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How Institutions and Local Contexts Shape the Child Penalty: Evidence from Italy's Public and Private Sectors

Paola Biasi

Maria De Paola

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Agar Brugiavini

How Institutions and Local Contexts Shape the Child Penalty: Evidence from Italy's Public and Private Sectors

Paola Biasi

(National Social Security Institute)

Maria De Paola

(University of Calabria)

Come istituzioni e contesti locali influenzano la *child penalty*: evidenze dai settori pubblico e privato in Italia

Paola Biasi^a e Maria De Paola*^{a, b}

Abstract. *Questo articolo analizza le conseguenze della maternità sul mercato del lavoro in Italia, con particolare attenzione a come i contesti istituzionali e locali influenzino la child penalty. Utilizzando dati amministrativi dell'Istituto Nazionale della Previdenza Sociale (INPS), seguiamo le traiettorie lavorative delle madri nei settori pubblico e privato dal terzo anno precedente fino al quinto anno successivo alla nascita del primo figlio. Adottiamo un approccio di event study con effetti fissi individuali per tenere conto dell'eterogeneità invariata nel tempo, stimando separatamente per ciascun settore la probabilità di uscita dal mercato del lavoro e le perdite salariali. I risultati mostrano che le madri subiscono penalizzazioni consistenti e persistenti, molto più marcate nel settore privato rispetto a quello pubblico, in particolare in termini di probabilità di abbandono dell'occupazione. Esaminiamo inoltre come le condizioni economiche locali, la disponibilità di servizi per l'infanzia e le norme di genere influenzino l'entità della child penalty, e se tali effetti moderatori differiscano tra i due settori. I nostri risultati evidenziano che questi fattori sono particolarmente rilevanti sul margine estensivo: una maggiore disponibilità di servizi per l'infanzia, tassi di disoccupazione più bassi e norme di genere meno tradizionali riducono la probabilità di uscita dal mercato del lavoro, mentre i loro effetti sul margine intensivo (ossia sui salari delle madri che restano occupate dopo la nascita) risultano molto più contenuti. Inoltre, tali effetti moderatori sono particolarmente pronunciati per le madri occupate nel settore privato, mentre quelle impiegate nel settore pubblico mostrano una minore sensibilità alle condizioni locali.*

Keywords: Child Penalty; Settore pubblico; Settore privato; Event study; Condizioni economiche; Disponibilità di servizi per l'infanzia; Norme di genere.

JEL codes: J16, J31, J18

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^a Direzione Centrale Studi e Ricerche, Istituto Nazionale della Previdenza Sociale (INPS). Roma, Italia – paola.biasi@inps.it;

^b Università della Calabria, Dipartimento di Economia, Statistica e Finanza, G. Anania, - m.depaola@unical.it

* Corresponding author at Università della Calabria, Dipartimento di Economia, Statistica e Finanza, G. Anania; maria.depaola@unical.it (M. De Paola)

How Institutions and Local Contexts Shape the Child Penalty: Evidence from Italy's Public and Private Sectors

Paola Biasi ^a and Maria De Paola ^{a, b}

^a INPS, Rome

^b Department of Economics, Statistics and Finance, University of Calabria

Abstract. *This paper investigates the labour market consequences of motherhood in Italy, with a focus on how institutional and local contexts shape the child penalty. Using administrative data from the Italian National Social Security Institute (INPS), we track the labour market trajectories of mothers in both the public and private sectors from three years before to five years after the birth of their first child. We adopt an event-study framework with individual fixed effects to account for time-invariant heterogeneity, estimating labour market exit probabilities and earnings losses separately for each sector. We find that mothers face substantial and persistent penalties, which are much larger in the private than in the public sector, especially in terms of the probability of leaving employment. We also examine how local economic conditions, childcare availability and gender norms affect child penalties, and whether these moderating effects vary between the two sectors. Our results show that these factors are particularly relevant on the extensive margin: greater childcare availability, lower unemployment rates and less traditional gender norms reduce the probability of exiting the labour market, while their effects on the intensive margin (earnings for mothers who remain employed after childbirth) are much more modest. In addition, these moderating effects are especially pronounced for mothers in the private sector; whereas those employed in the public sector are less sensitive to local conditions.*

Keywords: Child Penalty; Public Sector; Private Sector; Event study; Economic Conditions; Childcare Availability; Gender norms.

JEL codes: J16, J31, J18

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^a Research Department, National Institute of Social Security (INPS). Rome, Italy - paola.biasi@inps.it

^b University of Calabria, Department of Economics, Statistics and Finance, G. Anania; IZA - m.depaola@unical.it

* Corresponding author at: Department of Economics, Statistics and Finance, University of Calabria, Italy. maria.depaola@unical.it (M. De Paola)

1. Introduction

The labour market consequences of parenthood remain a central concern in labour economics. A key empirical finding is the existence of a persistent “child penalty” for women: following childbirth, mothers experience substantial and long-lasting earnings losses, while fathers’ earnings typically remain stable or even increase. Building on the seminal contribution by Kleven et al. (2019a), which documents this sharp gender divergence, subsequent studies have confirmed the robustness of this pattern across a wide range of countries (Kleven et al. 2025; Angelov et al. 2016). Evidence for Italy—the focus of this paper—is provided by Casarico and Lattanzio (2023), who document large wage penalties for mothers employed in the private sector, and by Biasi and De Paola (2025), who extend the analysis to fathers and, beyond employer-paid wages, also account for transfers from the welfare system.

While these analyses reveal qualitatively similar patterns across countries, they also highlight substantial quantitative variations in the magnitude of the estimated child penalty. For example, the penalty is roughly three times larger in Germany than in Denmark (Kleven et al., 2019b). Moreover, individuals are not affected equally, even within the same country: factors such as age at childbirth (Riedel and Melentyeva, 2025; Casarico and Lattanzio, 2023), leave taking behaviour (Österbacka and Räsänen, 2025) educational attainment, and pre-birth career trajectories (Adams-Prassl et al., 2024) influence the size of the penalty. Job characteristics also play a key role. For instance, Fontenay et al. (2021) show that, in Belgium, sectors with a higher prevalence of atypical or irregular work schedules exhibit larger child penalties. Similarly, Lattanzio and Casarico (2023) find that the penalty is larger in firms with less generous pay policies, weaker peer environments and a higher share of female workers. Other studies emphasize the role of family policies (Bedi et al., 2022; Kleven et al., 2024; Lassen, 2021) and prevailing gender norms (Boinet et al., 2024; Rafols, 2025).

Despite a rich and growing literature on the child penalty, relatively little is known about how institutional settings that govern workplaces and labour market relationships shape its magnitude and dynamics. While some studies focus on family-friendly firms (Hotz et al. 2018; Bächmann et al. 2020), the broader role of labour market regulation and sector-specific institutional frameworks remains underexplored.¹ This paper addresses this gap by examining how differences between the public and private sectors in Italy—characterized by distinct employment protections, workplace norms and institutional arrangements—affect mothers’ post-childbirth labour market outcomes. Italy provides a particularly compelling context due to its dual labour market structure, where the public and private sectors exhibit markedly different institutional features. The public sector is characterized by stronger employment protection, greater job security, more predictable schedules and higher flexibility in work arrangements, whereas private sector employment is typically less protected and more precarious. These institutional differences create divergent opportunity structures for parents navigating the work-family balance. If such features matter, we should expect systematic

¹ To the best of our knowledge, Fenizia et al. (2026) (in progress) is the only work investigating the child penalty in the public sector.

differences in the child penalty across sectors, reflecting the constraints and supports embedded in each institutional context.

