently close to zero, smaller heterogeneous effects cannot be ruled out. The null results should therefore be interpreted as the absence of evidence for large differential effects rather than definitive evidence of no effect. Moreover, the proportion of women taking childcare-related voluntary leave is relatively small, which limits the statistical power of the analysis and makes it more difficult to detect heterogeneous effects across sectors. In addition, the reform was implemented nationwide during a period of major institutional and economic change, including the COVID-19 recovery and the 2021 labour-market reform. These factors make it difficult to isolate the reform from other contemporaneous changes and, more importantly, our empirical strategy identifies only differential changes between Competitive and Non-competitive sectors. Therefore, common effects across both groups cannot be ruled out.

Notice that, after restricting the sample to Spanish mothers with observed pre-birth contribution-base information, we obtained a statistically significant effect that is smaller than the minimum detectable effect reported for the preferred full-sample specification. However, the MDE is sample- and specification-specific and therefore does not directly apply to this restricted subsample. Moreover, the significant estimate is relatively imprecise and lies close to the conventional 5% significance threshold.

Table 7: Minimum Detectable Effects at 80% Statistical Power

Specification	Estimate	95% CI	MDE (80% power)
Intensive (preferred)	-0.366	[-1.98, 1.25]	2.28 days
Extensive (preferred)	-0.0059	[-0.0151, 0.0034]	1.30 p.p.

Notes: The table reports minimum detectable effects for the preferred difference-in-differences specifications reported in Column (2) of Tables 5 and 6. The intensive-margin outcome is measured in childcare-leave days and the extensive-margin outcome in percentage points. Minimum detectable effects are calculated assuming 80% statistical power.

Finally, maternal age is positively associated with childcare-leave use, although this relationship should not be interpreted as causal. Age may capture unobserved life-cycle differences, such as labour-market experience, career stage, previous fertility, or household characteristics, that also affect leave-taking behaviour.

7 Conclusion

This study examines how motherhood-related labour-market trajectories differ across Competitive and Non-competitive sectors in Spain and whether these differences changed following the 2021 equalisation of fathers' paid parental leave. Using administrative data from the Spanish Continuous Sample of Working Lives, the analysis combines a childbirth event-study with a difference-in-differences analysis of voluntary childcare leave.

The results show meaningful heterogeneity in mothers' post-childbirth labour-market adjustment across sectors. Mothers in Non-competitive sectors experience a larger and more persistent reduction in monthly days worked, whereas mothers in Competitive sectors show a more persistent post-birth decline in Social Security contribution bases. The contribution-base results, however, require greater caution: some pre-birth sectoral differences are already visible, particularly in the post-reform period, and the Spanish-only analysis shows that the pre-reform pattern is sensitive to sample composition. These findings therefore limit a purely motherhood-specific interpretation of the contribution-base differences.

Evidence that the 2021 reform altered these sectoral differences is more limited. In the full sample, the average post-birth Competitive–Non-competitive gap does not change significantly across reform periods for either monthly days worked or contribution bases. Mothers in Non-competitive sectors are also more likely to take voluntary childcare leave and, on average, take more leave days than mothers in Competitive sectors. However, the difference-in-differences analysis does not show a statistically significant differential change across sectors in either leave take-up or the number of leave days following the reform. Among Spanish mothers, the post-birth sector gap in monthly days worked increases significantly after the reform, suggesting a relatively stronger labour-supply recovery among mothers employed in Competitive sectors. In addition, in the restricted sample of Spanish mothers with observed pre-birth contribution information, the extensive-margin estimate becomes statistically significant, although this result appears sensitive to sample composition.

These findings suggest that mothers' post-childbirth labour-market adjustments differ across sectoral environments and that policy responses may also vary across these groups. Accounting for this heterogeneity is therefore important when evaluating the effects of parental-leave reforms.

References

Boletín Oficial del Estado. Ley orgánica 3/2007, de 22 de marzo, para la igualdad efectiva de mujeres y hombres, 2007. BOE-A-2007-6115.

Boletín Oficial del Estado. Real decreto-ley 6/2019, de 1 de marzo, de medidas urgentes para garantía de la igualdad de trato y de oportunidades entre mujeres y hombres en el empleo y la ocupación, 2019. BOE-A-2019-3244.

