

Child Penalty: impacts of Motherhood on Women's Careers in the Private and Public Sectors

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RESUMO

Este estudo explora o impacto dos filhos na carreira das mulheres no mercado de trabalho, enfatizando as disparidades entre os setores privado e público. A chegada dos filhos afeta significativamente o status de emprego e os salários, influenciada pela dinâmica do salário por hora. Utilizando uma abordagem de estudo de eventos, nossos achados indicam um declínio no status de emprego de 30% no setor privado e 10% no setor público. Mães que trabalham no setor privado enfrentam uma queda de 20% em seus salários, enquanto no setor público os salários permanecem inalterados. Identificamos mecanismos específicos que contribuem para a penalidade dos filhos, incluindo escolhas ocupacionais, preferências setoriais e decisões relativas às empresas. Além disso, demonstramos que essas penalidades são mais acentuadas para mulheres empregadas no setor privado que ganham até dois salários mínimos. Nossas evidências contribuem para a investigação da penalidade dos filhos no Brasil, destacando dinâmicas específicas de cada setor. **Palavras-chave:** Maternidade. Mercado de trabalho. Estudo de evento.

ABSTRACT

This study explores the impact of children on women's careers in the labor market, emphasizing disparities between the private and public sectors. The arrival of children significantly affects employment status and wages, influenced by hourly wage dynamics. Using an event study approach, our findings indicate a decline in employment status of 30% in the private sector and 10% in the public sector. Mothers working in the private sector face a 20% drop in their

salaries, while in the public sector, wages remain unchanged. We identify specific mechanisms contributing to the child penalty, including occupational choices, sector preferences, and decisions regarding firms. Moreover, we demonstrate that these penalties are more pronounced for women employed in the private sector earning up to two minimum wages. Our evidence contributes to the investigation of the child penalty in Brazil, emphasizing sector-specific dynamics.

JEL Classification: J13, J16, J22, J22, J31, J62.

Key-words: Motherhood. Labor market. Child Penalty. Event Study.

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1 Introduction

Women's participation in the labor market has grown significantly in recent decades due to various factors such as higher levels of education among women, contraceptives methods, public policies on maternity leave, and gender quotas MULLIGAN; RUBINSTEIN, 2008 ROSSIN-SLATER; RUHM; WALDFOGEL, 2013rossin2017. However, gender disparities persist as challenges in women's careers BERTRAND; GOLDIN; KATZ, 2010hotz. Various arguments can explain the persistence of the gender gap in the labor market, including the impact of domestic and family responsibilities often assigned to women.

In Brazil, 53.3% of women were part of the labor force in 2022, whereas 73.2% of men were employed Instituto Brasileiro de Geografia e Estatística (IBGE), 2022. Conversely, women spend more than twice the amount of time on domestic and care giving responsibilities compared to men IBGE, 2018 The impact of motherhood on private sector employees has been well-documented in the literature. The arrival of a child requires women to spend more time at home taking care of the children and household chores GOMEZ; ARCEO-GOMEZ; TOLEDO, 2019 Motherhood can be associated with more career interruptions and a preference for more stable and flexible positions GONZAGA; OAQUIM; TERRA, 2020 KLEVEN; LANDAIS; SØGAARD, 2019 MEDEIROS, 2022

The impacts of motherhood on the public sector, however, may diverge from the main body of literature, which finds a strong impact on the private sector. The World Bank's gender report shows that the public sector tends to have less gender discrimination compared to the private sector World Bank, 2020 Women are more likely to seek employment in the public sector, where there is greater flexibility in working hours KLEVEN; LANDAIS; SØGAARD, 2019 In addition, the characteristics associated with occupation and remuneration can reduce the motherhood penalty BERNIELL et al., 2023 Public sector allow a significant stability and flexibility for theirs employees, which can mitigate part of motherhood impact.

This study investigates the effects of motherhood on earnings and labor market participation among women employed in the public and private sectors. Using administrative data from the Annual Social Information Report (RAIS) between 2012 and 2018 from the state of São Paulo, we constructed a panel including public sector and private sector employees. Using the Event

Study estimation method, with women who have not yet had children as the control group, we estimated separately the impact of childbirth on public and private sectors. Additionally, comprehensive information on employers and employees — such as remuneration, hours worked, occupation, sector, and firm — enables us to investigate the mechanisms driving the observed impacts.

For a range of labor market outcomes, we find significant effects of having children. Mothers and non-mothers employed in private and public sector progress similarly until the childbirth, after which their paths diverge sharply. We find that mothers achieve a drop of 30% in private sector and 10% in public sector on probability of being employed in third year of childbirth compared to the period previous maternity. Wages drop by around 20 percent in the private sector. In contrast, the public sector statistically maintains mothers' salaries.

Our mechanisms analysis suggests that employment characteristics between mothers and non-mothers differ. Specifically, we observe that in the years following childbirth, there is a gradual increase in the probability of being manager in the public sector. Additionally, there is a significant increase in probability of changing occupations, firms, or workplaces among private sector employees.