We focus on two critical, but distinct manifestations of the child penalty that capture different aspects of mothers' labour market trajectories. First, we analyse exit probability: the likelihood that mothers leave the labour market entirely after having children, which represents the most severe form of penalty as it involves complete workforce withdrawal. Second, we examine earnings penalties: the reduction in wages or overall earnings mothers experience following childbirth, conditional on remaining employed. This dimension reflects career disruptions, reduced working hours, occupational downgrading and/or diminished wage growth. These two dimensions may respond differently to institutional contexts. For instance, public sector job security might reduce exits while still allowing earnings penalties to emerge, whereas the private sector might see both higher exits and steeper earnings losses.

Beyond sector-level differences, we examine how local contextual characteristics fundamentally shape the constraints and resources available to working mothers.

We focus on three key contextual dimensions that shape women's labor market outcomes: local unemployment rates, childcare availability, and gender norms. First, high local unemployment can profoundly influence women's labor market behavior, particularly around childbirth. Theoretically, its effect on women's exit probabilities is ambiguous. On the one hand, scarce alternative job opportunities may "trap" mothers in their current positions, as the prospect of re-entering the workforce in a weak labor market is daunting, making them less likely to leave even under substantial work-family conflict. On the other hand, high local unemployment can increase women's vulnerability to labor market pressures. Employers facing a large pool of available labor can more easily replace employees, disproportionately affecting mothers, who may be perceived as less flexible or more likely to experience absences due to childcare. Which of these opposing forces dominates in practice is ultimately an empirical question. Second, access to affordable, high-quality childcare is crucial for mothers' labor market outcomes. It allows women to maintain continuous employment and working hours, reducing the need for temporary exits or part-time work after childbirth. By providing reliable support for childrearing, childcare helps mitigate work-family conflicts and the penalties associated with motherhood, particularly in areas where provision is strong. Finally, local gender norms, including attitudes toward women's roles, maternal employment, and the division of household labor, shape both employer expectations and family decisions regarding work-family balance. Critically, we hypothesize that these contextual factors may interact differently with public versus private sector employment. The public sector's institutional protections might buffer parents against some contextual disadvantages, while private sector workers may be more vulnerable to unfavourable local conditions.

To address these research questions, we use administrative data covering the population of Italian parents in both sectors, we observe complete labour market trajectories before and after childbirth with precise measurement of both earnings and employment status. This comprehensive coverage allows us to estimate child penalties separately for each sector and test how contextual variation shapes these penalties within each

institutional environment, so providing robust evidence on the interplay between institutions, context and mothers' labour market outcomes.

Our methodological approach builds on the standard event-study framework widely used in the child penalty literature (Kleven et al., 2019), which we extend by incorporating individual fixed effects. This extension allows us to control for time-invariant individual heterogeneity, so improving the identification of the labour market effects of parenthood.²

We document large and persistent differences in the motherhood penalty between the public and private sectors. Following childbirth, exit probabilities rise sharply and remain elevated for several years among mothers in the private sector, whereas mothers employed in the public sector experience no such increase and instead display a reduction in exit probabilities. These patterns are consistent with sectoral differences in employment protection. Stronger job security in the public sector both limits employers' scope for dismissals and increases mothers' incentives to remain in stable, protected employment. In contrast, weaker protections in the private sector facilitate employer-driven separations and reduce workers' attachment to less secure jobs, which contributes to the higher and more persistent post-birth exit rates.

We next focus on mothers who remain employed after childbirth and examine the impact of childbirth on earnings, measured inclusive of welfare-system transfers such as maternity and parental leave allowances. Prior to childbirth, women in the private and public sectors follow very similar labour market trajectories, indicating limited pre-existing differences. Marked divergences emerge at childbirth. In both sectors, earnings penalties are larger in the year following birth than in the birth year itself, which is consistent with Italy's system of paid maternity and parental leave as it temporarily cushions labour market adjustments by preserving employment relationships and providing income support. The magnitude of the earnings loss, however, differs substantially across sectors: in the private sector, post-birth earnings decline by approximately 33 log points, whereas the reduction is considerably smaller, at around 10 log points, in the public sector. Sectoral differences are already evident at childbirth, reflecting—at least in part—the more generous leave provisions and stronger employment protections available to public sector mothers beyond statutory minima, which effectively keep the child-related earnings penalty at zero in the public sector, while it amounts to approximately 20 log points in the private sector.

We then analyse how the motherhood penalty varies with contextual factors, including women's employment opportunities (proxied by the local unemployment rate), childcare availability and prevailing gender norms. Our results indicate that mothers living in areas with higher unemployment face a substantially higher probability of exiting employment in the private sector whereas this pattern is almost absent in the public sector. Among mothers who remain employed, those in more constrained local labour markets experience larger earnings losses, a pattern that holds in both the private and public sectors. This indicates that even in the public sector, where job security and leave policies are generally stronger, limited local labour

² We focus exclusively on mothers, since prior evidence shows that the birth of a child does not generate labour market penalties for fathers (Biasi and De Paola, 2025).

market opportunities can restrict access to promotions or additional assignments that would help sustain earnings, thereby amplifying post-childbirth losses.

Turning to childcare availability, we find that it significantly shapes outcomes for mothers in the private sector, where limited access is associated with substantially higher penalties. These effects operate primarily on the extensive margin, indicating that childcare availability plays an important role in enabling women to remain employed after childbirth, while having only limited impact on earnings among those who stay in work. This pattern is consistent with a selection mechanism whereby only mothers who are able to manage childcare responsibilities remain attached to employment. Mothers employed in the public sector exhibit considerably less heterogeneity in outcomes across areas with differing levels of childcare provision, reflecting the greater flexibility inherent in public employment which allows mothers to better manage family responsibilities even in the absence of formal childcare facilities.

Finally, we find that the probability of exit from the private sector for working mothers is higher in areas with more conservative gender norms, suggesting that in contexts where traditional expectations place a greater burden of childcare on women, private-sector work arrangements may provide insufficient support for combining work and family responsibilities, thereby increasing the likelihood of labour market exit. In contrast, exit probabilities in the public sector are largely unaffected by local cultural norms, indicating that stronger employment protections and flexible arrangements can shield mothers from the pressures of traditional expectations and help maintain labour market attachment.

Among mothers who remain employed, earnings penalties in both sectors are larger in areas characterized by traditional gender norms. This indicates that even when women continue working, prevailing cultural expectations around caregiving and household responsibilities constrain their ability to sustain pre-childbirth earnings. In the public sector, protections and workplace flexibility help retain mothers, but do not fully counteract the influence of traditional norms on how they allocate time and effort at work and this results in higher post-childbirth earnings penalties.

All in all, our results suggest that the motherhood penalty is shaped by multiple factors, but that the institutional framework plays a pivotal role in determining how these penalties materialize, their magnitude and how they interact with conditions outside the workplace.

In the private sector, mothers are particularly vulnerable: weak labour markets, limited childcare, and traditional gender norms increase the likelihood of exit and amplify earnings losses. Public sector employment, by contrast, provides a form of insulation—through job security and more flexible arrangements—which buffers mothers from labour market pressures and cultural constraints, reducing exits, but not fully preventing earnings penalties. These patterns imply that policies aimed at expanding flexible work arrangements, improving access to childcare and promoting gender-equitable norms could be particularly effective in mitigating the motherhood penalty, especially in less protected, more vulnerable labour market contexts.

The remainder of the paper is structured as follows: Section 2 describes the institutional framework and the data. Section 3 compares private and public sectors in terms of the impact of childbirth on the intensive and extensive margins for working mothers. Section 4 discusses the results in terms of the heterogeneous

effects due to contextual factors (local labour market, childcare availability and gender norms). Section 5 concludes.