Brantly Callaway and Pedro H.C. Sant'Anna. Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230, 2021. ISSN 0304-4076. doi: https://doi.org/10.1016/j.jeconom.2020.12.001. URL https://www.sciencedirect.com/science/article/pii/S0304407620303948. Themed Issue: Treatment Effect 1.

Cristina Castellanos-Serrano, Lorenzo Escot, and José Andrés Fernández-Cornejo. Parental leave system design impacts on its gendered use: Paternity leave introduction in spain. *Family Relations*, 73 (1):359–378, 2024. doi: https://doi.org/10.1111/fare.12875. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/fare.12875.

Lídia Farré, Christina Felfe, Libertad González, and Patrick Schneider. Changing gender norms across generations: Evidence from a paternity leave reform. Technical report, IZA Discussion Papers, 2023.

Lidia Farre, Libertad Gonzalez, Claudia Hupkau, and Jenifer Ruiz-Valenzuela. Paternity leave and child development. CEP Discussion Papers dp2024, Centre for Economic Performance, LSE, Jul 2024. URL https://ideas.repec.org/p/cep/cepdps/dp2024.html.

Lídia Farré, Libertad González, Claudia Hupkau, et al. Paternity leave in spain. *SERIEs*, 16:749–784, 2025. doi: 10.1007/s13209-025-00320-1. URL https://doi.org/10.1007/s13209-025-00320-1.

Lucía Gorjón and Imanol Lizarraga. Family-friendly policies and employment equality: An analysis of maternity and paternity leave equalization in spain. Working paper, 2024.

Claudia Hupkau and Jenifer Ruiz-Valenzuela. Work and children in spain: Challenges and opportunities for equality between men and women. *SERIEs*, 13:243–268, 2022. doi: 10.1007/s13209-021-00243-7.

Henrik Kleven, Camille Landais, and Jakob Egholt Søgaard. Children and gender inequality: Evidence from denmark. *American Economic Journal: Applied Economics*, 11(4):181–209, October 2019. doi: 10.1257/app.20180010. URL https://www.aeaweb.org/articles?id=10.1257/app.20180010.

Dani M Marinova and Pedro Manuel Bellón-Jiménez. Paternity leave and the motherhood penalty: How within-couple inequality conditions policy impact. *Social Policy & Administration*, 2025.

Alicia Quinto, Laura Hospido, and Carlos Sanz. The child penalty: evidence from spain. *SERIEs: Journal of the Spanish Economic Association*, 12(4):585–606, December 2021. doi: 10.1007/s13209-021-00241-9. URL https://ideas.repec.org/a/spr/series/v12y2021i4d10.1007_s13209-021-00241-9.html.

Wei-hsin Yu and Janet Chen-Lan Kuo. The motherhood wage penalty by work conditions: How do occupational characteristics hinder or empower mothers? *American Sociological Review*, 82(4):744–769, 2017. doi: 10.1177/0003122417712729. URL https://doi.org/10.1177/0003122417712729.

A Sector Classification

We start with the homogeneous groups (those in which the whole sector has the same classification).

A.1 Homogeneous sectors

A.1.1 Competitive sectors

G) Wholesale and retail trade Wholesale and retail trade are classified as competitive because many occupations involve sales performance, customer acquisition, commercial targets and promotion opportunities that depend on continuous labour-market participation. Career interruptions are therefore expected to generate relatively higher professional costs than in institutional sectors.

K) Financial and insurance activities Financial and insurance activities are classified as competitive because they are characterised by strong career progression, performance-based evaluation, client relationships and high-skilled professional occupations. Continuous labour-market attachment is expected to play an important role in promotion and career development, making motherhood-related interruptions potentially more costly.

M) Professional, scientific and technical activities Professional, scientific and technical activities are classified as competitive because they include occupations with substantial career progression, specialised human capital and promotion based on accumulated experience, client portfolios or research output. These characteristics suggest relatively high expected motherhood penalties.

A.1.2 Non-competitive sectors

These sectors mainly correspond to public or highly institutionalised occupations. They are classified as non-competitive because workers generally benefit from greater employment protection, more structured career paths and higher compatibility between work and family life. In many of these occupations, workers hold permanent civil service or equivalent public-sector positions obtained through competitive examinations, which provide a high degree of job security. As a result, employees can take parental leave and return to the same position without facing the substantial career penalties that are more common in highly competitive private-sector occupations. Career progression is also largely determined by formal promotion systems, qualifications or seniority rather than continuous labour-market attachment.