Our findings reveal a common pattern, but a different magnitude in the impact of motherhood for private and public sector. Within the private sector, mothers in the lowest minimum wage categories are more affected. Moreover, women in lower-skilled positions in the private sector experience more significant effects compared to those in managerial and professional roles. Recent research by Goldin (2014), Goldin e Katz (2016), and Kleven, Landais e Sogaard (2019) has extensively explored family-friendly occupations and firms, yielding important insights. Our evidence contributes to the investigation of the child penalty in Brazil, emphasizing sector-specific dynamics.

Furthermore, this study contributes to the extensive international and national literature on children and family labor supply. We investigate the effects of children on employment, wages, and hours worked, estimating coefficients using the methodology outlined by Kleven, Landais e Sogaard (2019). Our approach innovates by comparing the effects of these variables across the public and private sectors, thereby enhancing the understanding of labor market dynamics in Brazil.

This paper is organized as follows. Section 2 describes the institutional background of maternity leave. Section 3 outlines the data, descriptive statistics and methodology. Section 4 presents the main results and heterogeneities. In Section 5, we offer some concluding remarks.

2 Institutional Background

Brazil has the most generous maternity leave policy in Latin America. Initially established with the Consolidation of Labor Laws (CLT) in 1943, which granted women 84 days of paid leave by the employer, the policy now ensures mothers 120 days of fully paid leave covered by

Social Security. Since the 1988 Federal Constitution, women can start their leave 28 days before the birth or on the day of the child’s birth, without affecting their job stability for the next five months.

Until 2008, women employed in public and private sector have the same rights regarding maternity leave. However, a significant enhancement came in 2008 with Law No. 11,770, which established the Empresa Cidadã Program, allowing companies to extend maternity leave by 60 days (totaling 180 days) through a tax incentive. Participation is voluntary, but companies receive tax deductions for the additional leave. Initially prevalent in public companies, this program was regulated for private companies starting in January 2010. Although companies decide to offer this extended leave, acceptance is at the employee’s discretion, and it must be available to all employees of participating companies.

Additionally, paternity leave, initially set at five days in 1988, was extended by 15 days for public servants and employees of private companies participating in the Empresa Cidadã Program through Law No. 13,257/2016. While this represents progress in family policies, women still dedicated more of their professional lives to raise children compared to men. This scenario emphasizes the importance of understanding the effects of child-rearing on women’s careers and how these impacts differ between the public and private sectors.

3 Data e Methodology

3.1 Data

We explore the Brazilian matched employer-employee data that Ministry of Labor collects each year, Annual Social Information Report (RAIS). It offers a comprehensive and high-quality overview of the entire formal sector. We received access to worker-level tax identifiers, which are unique along the time. Identified data allow to track workers over time and across firms and occupations. To investigate child penalty on women careers, we use annual RAIS data for the period between 2012 and 2018. Database consists of detailed worker-level information on demographic characteristics, average wages, firm size, occupation, admission date, maternity leave, along with other variables.

The analysis is based on a random sample of 10% of formally employed women in São Paulo between 2012 and 2018, sourced from the RAIS database. We excluded duplicate observations for the same CPF¹ within the same year. For individuals with multiple employments in a year, we retained the job with the highest pay and seniority.

Although RAIS provides incredibly detailed information, there are important limitations to mention. RAIS includes only formal workers and lacks information on informal employees. We can only identify childbirths when women are actively in the formal labor market, which

¹CPF (Cadastro de Pessoa Física) is a unique identification number required for all individuals in Brazil. It is used for a variety of purposes, including tax administration, financial transactions, and access to public services.

does not allow us to identify a woman’s first child. To evaluate employment status, we imputed information for women in the years when they were not working in the formal labor market. For example, if a woman was working in the formal market in 2012 and 2013, but we could not find her in the RAIS database in 2014 and 2015, we recorded her status as unemployed for those years. The only information we were interested in was employment status; all other information for these imputations was marked as missing.

Further, with this full of information we evaluate how childbirth affects wage, employment, hours worked, and hourly wage across both public and private sectors. Additionally, to explore the mechanisms through which childbirth influences women’s careers, we utilize information on occupation, sector, and firm characteristics.

In our estimated database, we included only employees who took maternity leave between 2012 and 2018. The final database contains only women who were treated at some point during the analysis period. In addition, our analysis is restrict to women who were employed in the formal labor market for at least three years before the treatment (childbirth). To identify the legal nature of the employment, occupation, and type of employment, we considered information from the year of maternity leave. In distinguishing between public and private sector panels, we classified as public sector all women employed by legal entities within public administration, public companies, mixed economy companies, and those with statutory employment. In private sector was included all female workers not associated with the public sector or statutory employment. Political positions² were excluded from the sample. Additionally, in cases where maternity leave extended across consecutive years with fewer than 180 days were included.

At the conclusion of the sample selection process, we have a balanced panel consisting of 491,113 observations representing 70,159 female employees. Among these, 5,478 women are employed in the public sector, while 64,681 are employed in the private sector. Additionally, monthly wages were adjusted for inflation to 2018 levels, and natural logarithms were applied to the adjusted wages, contracted hours, and hourly wage variables.