2. Methodology, institutional context and data

We analyse mothers' labour market trajectories around the birth of their first child by using an event-study framework, tracking outcomes from three years before to six years after childbirth. This approach, in line with Kleven et al. (2019), exploits the intuition that, in the absence of childbirth, labour market outcomes typically evolve smoothly over time. Sudden changes in earnings or employment which coincide with the birth of a child can therefore be interpreted as the causal effect of parenthood.

To account for persistent differences across individuals, such as education, ability or pre-birth career trajectories, we extend the standard child penalty model by including individual fixed effects. This allows us to isolate the impact of parenthood from pre-existing heterogeneity and to properly capture how the timing of maternity affects outcomes.

In recognition of the fact that institutional context shapes labour market responses to parenthood, we estimate all models separately for public and private sector employees. This allows us to capture sectoral differences in employment protection, leave generosity, flexibility and organizational practices, which may affect both the magnitude and timing of the child penalty.

In Italy, as in many other countries, the public and private sectors differ sharply in institutional features, workplace organization and career structures. Public sector employment, representing 19% of total employment (ISTAT, 2022), typically offers higher wages, stronger job security and a greater prevalence of permanent contracts than the private sector (Checchi, Fenizia and Lucifora, 2024; De Palo and Pereda-Fernández, 2020). Working mothers in Italy, both in the private and public sectors, benefit from extensive legal protections under Legislative Decrees 151/2001 and 81/2008, including mandatory maternity leave and a ban on dismissal during pregnancy and until the child reaches one year of age. However, once this period of heightened protection expires, employment security diverges sharply: dismissal protections have been substantially weakened in the private sector following the repeal of Article 18 of the Italian Workers' Statute, a provision that previously required firms to reinstate workers in cases of unfair dismissal, whereas strong protections remain in force in the public sector (see for instance De Paola et al., 2021). In addition, collective agreements in the public sector uniformly provide one month of parental leave per year, paid at 100 percent of previous earnings, during the first three years after childbirth. By contrast, parental leave in the private sector was compensated at only 30 percent of earnings up to 2022. Although subsequent reforms introduced after 2022 improved parental leave benefits in the private sector, public sector employees continue to enjoy more

generous conditions, as one month of leave remains fully paid.³ Importantly, during the period covered by our data, this differential implies a substantial advantage for mothers employed in the public sector, both in terms of income protection and their ability to remain attached to employment following childbirth.

Specifically, we estimate for each sector the following event-study specification:

$$Y_{it} = \sum_{k \neq -1} \alpha_k D_{kit} + \gamma_i + \delta_t + \varepsilon_{it} \quad [1]$$

where Y_{it} is alternatively an indicator for being employed in the private (public) sector or the log of annual earnings, $\log(w_{it})$ for individual i , D_{kit} are event-time dummies (years relative to the birth of the first child). For each parent in our dataset, the year of the first child's birth is designated as the event year ($t=0$), with all other years indexed relative to this reference point. γ_i is an individual fixed effect, and δ_t are calendar year fixed effects. The figures reported in the following sections plot the event-time dummies capturing the impact of the child's birth relative to the pre-birth year (or, for exit probability, the probability estimated of mothers being employed in the previous period).

We measure earnings by using annual income inclusive of social security payments, which more accurately reflects individuals' effective earnings (Adams et al., 2024).⁴ This measure is particularly relevant in the Italian welfare system, where a substantial share of income around childbirth is mediated through public transfers rather than direct employer wages. In Italy, parents are entitled to three main types of paid parenthood-related leave⁵ and the generosity and accessibility of these leave arrangements differ markedly between the public and private sectors with the public sector offering more generous and more easily accessible leave opportunities. As a result, annual earnings inclusive of social security payments provide a more comprehensive measure of the resources available to individuals during the transition to parenthood than do wages alone. All these estimates are conditional on employment.

As an alternative labour market outcome, we examine the probability of exiting employment in the private or public sector in each year post-childbirth (conditional on presence in the labour market in the previous time period) by using linear probability models with individual fixed effects. While workers who leave the private (public) sector could, in principle, transition into public (private) employment, such cross-

³ In the private sector, some firms may offer arrangements that are more generous than the statutory provisions. However, these schemes are not directly observable in our administrative data and are generally limited to specific firms or sectors, rather than being widespread across the Italian labor market.

⁴ To calculate the social security benefits received by employees during absences for maternity, paternity or parental leave, we rely on the 'Differenze Accredito' dataset, which provides information on the remuneration that would have been made by social security contributions had an employee worked regularly during a period of absence. To estimate the compensation received by the employee, to this we apply the replacement rates specified by Italian legislation.

⁵ The Italian System provides three primary types of parenthood-related leave: Maternity leave, with five mandatory months, with 80% of the average wage covered by social security and an additional 20% covered by the employer if stipulated in collective agreements; paternity leave (mandatory) only for the private sector, one day (2013–2015) or two days (2016–2017), fully compensated by social security; parental optional leave, up to 10 months shared between parents, with each parent eligible for up to 6 months (extended to 11 months if the father takes at least 3 months). Compensation is 30% of the average wage for a maximum of 6 months (3 months for each parent and three months to be used alternatively

sector moves were very limited during the study period. This is largely due to hiring freezes in the public sector, which substantially constrained mobility between sectors (INPS Report, 2023).

In our empirical analysis, we focus on mothers⁶ aged 20 to 45 at the time of childbirth who had their first child in 2017 or 2018 and were employed in either the non-agricultural private sector or the public sector at childbirth. We restrict the sample to these two birth cohorts because data on public sector employees are only available from 2014.

To identify mothers, we leverage INPS (the Italian National Social Security Institute) data from the Italian Universal Child Allowance (UCA), introduced in 2022 and available to all families with children under the age of 21. Due to the high take-up rate of this allowance—around 95% for children born between 2013 and 2023—this dataset provides a reliable registry of births in Italy over recent years and allows us to identify both parents as well as each child’s year of birth. We merge this information with INPS administrative records on the population of private and public sector employer-employee matches and social security payments. This merged dataset enables us to track parents’ labour market trajectories for three years before and five years after the birth of their first child. The resulting unbalanced panel comprises approximately 1.7 million observations (279,293 mothers) in the private sector and about 300,000 observations (51,743 mothers) in the public sector. This comprehensive coverage allows us to analyse earnings and employment outcomes across sectors and over time, so capturing both the consequences of parenthood.

To explore heterogeneity in the child penalty, we examine how local contextual characteristics—economic conditions, childcare availability, and gender norms—affect the magnitude of the motherhood penalty. Importantly, the impact of these factors may differ as a consequence of whether the mother is employed in the private or public sector, given the substantial differences in employment protection and work–family flexibility across sectors. First, we consider local economic conditions, proxied by the unemployment rate at the level of the Local Labor Market Area (Sistema Locale del Lavoro), which captures the availability of alternative employment opportunities for women (we consider the unemployment rate for 2011). Second, we include measures of childcare accessibility by using the presence of childcare facilities (municipal nurseries), as reported by the Italian National Statistics Institute (ISTAT) database, in the area of residence. Greater childcare availability reduces the costs associated with childbearing by facilitating continued labour market participation. Third, we account for local gender norms by using municipal-level paternity leave uptake by fathers as a proxy. Paternity leave was introduced in Italy in 2015, and we focus on the period 2016–2018, which we consider the most appropriate given the sample of mothers in our analysis.⁷ As social norms are deeply rooted in cultural contexts and often transmitted across generations, we focus on the norms prevailing in the municipality where the individual was born, as these are likely to have shaped their formative environment. Higher paternity leave take-up signals a local culture in which men are more likely to share childcare responsibilities, reflecting less traditional gender norms.