The following sectors are therefore classified as non-competitive:

- O) Public administration.
- P) Education.

- Q) Human health and social work activities.
- U) Activities of extraterritorial organisations.

A.1.3 Neutral sectors

Neutral sectors are those in which no predominant competitive environment can be identified. These sectors include activities with substantially different working conditions, career structures and promotion opportunities, making it difficult to consistently classify the entire sector as either competitive or non-competitive. Rather than assigning an arbitrary classification, these sectors are retained as neutral unless there is clear conceptual evidence that specific activities systematically differ from the rest of the sector. The neutral category therefore reflects the absence of a dominant competitive profile, rather than uncertainty regarding the classification.

The following sectors are therefore classified as neutral:

- A) Agriculture, forestry and fishing.
- B) Mining and quarrying.
- C) Manufacturing.
- D) Electricity, gas, steam and air conditioning supply.
- E) Water supply; sewerage, waste management and remediation activities.
- F) Construction.
- I) Accommodation and food service activities.
- L) Real estate activities.

A.2 Classification of heterogeneous sectors

The following sectors include activities that cannot be consistently assigned to a single category. Therefore, a manual classification was performed at the three-digit CNAE level, based on the expected motherhood penalty associated with the predominant occupations within each activity.

H) Transportation and storage Most transportation and storage activities are classified as neutral because they encompass a wide range of occupations with heterogeneous career structures and employment conditions. Nevertheless, land passenger transport and air transport are classified as competitive.

These activities include occupations such as flight attendants, taxi drivers, ride-hailing drivers (e.g., Uber or Bolt), and other passenger transport services, where work schedules are highly inflexible

and often incompatible with family responsibilities. Furthermore, prolonged career interruptions may lead workers to permanently leave these occupations due to the difficulty of reconciling family life with irregular working hours. Consequently, the expected motherhood penalty is likely to be higher than in other transport activities.

J) Information and communication Most publishing activities are classified as neutral, including book publishing and software publishing. In contrast, motion picture and video production, sound recording and music publishing, broadcasting, television programming, and news agencies are classified as competitive.

These activities are characterised by occupations where career advancement depends heavily on continuous labour-market participation, reputation, networking and visibility. Promotion opportunities are highly competitive, and maintaining employment often requires sustained availability and continuous professional engagement. As a result, temporary career interruptions associated with motherhood are expected to generate relatively larger professional costs.

N) Administrative and support service activities Most activities within this section are classified as neutral because they include a broad range of support services with relatively heterogeneous employment conditions.

Nevertheless, temporary employment agencies are classified as competitive due to the high labour turnover and the inherently temporary nature of employment relationships. Similarly, investigation and security activities are classified as competitive because they involve stronger performance requirements and greater dependence on continuous labour-market attachment. Activities related to the organisation of conventions and trade fairs are also classified as competitive, as they involve project-based work, client relationships and event organisation, where prolonged absences may impose greater professional costs.

R) Arts, entertainment and recreation Most artistic, sports and recreational activities are classified as neutral, reflecting the substantial heterogeneity of occupations within the sector.

Nevertheless, libraries and archives, museums, and cultural heritage conservation and restoration activities are classified as non-competitive because employment is largely institutionalised and frequently associated with public-sector organisations or publicly funded cultural institutions. Career progression is generally more structured and less dependent on uninterrupted labour-market participation, suggesting lower expected motherhood penalties.

S) Other service activities Most activities within this section are classified as competitive, as they mainly comprise small private businesses and self-employed occupations. In these activities, prolonged career interruptions may generate substantial income losses, loss of clients or reduced business

continuity, increasing the expected motherhood penalty.

Nevertheless, activities of business organisations, employers' organisations and professional organisations, trade unions, other membership organisations, and other personal service activities are classified as neutral. These activities exhibit more heterogeneous employment structures and generally provide less evidence of the career dynamics that characterise the competitive group.

B Data Cleaning

This appendix describes the main data-cleaning steps applied to construct the analytical samples used in the empirical analysis.

First, women for whom the recorded leave spell has a negative duration are excluded. These cases were carefully examined to rule out potential coding errors, confirming that the issue originates in the data itself: the start and end dates of the leave are inconsistently recorded.