3.2 Descriptive Statistics

Table 1 displays summary statistics for female workers who gave birth at some point between 2012 and 2018, for both the public and private sectors. The table shows that the sectors diverge across observable characteristics, such as wages, hourly wages, firm size, education, and occupation. The primary difference lies in earnings. On average, in the year before childbirth, female workers in the public sector earn about 3,544 Brazilian reais per month, which is higher than the earnings of private sector workers, who earn 2,323 Brazilian reais per month. In addition, nearly 58 percent of female workers in public sector and 20 percent of female workers in private sector have a college degree, 66 percent of public female workers and 57 percent of private female workers are above of 35 years old, 94 percent of public female workers and

²Senators, Federal Deputies, State and District Deputies, Mayors, etc.

51 percent of private female workers are employed in large establishments with at least 100 employees, and 15 percent of female workers in public sector and 41 percent of female workers private sector hold a managerial position.

Table 1: Descriptive Statistics: Female Workers

	Public Sector		Private Sector	
	Mean	SD	Mean	SD
Wage				
Wages (in <i>reais</i>)	3,544.08	3,662.34	2,323.08	2,736.29
Log Earnings	7.82	1.01	7.42	0.96
Hourly Wage (in <i>reais</i>)	105.77	142.81	59.51	114.95
Log Hourly Wage	4.26	1.06	3.71	0.98
Firm Size				
0-9 Employees	0.00	0.06	0.12	0.32
10-49 Employees	0.03	0.16	0.23	0.42
50-99 Employees	0.02	0.15	0.15	0.36
100+ Employees	0.94	0.23	0.51	0.50
Education				
Basic Education	0.05	0.22	0.17	0.37
High School	0.37	0.48	0.63	0.48
College	0.58	0.49	0.20	0.40
Age				
Age	32.33	4.80	28.71	5.55
less or equal to 25	0.08	0.27	0.31	0.46
26-35	0.66	0.47	0.57	0.50
36-45	0.25	0.43	0.12	0.33
more than 45	0.00	0.06	0.00	0.03
Occupation				
Managerial	0.04	0.18	0.04	0.21
Professional	0.61	0.49	0.21	0.41
White Collar Lower Level	0.21	0.41	0.33	0.47
Blue Collar	0.15	0.35	0.41	0.49
Women	5,478		64,681	
Observations	38,346		452,767	

Note: This table reports descriptive statistics for female workers using information RAIS data. The first two columns refer to a sample of female workers from public sector. Third and fourth report summary statistics for the private employees. Total number of unique workers is reported in the last row. All variables is referring to the first year before childbirth.

3.3 Methodology

We exploit an event-study design using women who were not treated yet as the control group. This study examines the average differential effect of first childbirth between mothers and women who have not yet become mothers, assuming that all selected women eventually become mothers. This approach aims to explore differences among women who are more similar and share similar preferences, as they will all experience motherhood at some point. The event-study methodology offers significant advantages by mapping the complete dynamic trajectory of these effects and leveraging individual-level variations in the timing of births.

Although motherhood is a non-exogenous choice, the event of having a first child generates significant changes in the labor market that are arguably orthogonal to unobserved determinants influencing mothers' career trajectories over time KLEVEN; LANDAIS; SØGAARD, 2019. Therefore, the Event Study strategy provides significant advantages by allowing for tracking of mothers in the years leading up to and following the birth of their child. For each mother i , $t = 0$ is defined as the year of the child's birth relative to all years in the sample.

It is important to note that due to the nature of formal employee records, there may be periods when individuals are not observed in the sample, which can challenge the precise identification of the birth of the first child, as feasible in Kleven, Landais e Sogaard (2019)'s strategy. Consequently, the estimated coefficients reflect the average effect of childbirth on mothers, not necessarily restricted to the first child. We restrict the sample to workers employed in the formal sector the previous 3 years before the childbirth. Then, we investigate motherhood impacts on the probability of being employed in each year after childbirth.

In our analysis, we designate the year of a woman's childbirth as $t = 0$, with subsequent years indexed relative to that point. We examine a wide range of labor market outcomes over event time, capturing variations across mothers and non-mothers.

From this sample, we estimate the following regression:

$$y_{ist} = \sum_{j \neq -1} \alpha_j \cdot I(j = t) + \sum_k \beta_k \cdot I(k = \text{age}_{is}) + \sum_{yr} \gamma_{yr} \cdot I(yr = s) + \epsilon_{ist} \quad (1)$$

where, y_{ist} represents the outcome variable for individual i in year s at event distance t . $I(j = t)$ denotes the time relative to the first childbirth event, β_k captures age effects, γ_s accounts for year effects, and ϵ_{ist} is the error term.