⁶ The sample comprises mothers who are married, cohabiting or separated/divorced.

⁷ Results are robust to alternative time windows, indicating that our findings are not sensitive to the specific period chosen.

Table 1 compares mothers employed in the public and private sectors. The public sector sample includes 284,875 observations corresponding to the 51,743 mothers, who exhibit higher average annual earnings (in logs) and are predominantly employed full-time. The private sector sample is comprised of 1,672,006 observations regarding 279,293 mothers; these mothers earn less on average and are substantially less likely to work full-time. In both samples, the majority of mothers reside in northern Italy. Local labour market conditions, as measured by unemployment rates, are broadly comparable across sectors and access to childcare facilities is high for both public and private sector mothers. By contrast, average municipal-level paternity leave take-up is moderately higher in areas where mothers employed in the private sector reside.

Table 1. Descriptive statistics

Public sector					
	N	Mean	SD	Min	Max
Annual earnings (ln)	284,875	10.043	0.723	1.318	11.53
Full-time	284,875	0.956	0.205	0	1
North	284,875	0.731	0.443	0	1
Unemployment rate (LMA, 2011)	281,372	6.661	4.045	1.81	24.71
Childcare facilities	278,264	0.905	0.294	0	1
Paternity leave take-up	278,864	0.438	0.181	0	1
Private sector					
	N	Mean	SD	Min	Max
Annual earnings (ln)	1,672,006	9.438	1.057	3.608	16.418
Full-time	1,672,006	0.522	0.500	0	1
North	1,672,006	0.770	0.421	0	1
Unemployment rate (LMA, 2011)	1,649,546	6.356	3.831	1.81	24.71
Childcare facilities	1,633,022	0.906	0.291	0	1
Paternity leave take-up	1,522,883	0.481	0.194	0	1

3. Public vs. Private Sector Motherhood Penalties

In this section, we present our main results, showing how childbirth affects mothers' labour market involvement and earnings over time and highlighting differences in motherhood penalties between the public and private sectors. In all figures, shaded areas denote 95 percent confidence intervals.

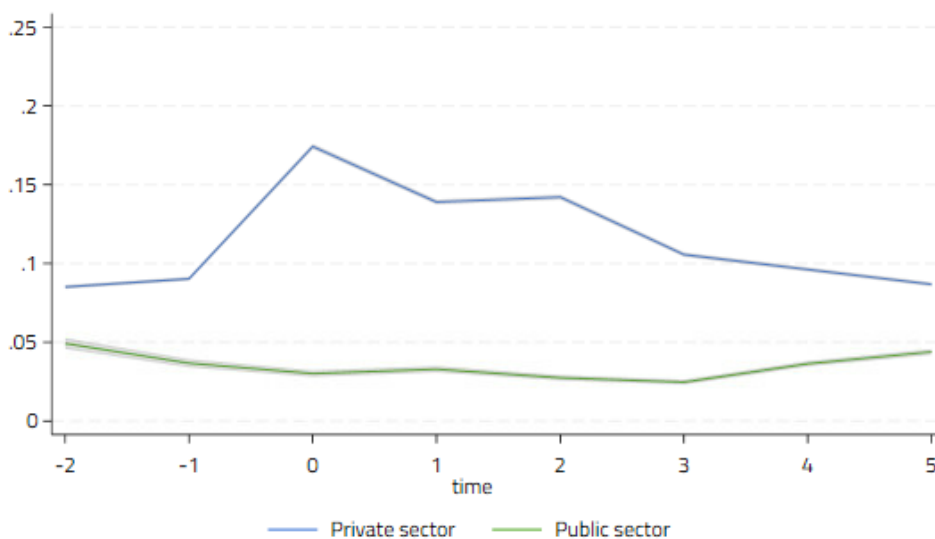
Figure 1 shows the probability of mothers exiting the labour market following childbirth and distinguishes between those employed in the private sector (blue line) and the public sector (green line). The x-axis displays time periods measured in years relative to the birth event, where period -1 represents the year before childbirth, period 0 marks the birth year and positive periods trace the post-birth trajectory.

The graph reveals a substantial and persistent gap in exit probabilities between the two sectors. In the period immediately preceding childbirth (period -1), exit probabilities are already noticeably higher in the private sector (approximately 9%) than in the public sector (approximately 5%). This pre-birth difference highlights that sectoral disparities in labour market outcomes reflect not only motherhood-specific conditions, but also the broader institutional framework governing employment relationships. Weaker employment

protections in the private sector create greater job insecurity for all workers, whereas public sector employees benefit from strong job security which allows them to maintain stable employment. Following childbirth, the private sector exhibits a dramatic spike in exit probability, reaching nearly 17% at period 0, the immediate post-birth period. This elevated exit rate persists with some decline over time: it remains around 14% through periods 1-2, then gradually decreases to 11% by period 4 and continues declining slowly to around 9% by period 5. In stark contrast, the public sector shows remarkable stability in labour market involvement. Exit probabilities remain relatively flat at between 2 and 5% throughout the entire post-birth observation window.

The persistent gap between sectors demonstrates that institutional context fundamentally shapes mothers' ability to maintain their job after childbirth. The private sector's consistently higher exit rates suggest that mothers in this context face greater difficulties reconciling work and family responsibilities, potentially due to less flexible work arrangements, weaker job protections or more demanding and unpredictable schedules. Notably, both sectors show some convergence over time, with the private sector gap narrowing from its peak. This could reflect either genuine re-entry of some mothers who initially exited or compositional changes as the sample becomes increasingly one in which mothers with stronger labour market attachment or more favourable circumstances for combining work and family are selected.

Figure 1. Mothers' probability of exit from labour market after childbirth, by sector of employment



To understand how the child penalty manifests across different margins, Figure 2 presents the evolution of the child penalty in terms of log earnings for mothers employed in the private sector (blue line) and public sector (red line) around the time of childbirth. The vertical dashed line at period -1 serves as the reference point, anchoring the pre-birth baseline against which subsequent changes are measured.

The graph reveals striking differences in how motherhood affects earnings across the two sectors. Prior to childbirth, mothers in both sectors follow similar trajectories, with minimal divergence between the two groups. In the immediate post-birth period (periods 0–2), however, a substantial contrast emerges. Mothers in

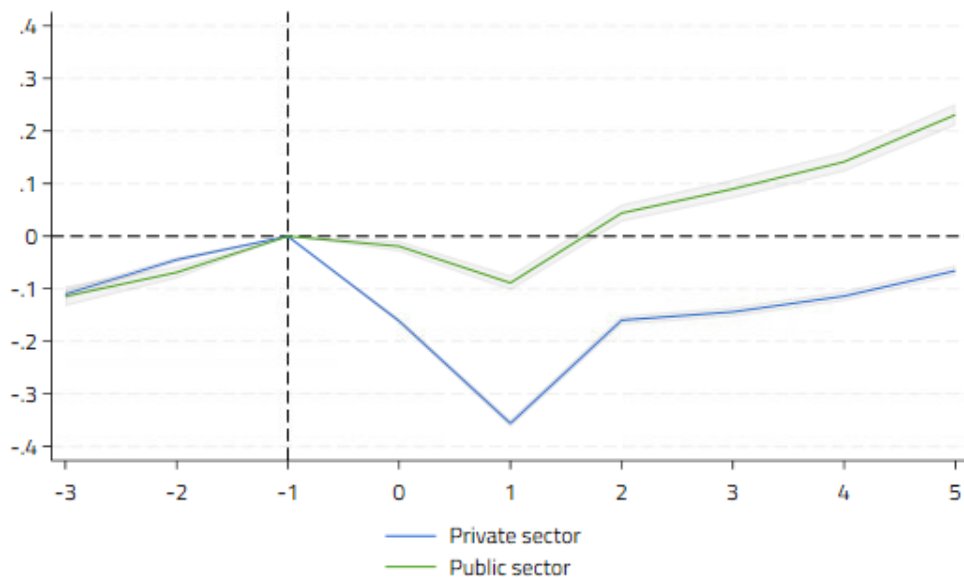
the private sector experience a sharp earnings penalty, which reaches its lowest point one year after childbirth at approximately -0.35 log points (around a 30% reduction in earnings). By comparison, mothers in the public sector face a considerably smaller initial penalty of about -0.09 log points