Second, we drop women for whom the CNAE sector variable is missing across all observations, meaning they cannot be classified into any sector and are therefore unusable for the analysis.

Third, we exclude women who are older than 45 at the time of childbirth. This restriction addresses a limitation of our birth proxy, which is based on changes in f$amsize_0$6 (household members under age 6). Since this variable does not identify childbirth directly, an observed increase in $famsize_0$6 for an older woman more likely reflects another child under six joining the household (e.g., through cohabitation or family reunification) rather than an actual childbirth. We also exclude women for whom age information is unavailable.

Fourth, for the voluntary childcare-leave analytical sample, we exclude birth cohorts from 2014 and 2024. For 2014, we lack the 12 months of pre-birth data required to construct our controls. For 2024, we lack sufficient post-birth follow-up, as we cannot observe outcomes 12 months after childbirth for this cohort.

Finally, we exclude women whose recorded leave spell has a duration of zero days. These spells begin and end on consecutive dates, resulting in a recorded duration of zero days. We interpret this as an administrative recording error rather than an actual leave episode, since a zero-day leave is not economically meaningful. This interpretation is reinforced by the fact that most of these cases coincide with a change of month, suggesting that the issue stems from how transitions between contract records were logged rather than from genuine leave-taking behaviour.

See the process in table A1:

Table A1: Sample Selection Process

Sample restriction	Women excluded	% of current sample	Women remaining
Initial sample	–	–	116,520
Negative leave duration	1,935	1.66	114,585
Missing CNAE sector	1,685	1.47	112,900
Zero-day leave	90	0.08	112,810
Missing age or age ≥ 45	15,962	14.15	96,848
Birth years outside main sample	30,614	31.61	66,234
Missing pre-birth CNAE	9,329	14.09	56,905
Neutral sector	21,842	38.38	35,063
Final analytical sample	–	–	35,063

Notes: The table reports the sequential restrictions used to construct the analytical sample for the voluntary childcare-leave analysis. "Women excluded" gives the number of observations removed at each stage. The percentage column reports the share excluded relative to the sample remaining immediately before each restriction. The final analytical sample includes women classified in Competitive or Non-competitive sectors according to their pre-birth CNAE sector.

C Descriptive Statistics

This section of the appendix presents additional descriptive statistics for the main sample that are not reported in the main text but help provide a more complete picture of the sample characteristics.

Table A2: Distribution of Childbirths by Year in the Initial Study Sample

Birth year	Number of births
2015	11,611
2016	10,609
2017	10,478
2018	10,105
2021	7,808
2022	8,005
2023	7,618
Total	66,234

Notes: The table reports the number of childbirths observed in the main study years before imposing the requirement of an identifiable pre-birth CNAE sector and before excluding women classified in Neutral sectors. Each observation corresponds to one mother-childbirth event included in the initial sample.

Table A3: Distribution of Women by Pre-Birth Sector and Reform Period

Period	Sector group	N women	Share (%)
Pre-reform	Neutral	14,028	39.2
Pre-reform	Competitive	13,905	38.8
Pre-reform	Non-competitive	7,880	22.0
Post-reform	Neutral	7,814	37.0
Post-reform	Competitive	7,806	37.0
Post-reform	Non-competitive	5,472	25.9

Notes: The table reports the number and percentage of women classified into Competitive, Neutral, and Non-competitive sectors according to the last observed sector before childbirth. Shares are calculated separately for the pre-reform and post-reform birth cohorts. Women classified in Neutral sectors are excluded from the main Competitive–Non-competitive analytical sample.

Table A4: Characteristics of Women by Sector, Post-Reform (2021–2023)