Our regression includes a full set of event time dummies (first term on the right-hand side), age dummies (second term), and year dummies (third term). We exclude the event time dummy at $t = -1$, meaning that the event time coefficients measure the impact of childbirth relative to the year immediately preceding the first childbirth. By incorporating a full set of age dummies, we control non-parametrically for underlying life-cycle trends. Similarly, including a complete set of year dummies allows us to adjust non-parametrically for time trends such as wage inflation and economic cycles. The effects of all three sets of dummies can be discerned because, conditional on age and year, variations in event timing are driven by differences in the

age at which individuals experience their first child.

Therefore, the treatment group for each year s at t treatment periods consists of women who experienced childbirth in that year s at t treatment periods, while the control group consists of women who were treated in another year s at t treatment periods within the analyzed period. The estimated coefficients thus represent the average difference in outcomes between women who became mothers in year s at t treatment periods and women who did not become mothers during that period but were treated at some point within the analyzed period.

Continuous variables were log-transformed to facilitate interpretation of results. We investigated the following variables: employment status ($y_{ist} = 1$ if employed in year t), salary, hourly wage, hours worked, variables indicating managerial, professional, white collar lower level and blue collar positions. Indicator variables will be interpreted as probability of hold this position in each year compared to $t = -1$. In addition, we explore variables to capture change of occupation, firm or workplace after childbirth compared to $t = -1$. The variables indicating changes were defined equal 1 if a women transitioned from one occupation (or firm, or occupation and firm) to another occupation (CBO³), or firm (CNPJ-CEI⁴), or workplace (CNPJ + CBO).

4 Estimating the Impacts of Children

In this section, we provide analyses of how children influence various aspects of employment outcomes for women in public and private sector. We begin by examining their effects on wages, hours worked, and hourly wages. Subsequently, we delve into understanding these effects further by exploring how mother's choices regarding occupation, firm, and firm are shaped by motherhood.

4.1 Impacts on Employment, Wage and Hours Work

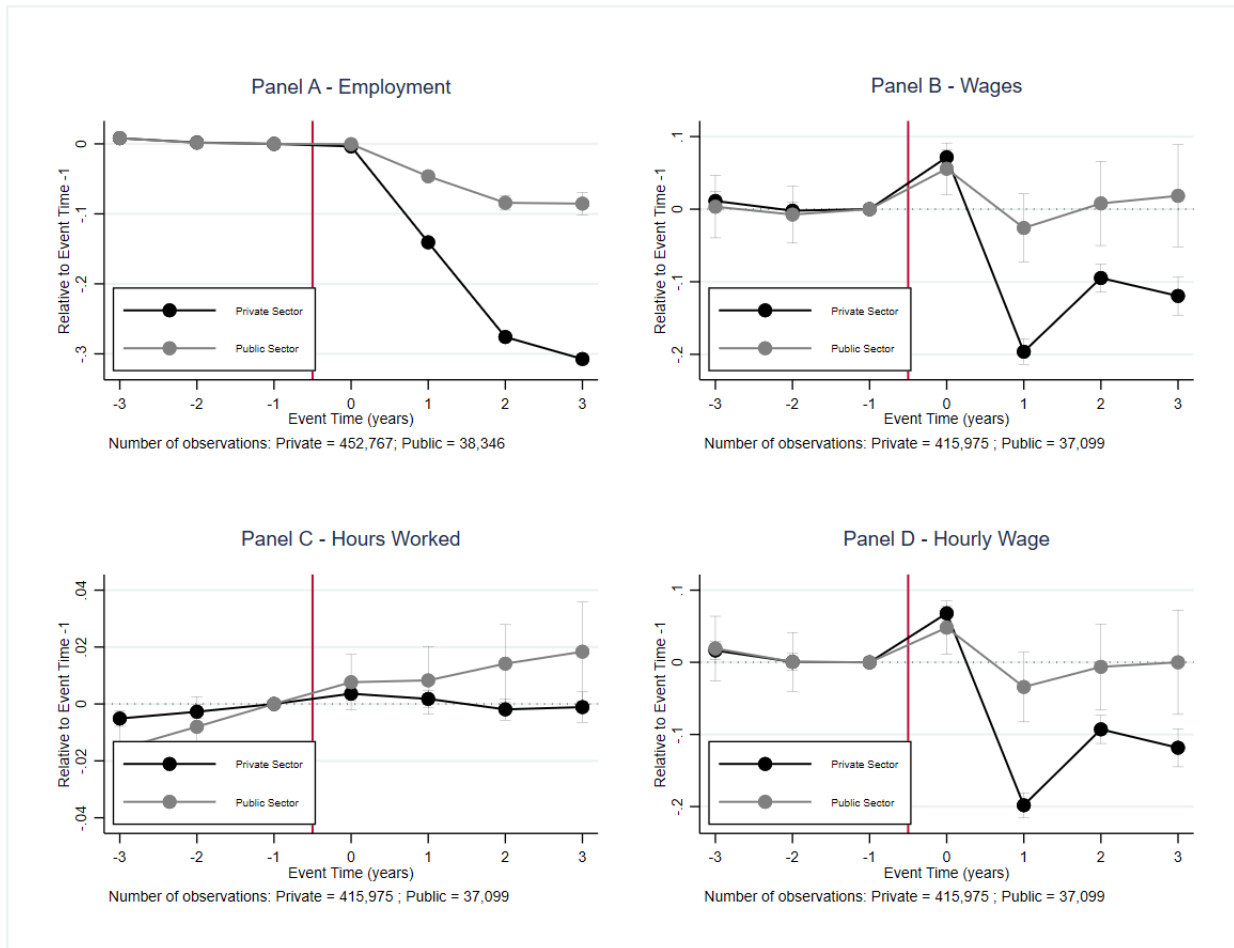
Figure 1 report the impacts of children on the outcomes at each event time t relative to the year preceding the childbirth ($t = -1$), with adjustments non-parametrically for age and temporal trends. The figure includes 95 percent confidence intervals around the event coefficients. Panel A shows employment's trajectories of women employed in public and private sector evolve in a parallel manner. However, upon the arrival of the child, there is a noticeable divergence. Women in private sector experience an immediate drop of nearly 30 percent, whereas public