It is notable that the penalty in both sectors is larger in the year following childbirth (period 1) than in the birth year itself (period 0). This pattern reflects Italy's welfare protections, which provide mothers with paid maternity leave and parental leave that buffer the immediate impact of childbirth on labour market outcomes. During these protected leave periods, mothers maintain formal employment relationships and receive income support, temporarily shielding them from the full magnitude of the penalty. The difference, already observable at period 0, is particularly informative. Even in the immediate post-birth period, when statutory protections apply universally, public sector mothers experience a smaller earnings penalty. This likely reflects greater enforcement of regulations in the public sector, where standardized schedules and greater protection against unfavourable reassignments limit the earnings consequences of childbirth even in the short run.

The trajectories do not converge: while mothers' outcomes in the public sector begin to recover from period 2 onward, outcomes in the private sector remain negative throughout the entire period under consideration.⁸ It is also important to consider that mothers who remain employed after childbirth are likely positively selected in terms of job quality and labor market attachment. Consequently, the estimated effect on earnings represents a lower bound of what would be observed if all mothers had stayed employed. This bias is expected to be stronger when post-birth labor market exits are more common, then it is likely to be larger in the private sector, where such exits are frequent, and smaller in the public sector, where employment retention is higher.

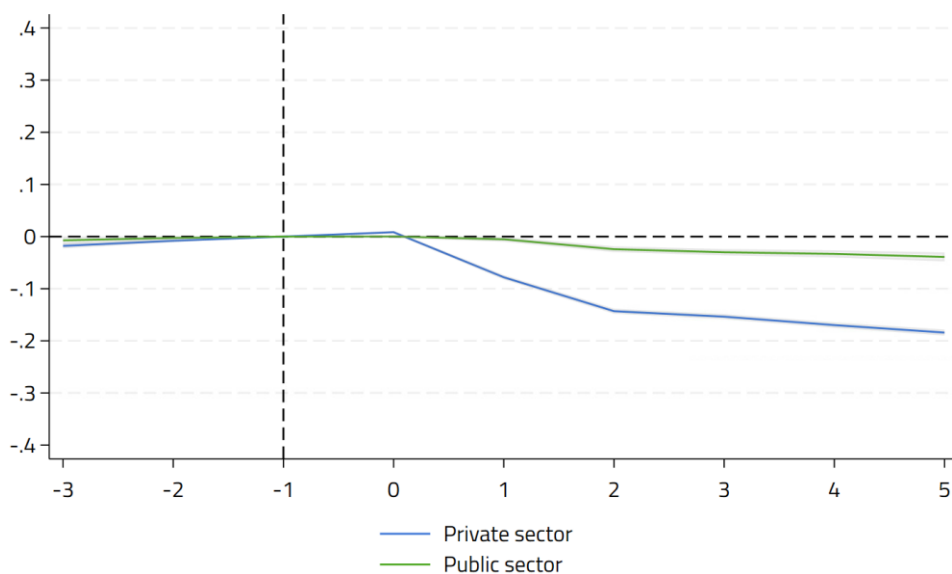
⁸ Biasi and De Paola (2025) report slightly different findings for private sector employees, observing earnings recovery five years after childbirth, which may reflect their use of a different cohort of mothers and the inclusion of age fixed effects in their estimates.

Figure 2. Mothers' earnings after childbirth, by sector of employment



The decline in earnings observed in the private sector appears to be driven primarily by reductions in working time. Indeed, Casarico and Lattanzio (2023) document a substantial decrease in the number of days (or weeks) worked by mothers in the private sector following childbirth, accompanied by an increase in part-time employment. For the public sector, the data at our disposal do not allow for reliable measurement of the number of days or weeks worked and this prevents a direct analysis of changes in labour supply along this margin. However, we can examine transitions into part-time employment. As shown in Figure 3, the probability of working full time decreases after childbirth in both sectors, but this decrease is markedly larger among mothers employed in the private sector.

Figure 3. Mothers' full-time employment after childbirth, by sector of employment



Our results highlight that the child penalty operates through multiple channels: not only do mothers who remain employed experience earnings reductions, but a substantial fraction of private sector mothers exit the labour market entirely, an outcome that public sector employment largely prevents. This difference reflects the greater flexibility, more predictable schedules and structured work arrangements typical of public sector employment, which help buffer mothers against the labour market shock of childbirth. Moreover, although legal protections for motherhood are formally symmetric—including dismissal prohibitions during maternity leave and the right to request part-time work—their practical enforcement may be less consistent in the private sector. Importantly, once statutory protections expire, private sector mothers face weaker employment safeguards than their public sector counterparts, a difference that is likely to amplify the child penalty

We acknowledge that differences between the public and private sectors may, in principle, reflect differences in worker or firm characteristics. However, our empirical strategy substantially mitigates this concern. The inclusion of individual fixed effects absorbs all time-invariant heterogeneity across workers, such as education, ability and baseline preferences for job stability, so implying that any remaining selection must operate through time-varying factors. While selection related to career dynamics or anticipatory behaviour cannot be entirely ruled out, the similarity of pre-birth trends across sectors and the sharp divergence occurring precisely at childbirth suggest that the observed sectoral differences primarily reflect institutional features rather than compositional differences in worker characteristics.

To assess whether the observed sectoral differences in the child penalty are driven by worker composition rather than institutional features, we progressively account for several potential confounders. First, we restrict the sample to more comparable populations by excluding manual workers in the private sector—a group largely absent from public sector employment. If occupational composition were driving our results, the sectoral gap should attenuate within this more homogeneous sample. However, the estimated child penalty among private-sector white-collar workers remains unchanged, suggesting that differences in occupational structure are not the primary explanation.⁹ We also consider whether organizational characteristics may explain the gap. Public sector employment is typically concentrated in larger organizations that can more easily absorb temporary absences, reorganize tasks, and offer predictable schedules or flexible arrangements. In contrast, private sector firms in Italy are predominantly small, often facing tighter staffing constraints and limited scope for task reallocation. If firm size were a key mechanism, the child penalty should be smaller in larger private-sector firms. To test this channel, we estimate our model separately for mothers employed in small (fewer than 15 employees) and large (more than 15 employees) private-sector firms. We find no meaningful differences between the two groups (results not reported and available upon request), suggesting that firm size alone does not account for the sectoral gap.

⁹ Although our data do not include direct measures of education, evidence from Casarico and Lattanzio (2023) indicates that child penalties are similar across education groups, which alleviates concerns that educational differences drive our results.

4. Public vs. Private Sector Motherhood Penalties and Contextual Factors

In this section, we examine how contextual factors, including local labour market conditions, access to childcare, and prevailing social norms, interact with institutional settings to shape the magnitude and dynamics of the child penalty in the public and private sectors.