Variable	Competitive	Non-competitive	Difference	p-value
Panel A: Full sample				
Age at childbirth	33.42	33.96	-0.54	< 0.001
Spanish nationality (%)	82.15	94.74	-12.58	< 0.001
Pre-birth contribution base	65.38	82.79	-17.42	< 0.001
Firm size	2444.93	3485.91	-1040.97	< 0.001
Permanent contract (%)	70.28	39.97	30.31	< 0.001
Public/statutory employment (%)	0.03	20.29	-20.26	< 0.001
Part-time (%)	20.32	22.11	-1.79	0.013
Any childcare leave, 12m (%)	4.61	10.12	-5.51	< 0.001
Leave days, 12m	5.63	12.33	-6.71	< 0.001
Total leave days	9.06	22.84	-13.78	< 0.001
Observations	7,806	5,472		
Panel B: Childcare-leave takers				
Age at childbirth	34.60	35.14	-0.54	0.056
Spanish nationality (%)	89.72	97.47	-7.75	< 0.001
Pre-birth contribution base	77.95	92.35	-14.40	< 0.001
Firm size	1045.13	2760.41	-1715.28	< 0.001
Permanent contract (%)	96.93	50.67	46.26	< 0.001
Public/statutory employment (%)	0.00	26.71	-26.71	< 0.001
Part-time (%)	15.56	11.91	3.64	0.123
Leave days, 12m	121.99	121.83	0.17	0.971
Total leave days	175.76	207.60	-31.84	0.003
Observations	360	554		

Notes: The table reports characteristics of women giving birth between 2021 and 2023, separately for Competitive and Non-competitive sectors. Panel A includes all women in the analytical sample, while Panel B is restricted to women taking voluntary childcare leave within 12 months after childbirth. Differences are calculated as Competitive minus Non-competitive. Reported p-values correspond to tests of equality of means between the two sector groups. The pre-birth contribution base is observed in the Social Security records and is used as a proxy for wages. Sample sizes may vary across variables because of missing information.

D Additional Validation and Robustness Checks

Table A5: Sector Transitions Among Mothers Taking Voluntary Childcare Leave

Pre-birth sector \ Post-birth sector	Competitive	Neutral	Non-competitive
Competitive	99.20%	0.45%	0.36%
Neutral	0.86%	98.80%	0.34%
Non-competitive	0.07%	0.30%	99.60%

Notes: The table reports transitions between broad sector groups around childbirth (-12 months to +12 months) among mothers who take voluntary childcare leave. Rows identify the sector observed before childbirth and columns identify the sector observed after childbirth. Each row reports the percentage distribution of mothers across post-birth sector groups. Sector groups are defined using the Competitive, Neutral, and Non-competitive classification described in the main text.

To assess whether pre-birth characteristics changed differentially across Competitive and Non-competitive sectors after the reform, we estimate the following placebo specification:

$$Y_i^{pre} = \alpha + \beta \left(Post_i \times Competitive_i \right) + \gamma_{c(i)} + \delta_{s(i)} + \rho_{r(i)} + \varepsilon_i, \tag{5}$$

where Y_i^{pre} denotes the corresponding pre-birth characteristic, $\gamma_{c(i)}$ are birth-year fixed effects, $\delta_{s(i)}$ are pre-birth industry fixed effects, and $\rho_{r(i)}$ are region fixed effects. The coefficient β captures whether the Competitive–Non-competitive difference in that pre-birth characteristic changes between the pre- and post-reform cohorts.

Table A6: Placebo Tests: Pre-Birth Characteristics

	Permanent Contract	Public Employee	Firm Size	Pre-Birth contribution base
Post × Competitive	0.0780***	-0.0223*	-948.4**	-0.4922
	(0.0173)	(0.0095)	(280.0)	(2.300)
Birth-year FE	Yes	Yes	Yes	Yes
Pre-birth industry FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Observations	32,920	35,063	35,063	32,010
R^2	0.22936	0.23679	0.05751	0.12782
Within R^2	0.00177	0.00054	0.00085	0.00000367