³CBO (Classificação Brasileira de Ocupações) is the Brazilian Classification of Occupations. It is a system used to categorize and describe various types of occupations and job roles in Brazil. This classification is utilized for statistical, administrative, and economic purposes, helping to standardize job titles and definitions across the country.

⁴CNPJ (Cadastro Nacional da Pessoa Jurídica) and CEI (Cadastro Específico do INSS) are registration systems in Brazil. CNPJ is a unique registration number required for businesses and legal entities, while CEI is used for registering individuals and entities who engage in specific activities that require social security contributions, such as construction projects.

employee's employment show 10 percent of decrease. Panel B, conditional to the employment status ($employment = 1$), illustrates the impact of children on wages. Women employed in the private sector experience a 20% decrease in their wages. Mothers in the public sector experience a wage decrease of less than 10%. In the following years, part of this wage decline is recovered, but not fully, particularly in the private sector.

Figure 1: Impacts of children



Notes: The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years before the childbirth. The employment variable statistics are estimated on a balanced sample with imputed observations for each CPF in years when women are out of the formal labor market, as described in the data section. The other variables are estimated on a non-balanced sample of mothers who had children between 2012 and 2018. The effects on wages, hours worked, and hourly wages are estimated conditional on employment status. The shaded 95 percent confidence intervals are based on robust standard errors.

Motherhood's impacts on wage arise from two dimensions: hours worked and hourly wages. Panels C and D of Figure 1 illustrate hours worked and hourly wage impacts. Hourly wage dimension has the most significant impact. Before having children, the trajectories of public and private employees are quite similar. However, they sharply diverge immediately after the arrival of a child. The gaps in hourly wages indicate negative impacts on women in both sectors, with

the private sector being particularly affected. Mothers working in the private sector experience a 20 percent drop in their hourly salary during the first year after childbirth. Similar to overall wage impacts, hourly wage partially recovers in the following years.

These findings align with those of Kleven et al. (2019) and contribute to the extensive literature on family labor supply. We provide estimates of the labor market implications of motherhood and highlighting the disparities between the public and private sectors. We demonstrate that motherhood impacts the employment status of female employees. Mothers show a smaller probability of being employed in the years following childbirth compared to non-mothers. This impact is particularly strong in the private sector. The public sector can mitigate part of the child penalty due to its stability characteristics. However, for mothers who remain in the formal labor market, motherhood still affects their careers. We demonstrate that the impact of motherhood on wages arises from the hourly wage dimension. Other mechanisms related to the child penalty on hourly wages, such as occupations, firms, and workplace characteristics, are also examined. In the following section, we investigate these mechanisms further.