4.1. Public vs. Private Sector Motherhood Penalties and Local Employment Conditions

We begin by examining the role of local labour market conditions, proxied by the local unemployment rate, which may affect both mothers' post-childbirth employment retention and their subsequent earnings trajectories. We classify Italian municipalities based on local labor market conditions, measured at the Labour Market Area (LMA) level. Each municipality is assigned the unemployment rate of its LMA.¹⁰ We then compute the national mean of LMA unemployment rates and split municipalities into two groups: those in LMAs above the national mean and those at or below it. Each mother is assigned the corresponding value based on her municipality of residence in the year prior to childbirth ($t = -1$); when this information is unavailable, we rely on the closest available observation. We then estimate the baseline model described in equation [1] separately by sector and local labour market group. We compare the resulting event-study profiles to assess how the magnitude and dynamics of the child penalty vary across sectors and economic contexts.

Figure 4 displays the probability of leaving employment after childbirth as indicated by local unemployment rate, estimated separately for the private sector (left panel) and public sector (right panel). In each panel, the blue line represents mothers residing in areas with above-national-mean unemployment rates, while the green line shows mothers in below-national-mean unemployment areas.

Panel a of Figure 4 shows that exit probabilities in the private sector are higher in high-unemployment areas at all points in time, both before and after childbirth. In the pre-birth period ($t = -1$), mothers in above-average unemployment areas already face substantially higher exit rates, around 14 percent, compared to approximately 8 percent in areas with a stronger labour market. Following childbirth ($t = 0$), exit probabilities increase sharply in both groups, peaking at roughly 23 percent in high-unemployment areas versus about 14 percent in low-unemployment areas—a gap of nearly 9 percentage points. Although exit probabilities gradually decline over time, the gap between the two groups remains persistent throughout the post-birth period, suggesting that unfavourable local labour market conditions amplify the motherhood-related risk of labour market exit in the private sector.

When we rank municipalities within each macro-area (South and North),¹¹ we find that local economic conditions operate independently of the broader North-South divide. As shown in Figure A1 in the Appendix

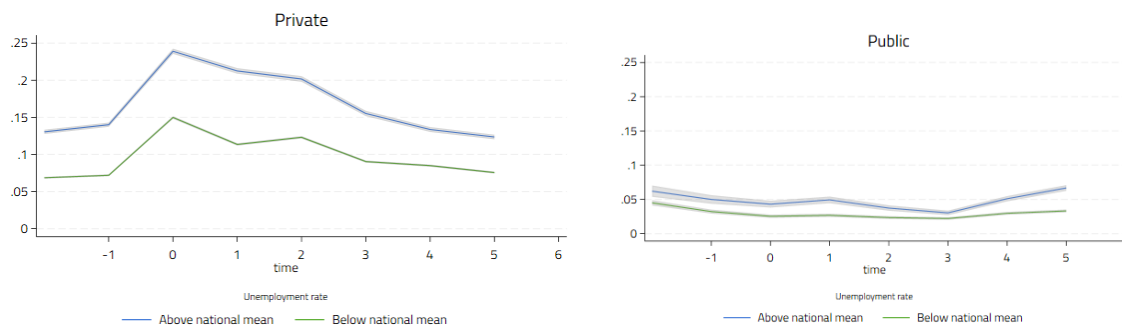
¹⁰ We use the municipal unemployment rate in 2011, aggregated at the Labour Market Area level.

¹¹ This approach allows us to compare mothers who are exposed to different local contexts while keeping the broader geographic environment constant. By focusing on relative differences within macro-areas, we mitigate concerns that our results are mechanically driven by the North–South divide and instead assess whether local variation in structural and cultural factors is associated with differential post-birth labour market outcomes.

to the paper, while it is true that southern mothers face substantially higher exit probabilities overall compared to northern mothers (the blue line is at nearly double height of the brown line by year 5), the within-region patterns are also important. Local labour market conditions create systematic differences, especially in northern areas, in mothers' ability to retain private sector employment.

In the public sector, exit risks are substantially lower than in the private sector across all local labor market conditions. Around the year of childbirth, areas with weaker labor market conditions exhibit slightly higher exit probabilities compared to areas with stronger employment rates; however, these differences are modest and far smaller than those observed in the private sector.

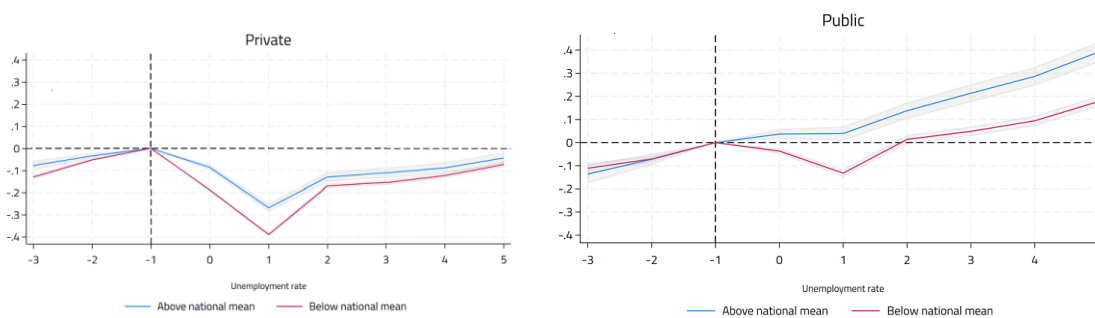
Figure 4. Mothers' probability of exit from labour market after childbirth, by sector of employment and local unemployment



We then turn to the earnings trajectories of women who remain employed. As shown in Figure 5, differences in earnings in the private sector, conditional on employment, are relatively modest across local labour market conditions. Mothers in high-unemployment areas (blue line) experience a somewhat steeper initial decline, with the earnings penalty reaching approximately -0.4 log points around the end of period 1, compared with about -0.3 log points for mothers in low-unemployment areas (red line). However, these trajectories follow a converging path from period 2 onwards, slowly reducing the gap and remaining closely aligned for the remainder of the observation window.

In the public sector (right panel), the motherhood earnings penalty is substantially smaller overall compared to the private sector. For mothers residing in municipalities with above-average unemployment rates (blue line), the earnings penalty is largely absent. These mothers exhibit a consistently upward earnings trajectory that is only marginally affected by childbirth. By contrast, mothers in municipalities with below-average unemployment rates (red line) experience a more persistent penalty. Following childbirth, their earnings drop to approximately -0.15 log points and the coefficient assumes positive values from period 2 and follows an increasing trend until the final period of observation. While earnings trajectories are similar for both groups before childbirth, they begin to diverge afterward, with mothers living in municipalities with lower unemployment (better labour market conditions) experiencing higher penalties over time.

Figure 5. Mothers' earnings after childbirth by sector and local unemployment



The earnings trajectories observed in both the private and public sectors indicate that, in high-unemployment areas, post-birth earnings penalties persist even among mothers who remain employed, although their magnitude is relatively limited. Given that post-birth employment in high-unemployment areas is likely to be selective—reflecting the continued employment of mothers with stronger labor market attachment or better job prospects—one would normally expect observed earnings losses among those who remain employed to be attenuated. The persistence of earnings penalties despite this positive selection therefore points to a direct role of adverse local labor market conditions in shaping post-birth earnings trajectories, by limiting opportunities for wage growth, promotions, overtime, and access to higher-quality assignments.

4.2. Public vs. Private Sector Motherhood Penalties by Sector and Childcare Availability

We now examine how childcare availability in the municipality of residence shapes the child penalty across sectors. Access to affordable, quality childcare represents a critical enabling factor for mothers' continued labour market participation and career progression after childbirth. By reducing the time and cost constraints associated with childrearing, childcare infrastructure can directly mitigate work-family conflicts and enable mothers to maintain employment and working hours. However, the importance of childcare availability may vary substantially between institutional contexts. We expect childcare availability to matter more in the private sector, where workplace flexibility is weaker than in the public sector.