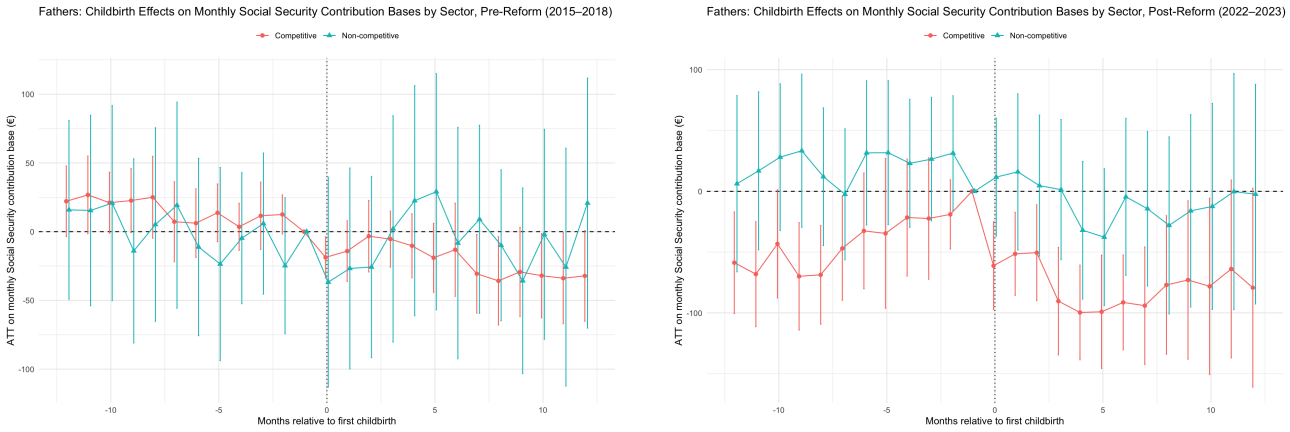
Notes: Each column reports a separate difference-in-differences regression in which the dependent variable is the indicated pre-birth characteristic. *Post* identifies post-reform birth cohorts and *Competitive* identifies women working in Competitive sectors before childbirth. All specifications include birth-year, pre-birth CNAE3 industry, and region fixed effects. Standard errors are clustered at the pre-birth CNAE3 level and reported in parentheses.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$.

E Fathers as a Benchmark

Figure A1: Fathers' Dynamic Childbirth Effects on Monthly Social Security Contribution Bases by Sector

(a) Pre-reform (2015–2018)

(b) Post-reform (2022–2023)



Notes: The figure reports dynamic average treatment effects on fathers' monthly Social Security contribution bases around first childbirth, separately for Competitive and Non-competitive sectors. Estimates are obtained using the Callaway and Sant'Anna (2021) difference-in-differences estimator with not-yet-treated fathers as the comparison group. Event time is measured in months relative to first childbirth, with $e = -1$ as the reference period. The pre-reform treated cohorts are 2015–2018, with the 2019 cohort retained as not-yet-treated when applicable. The post-reform treated cohorts are 2022–2023, with the 2024 cohort retained as not-yet-treated when applicable. Contribution bases are measured in euros per month, and sector classification is based on the father's pre-birth sector. Vertical bars report 95% confidence intervals.

F Robustness Checks

F.1 Spanish-Only Difference-in-Differences Analysis

As an additional robustness check, the difference-in-differences analysis is restricted to Spanish mothers with observed pre-birth contribution-base information. In this subsample, the estimated effect on the extensive margin is around -1.05 percentage points and is statistically significant at the 5% level (Table A7). Importantly, the coefficient is virtually unchanged when the pre-birth contribution base is added as a control, suggesting that the difference relative to the full-sample specification is driven by the composition of the restricted sample rather than by conditioning on the contribution measure itself.

F.2 Robustness of the Contribution-Base Event Study

To assess the sensitivity of the contribution-base results to sample composition, we re-estimate the event-study analysis restricting the sample to Spanish mothers. This addresses the possibility that post-childbirth changes in Social Security contributions among foreign mothers partly reflect return migration.

Table A7: Difference-in-Differences Estimates: Spanish-Only Sample with Observed Pre-Birth Contribution Base

	Any Childcare Leave	
	Without Contribution-Base Control	With Contribution-Base Control
Post × Competitive	-0.0105*	-0.0105*
	(0.0051)	(0.0051)
Individual controls	Yes	Yes
Pre-birth contribution base	No	Yes
Birth-year FE	Yes	Yes
Pre-birth industry FE	Yes	Yes
Region FE	Yes	Yes
Observations	29,072	29,072

Notes: The sample is restricted to Spanish mothers with non-missing pre-birth contribution-base information. The dependent variable is an indicator equal to one if the mother takes voluntary childcare leave within the 12 months following first childbirth. Standard errors are clustered at the pre-birth CNAE3 level and reported in parentheses.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$.