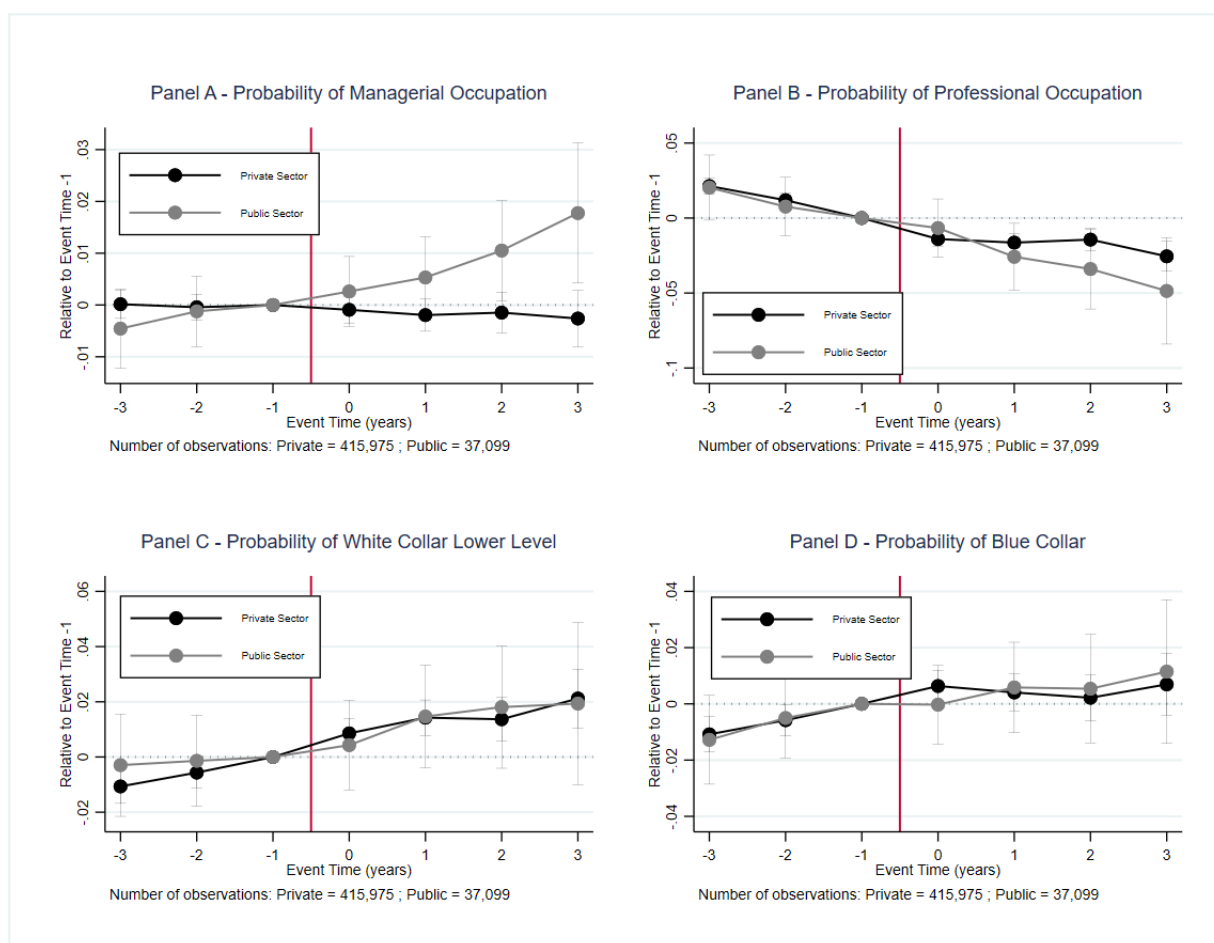
4.2 Impacts on Occupation, Firms and Sector

We have demonstrated that motherhood is linked to substantial effects on wages, hourly wages, and employment, as extensively discussed in the existing literature. Yet, ongoing studies seek to pinpoint the mechanisms underlying these outcomes. One potential explanation revolves around mothers' preferences for career choices that prioritize family needs and involve occupations offering greater flexibility. To explore this further, we analyze occupation and firm characteristics to investigate the impact of motherhood. This section provides empirical evidence addressing this gap.

The findings are presented in Figure 2, using the same analytical framework as previously described. Panel A assesses the probability of managerial ⁵ positions in each (t). Women in both the public and private sectors exhibit similar trends over time. Giving birth shows no significant impact on the probability of attaining a managerial position in the private sector. However, in the public sector, the likelihood of becoming a manager increases in the following years.

⁵Managerial positions refer to upper members of the public sector (1).

Figure 2: Impacts of children on Occupation



Notes: The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years before the childbirth. The employment variable statistics are estimated on a balanced sample with imputed observations for each CPF in years when women are out of the formal labor market, as described in the data section. The other variables are estimated on a non-balanced sample of mothers who had children between 2012 and 2018. The effects on wages, hours worked, and hourly wages are estimated conditional on employment status. The shaded 95 percent confidence intervals are based on robust standard errors. The occupation categories were defined according to the groups in the CBO 2002 and Szerman (2023) classification. Manager: Upper members of the public sector (1); Professional: Professionals in sciences and arts (2) and Middle-level technicians (3); White Collar Lower Level: Administrative services workers (4); Blue Collar: Service workers, retail salespersons in shops and markets (5), Agricultural, forestry, and fishing workers (6), Workers in industrial goods and services production (7), Workers in industrial goods and services production (8), Workers in repair and maintenance services (9).