As before, we distinguish between adjustments along the intensive margin (earnings among employed mothers) and the extensive margin (exit from employment after childbirth).

We measure childcare availability using municipality-level data from the Italian National Institute of Statistics (ISTAT, 2021), focusing on formal childcare services for children aged 0–3. Municipalities are classified into two groups depending on whether such services are available. We then estimate our baseline event-study model separately for each sector and for each childcare availability group.

Figure 6 presents the probability of exiting employment after childbirth by sector and childcare availability in the municipality of residence. Green lines represent mothers in areas with available childcare facilities, while blue lines show mothers in areas where childcare is not available.

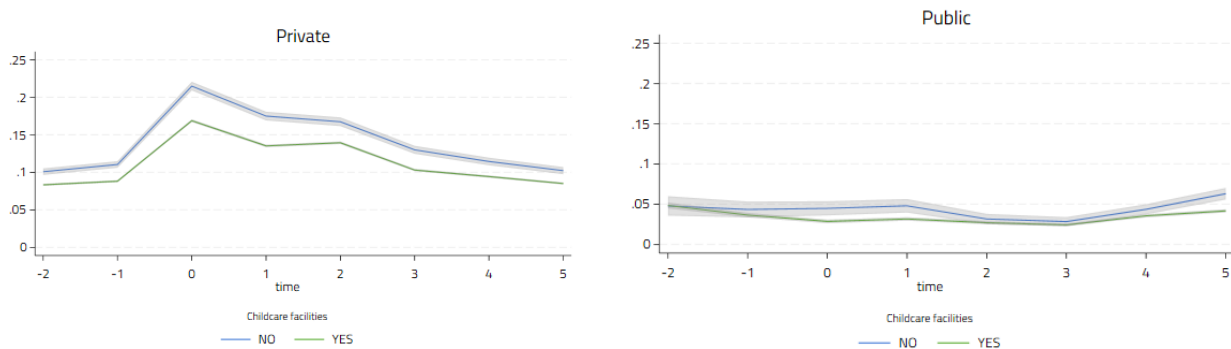
In the private sector (panel a), motherhood is associated with a substantial increase in exit probabilities, particularly in municipalities where childcare facilities are not available. These differences are most pronounced in the years immediately following childbirth and persist over time, so indicating that limited access to childcare increases the likelihood that private-sector mothers will adjust to childbirth by exiting employment altogether rather than remaining employed with reduced earnings.

When we compare municipalities within each macro-area (South and North), we find that access to local childcare affects mothers in both regions, but that the impact is considerably stronger in the South. Figure A2 in the Appendix shows that mothers in southern municipalities without childcare services face much higher probabilities of leaving employment. In the North, the negative impact of the lack of childcare remains, but the gap in exit rates between municipalities with and without childcare is substantially smaller than in the South.

By contrast, exit probabilities in the public sector show little variation due to the level of childcare availability. Mothers employed in the public sector are unlikely to leave employment after childbirth, regardless of local childcare provision, so highlighting the role of institutional features in insulating employment continuity from external constraints. This insensitivity to the level of availability of external childcare infrastructure reflects the public sector's institutional protections, which appear to function as effective substitutes for childcare availability. Features such as job-protected leave, flexible work arrangements, predictable schedules and strong employment security may enable public sector mothers to manage their work-family balance even in contexts with limited formal childcare as they help reduce the mothers' dependence on external support infrastructure.

The analysis within macro-areas show that in southern areas, the lack of childcare facilities is associated with a relatively higher exit probability around childbirth; the difference between North and South is, however, modest (see Figure A2).

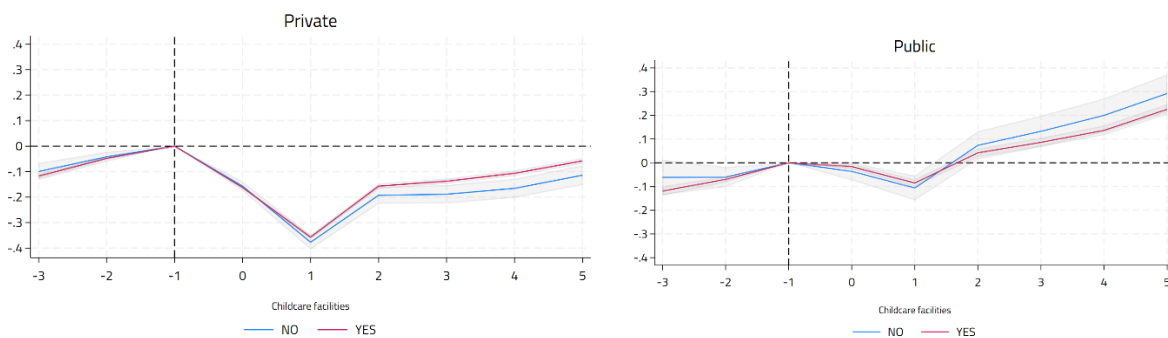
Figure 6. Mothers' probability of exit from the labour market after childbirth, by sector and childcare availability



In Figure 7, we analyse earnings trajectories (in log points) following childbirth, disaggregated by childcare availability in the municipality of residence for mothers working in the private sector (left panel) and those in the public sector (right panel). In the private sector (left panel), mothers residing in municipalities with childcare facilities experience slightly smaller earnings declines following childbirth compared to those in areas lacking childcare. However, these differences are modest and not statistically significant. Similarly, the public sector (right panel) shows virtually no differentiation due to childcare availability.

Taken together, the findings shown in Figures 6 and 7 highlight a clear sectoral contrast. In the private sector, limited childcare provision increases the likelihood of exiting employment, while conditional on continued employment, earnings penalties are only marginally affected. In the public sector, instead, both earnings trajectories and exit probabilities are largely unaffected by local childcare availability, suggesting that institutional protections effectively substitute for external childcare support in mitigating motherhood penalties

Figure 7. Mothers' earnings after childbirth, by sector and childcare availability



4.3. Public vs. Private Sector Motherhood Penalties by Sector and Social Norms

In this sub-section, we examine heterogeneity in motherhood penalties by local gender norms, proxied by municipal-level take-up of paternity leave, and compare adjustment patterns in the public and private sectors.

Figure 8 presents the probability of exiting employment after childbirth by sector and gender norms. In the private sector, motherhood is associated with a sharp and persistent rise in exit probabilities, particularly in municipalities with more traditional gender norms. These differences are most pronounced in the first years after birth and remain noticeable over time, suggesting that private-sector jobs make it harder to reconcile work and family in more traditional contexts where motherhood entails a substantial increase in domestic responsibilities, thereby increasing the likelihood of labour market exit. By contrast, exit probabilities in the public sector show little variation across local gender norms, so highlighting the protective effect of stronger

employment safeguards and flexible work arrangements in supporting mothers' continued labour market involvement, even in more traditional contexts.