Table A8: Robustness Checks: Sector-Gap Tests for Monthly Social Security Contribution Bases

	Baseline	Spanish only
Panel A: Joint Wald tests of the Competitive–Non-competitive gap		
Pre-reform: pre-birth	0.120	0.0306
Pre-reform: post-birth	< 0.001	< 0.001
Post-reform: pre-birth	0.0346	0.0530
Post-reform: post-birth	0.962	0.685
Panel B: Change in the average post-birth sector gap across reform periods		
p-value	0.872	0.794

Notes: Entries in Panel A report p-values from joint Wald tests of equality between the dynamic treatment effects estimated for mothers in Competitive and Non-competitive sectors. Pre-birth tests jointly consider event times -12 to -2, while post-birth tests consider event times 0 to 12. Panel B reports the p-value from a test of whether the average post-birth Competitive–Non-competitive gap differs between the pre- and post-reform periods. Dynamic effects are estimated using the Callaway and Sant'Anna (2021) estimator with not-yet-treated mothers as the comparison group and contemporaneous age, measured monthly, included as a covariate. The baseline specification includes mothers of all nationalities, while the Spanish-only specification restricts the sample to Spanish mothers.

The contribution-base results are broadly consistent across the baseline and Spanish-only specifications in terms of the comparison across reform periods. In the baseline sample, there is no statistically significant evidence of pre-birth sectoral differences in the pre-reform period, whereas post-birth differences are strongly significant. By contrast, restricting the sample to Spanish mothers reveals statistically significant pre-birth sectoral differences in the pre-reform period, indicating that the apparent absence of such differences in the full sample is sensitive to sample composition.

In the post-reform period, the baseline specification shows statistically significant pre-birth sectoral differences, while the corresponding test in the Spanish-only sample is only marginally insignificant. In both samples, post-birth sectoral differences are statistically insignificant. Most importantly, neither specification provides evidence that the average post-birth Competitive–Non-competitive gap changed

significantly between the pre- and post-reform periods. The main conclusion regarding the reform is therefore unchanged when the analysis is restricted to Spanish mothers.

F.3 Robustness of the Monthly Days-Worked Event Study

We similarly re-estimate the monthly days-worked event study restricting the sample to Spanish mothers to assess whether the results are sensitive to the nationality composition of the sample.

Table A9: Robustness Checks: Sector-Gap Tests for Monthly Days Worked

	Baseline	Spanish only
Panel A: Joint Wald tests of the Competitive–Non-competitive gap		
Pre-reform: pre-birth	0.595	0.550
Pre-reform: post-birth	< 0.001	< 0.001
Post-reform: pre-birth	0.265	0.270
Post-reform: post-birth	< 0.001	< 0.001
Panel B: Change in the average post-birth sector gap across reform periods		
Pre-reform gap	0.243	0.346
Post-reform gap	0.432	0.935
Change in gap	0.189	0.588
p-value	0.412	0.0115

Notes: Entries in Panel A report p-values from joint Wald tests of equality between the dynamic treatment effects estimated for mothers in Competitive and Non-competitive sectors. Pre-birth tests jointly consider event times -12 to -2, while post-birth tests consider event times 0 to 12. Panel B reports the average Competitive–Non-competitive post-birth gap in the pre- and post-reform periods and the p-value from a test of whether this gap changes across reform periods. Dynamic effects are estimated using the Callaway and Sant'Anna (2021) estimator with not-yet-treated mothers as the comparison group and contemporaneous age, measured monthly, included as a covariate. The baseline specification includes mothers of all nationalities, while the Spanish-only specification restricts the sample to Spanish mothers.

The monthly days-worked results are highly consistent across the baseline and Spanish-only samples with respect to the timing of sectoral differences. In both cases, there is no statistically significant evidence of differential pre-birth dynamics between Competitive and Non-competitive sectors, whereas post-birth differences are jointly significant in both the pre- and post-reform periods.

The restriction to Spanish mothers, however, changes the estimated evolution of the average post-birth sector gap across reform periods. In the full sample, the gap increases only modestly, from 0.243 to 0.432 days, and the change is statistically insignificant ($p = 0.412$). Among Spanish mothers, by contrast, the gap increases from 0.346 to 0.935 days. The resulting increase of 0.588 days is statistically significant ($p = 0.0115$).

Since the gap is defined as the effect for Competitive mothers minus the effect for Non-competitive mothers, the positive change indicates a relatively more favourable post-childbirth labour-supply trajectory for mothers employed in Competitive sectors in the post-reform period. This finding suggests that the full-sample result is sensitive to the nationality composition of the sample and provides evidence of a stronger relative labour-supply recovery among Spanish mothers employed in Competitive sectors.