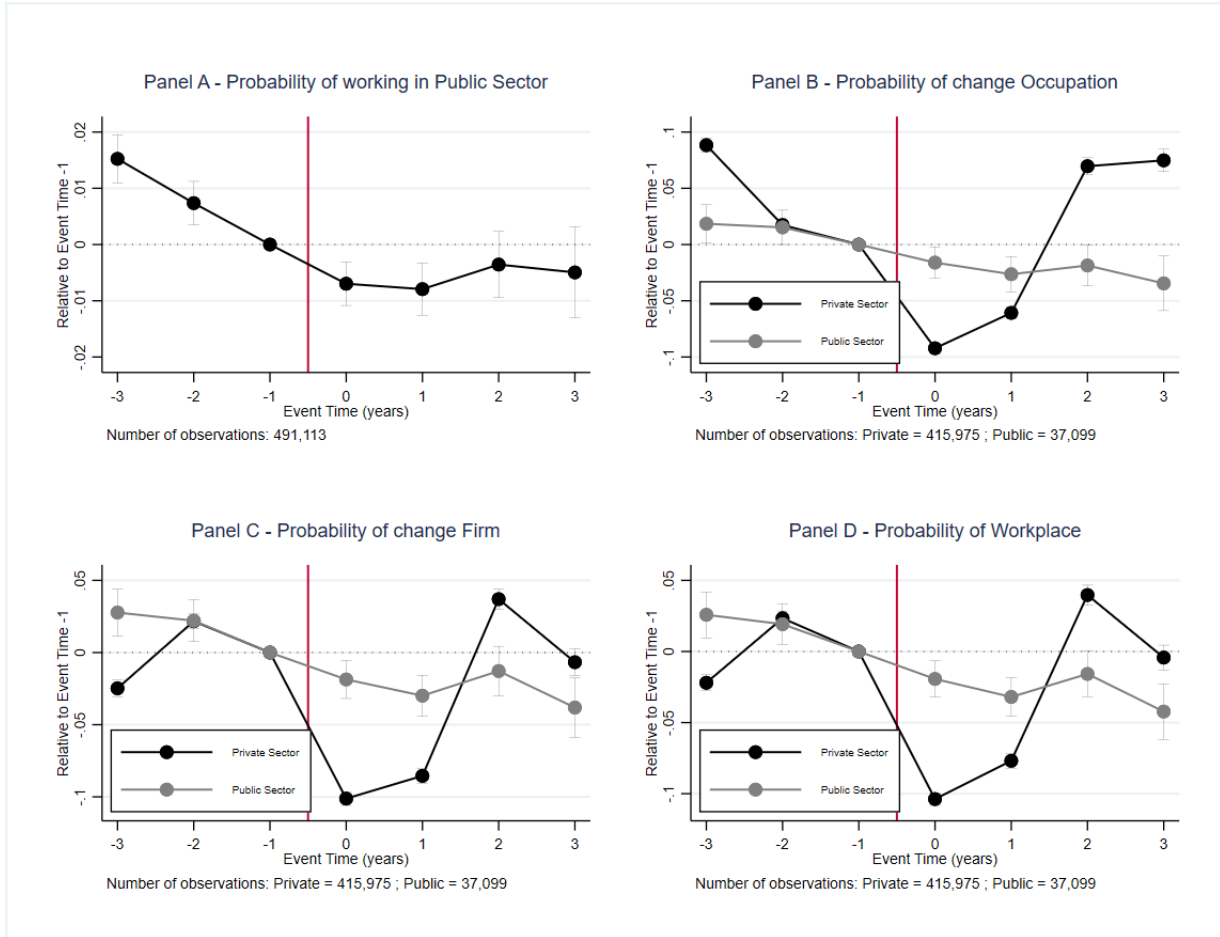
Panel B examines the impact of motherhood on professional⁶ occupations, specifically focusing on roles in sciences and arts and middle-level technical positions. We observe a decline trend even before the childbirth for both sectors. Panel C focus on the impact of childbirth on white-collar lower level occupations⁷. We find that there is no significant impact on the probability of women working in white-collar occupations around childbirth in either sector.

⁶Professional occupations refer Professionals in sciences and arts (2) and Middle-level technicians (3).

⁷White Collar Lower Level: Administrative services workers (4).

Finally, looking specifically to blue-collar⁸ positions, we observe no significant variation of probability of women being in blue-collar occupations after childbirth.

Figure 3: Impacts of children on Sector and Firms



Notes: The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years before the childbirth. The employment variable statistics are estimated on a balanced sample with imputed observations for each CPF in years when women are out of the formal labor market, as described in the data section. The other variables are estimated on a non-balanced sample of mothers who had children between 2012 and 2018. The effects on probability of working in public sector, change occupation, change firm and change workplace are estimated conditional on employment status. The shaded 95 percent confidence intervals are based on robust standard errors.

Another mechanism usually explored in understanding the child penalty is women's preferences for family-friendly workplaces, as investigated by Kleven, Landais e SØgaard (2019). To explore women's career preferences around childbirth, we examine four main variables: the probability of working in the public sector, changing occupations, changing firms, and changing workplaces⁹. Figure 3 presents the results. In Panel A, we observe a decreasing trend in

⁸Blue-collar occupations refer to service workers, retail salespersons in shops and markets (5), Agricultural, forestry, and fishing workers (6), Workers in industrial goods and services production (7), Workers in industrial goods and services production (8), Workers in repair and maintenance services (9).

⁹Here we defined here as remaining in the same occupation within the same firm.

the probability of working in the public sector before childbirth, a common finding in the child penalty literature due to maternity-related preferences. However, in the years following maternity leave, the probability of working in the public sector shows a stability trend.

To understand the decrease in hourly wages, we examined the probabilities of changing occupation, firm, and workplace. In Panel B, we observed parallel trends in the probability of changing occupation between the public and private sectors. However, a significant divergence appears after childbirth. In the private sector, the probability of changing occupation drops sharply in the year of childbirth but increases in the subsequent years. In the public sector, the trend divergence is less clear. The minimal change observed in the first year after childbirth may be correlated with the job stability guaranteed by maternity leave laws.