Figure 8. Mothers' probability of exit from the labour market after childbirth, by sector and social norms

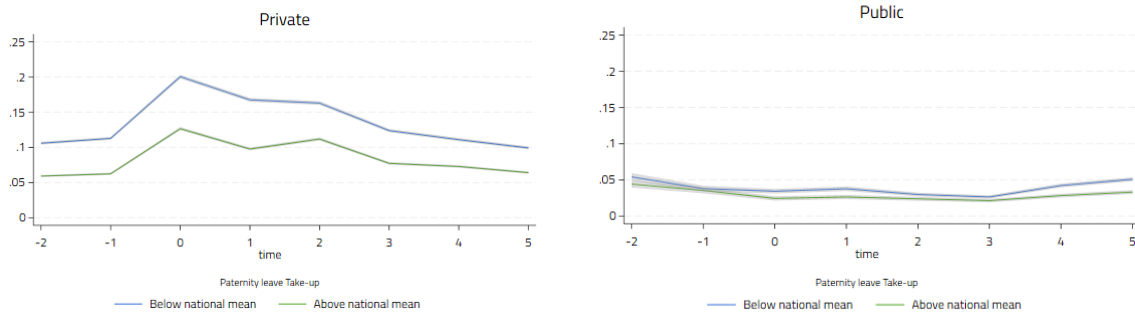
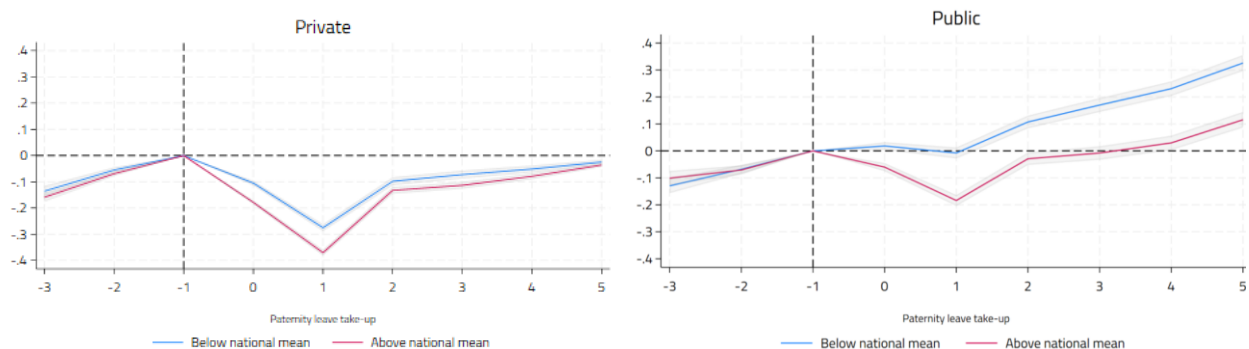


Figure 9 shows that among mothers who remain employed, earnings penalties in both sectors are amplified in areas characterized by traditional gender norms. This indicates that prevailing cultural expectations regarding caregiving and household responsibilities constrain women's ability to maintain pre-childbirth earnings, even when they continue working. In the public sector, while employment protections and workplace flexibility help retain mothers, they do not fully offset the influence of traditional norms on the allocation of time and effort at work, resulting in persistent post-childbirth earnings penalties.

Overall, the results on the extensive and intensive margins show that gender norms shape the motherhood penalty differently across sectors. In the private sector, in areas with more traditional norms and lower paternal involvement, the penalty operates mainly through labour market exit rather than earnings reductions for those who remain employed. By contrast, exit rates in the public sector are largely unaffected by local gender norms and the penalty is reflected primarily in earnings adjustments.

Figure 9. Mothers' earnings after childbirth, by sector and gender norms



5. Conclusion

This paper studies how institutional features of the labor market shape the motherhood penalty and focuses on differences between public and private sector employment by using Italian administrative data and an event-study framework.

Our results show that the motherhood penalty operates mainly through exit from employment in the private sector, rather than through earnings reductions alone. Nonetheless, earnings losses among mothers who remain employed are still substantial and persistent. In contrast, mothers in the public sector face no increase in exit probabilities and experience substantially smaller earnings penalties.

These patterns are consistent with stronger employment protection, greater job security and higher workplace flexibility in the public sector, which jointly limit both employer-driven and voluntary exits.

We also examine how the impact of childbirth varies across different contextual factors: local unemployment rates, capturing the structural economic conditions of the labor market; the availability of childcare facilities, reflecting the role of family-support services; and prevailing gender norms, representing the broader cultural environment. Our results indicate that these contextual factors amplify the negative consequences of parenthood for mothers in the private sector, particularly in terms of labor market exit. By contrast, differences in labour market consequences due to these varying contexts are small in the public sector, both in magnitude and in temporal trends.

Overall, our results suggest that interventions designed to support mothers in the workforce could play a key role in reducing the motherhood penalty. In particular, measures that increase the availability of flexible work options, enhance access to affordable childcare, and foster more gender-equitable social norms are likely to be most effective. Their impact may be especially pronounced in labor markets that offer fewer protections, where mothers face higher risks of job loss and career interruptions.

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Appendix

Figure A1. Mothers' probability of exit from the labour market after childbirth, by sector, unemployment rate and macroarea

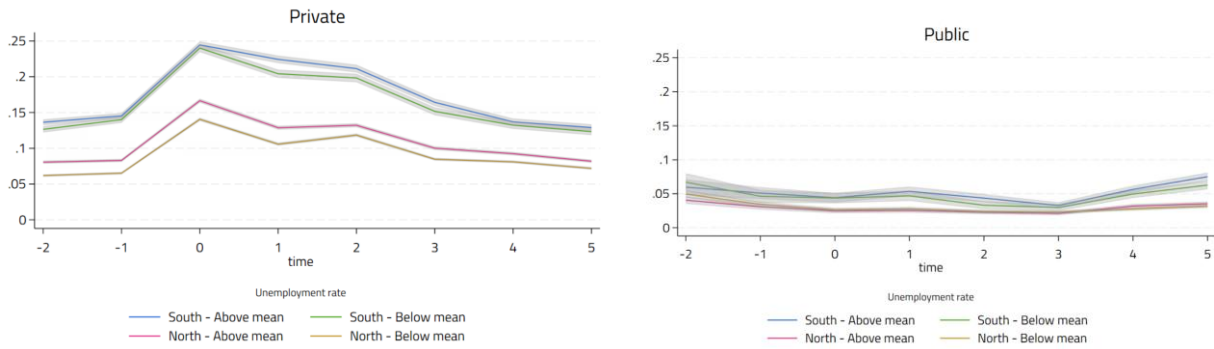


Figure A2. Mothers' probability of exit from the labour market after childbirth, by sector, childcare facilities and macroarea

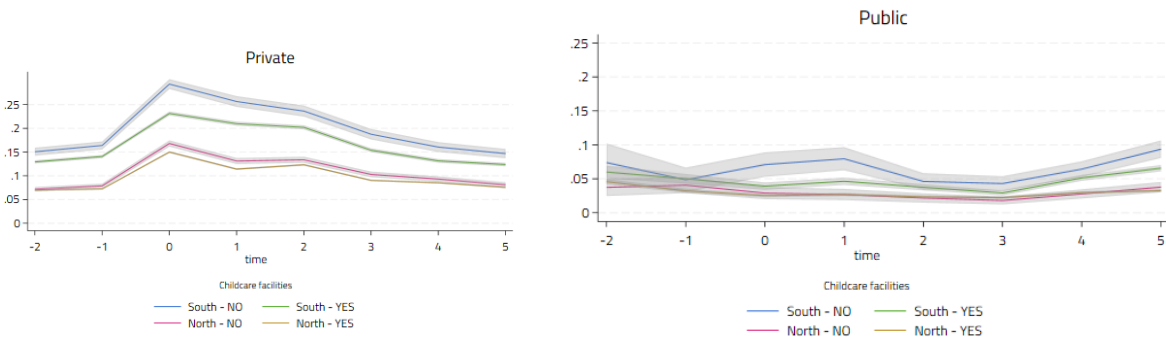


Figure A3. Mothers' probability of exit from the labour market after childbirth, by sector, paternity leave take-up and macroarea