In Panel C and Panel D, a similar trend is observed. The probability of changing firms and workplace decrease in $t = 0$ and start an increasing path after childbirth in the private sector. Conversely, the public sector experiences a stable trend in the probability of changing firms.

Understanding the occupation and firm characteristics of mothers before and after childbirth is crucial for identifying the mechanisms behind the child penalty on wages. Our analysis shows no significant variation in the probability of mothers being in professional, white-collar, or blue-collar positions after childbirth. However, the probability of becoming a manager increases in the public sector post-childbirth, which may partially explain the mitigated wage impact in this sector. Panels B-D of Figure 3 provide key insights into the impact of motherhood on wages. In the public sector, there is almost no variation in the probability of changing occupation, firm, or workplace after childbirth. In contrast, the private sector exhibits a different pattern, with mothers frequently changing occupation, firm, or workplace after childbirth. This may contribute to the observed wage decline.

4.3 Child Penalty: Heterogeneities

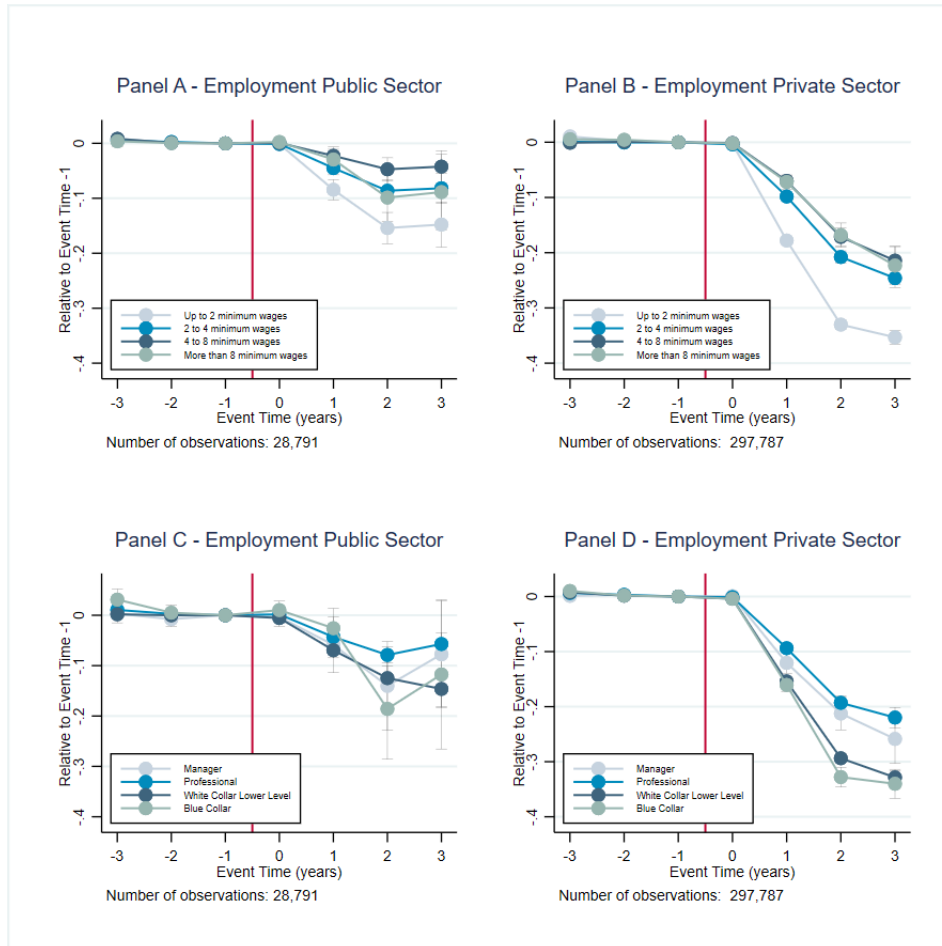
In this section, we analyze the impact of motherhood across different worker categories, showing the evolution of each category over time. We break down the child impact on employment, wages, hours worked, and hourly wages into four minimum wage categories and four occupation categories.

Figure 4 reinforces the previous results. Private sector experiences a more significant impact from childbirth, with mothers earning the lowest salaries being the most affected. While mothers in the private sector earning up to 2 minimum wages see a drop in employment more than 30%. Mothers earning between 2 and 4 minimum wages experience around of 20% drop in the third year after maternity leave. In the public sector, however, the impact heterogeneity follows a similar pattern: mothers in the lowest salary categories are more affected than those in the highest salary categories.

Panels C-D of Figure 4 show that mothers in white-collar lower level occupations and blue-collar occupations experience the highest impact on employment in the private sector.

Employment status shows around of 30% decrease. In contrast, mothers in managerial and professional occupations face a smaller impact. They face a drop of 20% in the probability of being employed in the third year after childbirth.

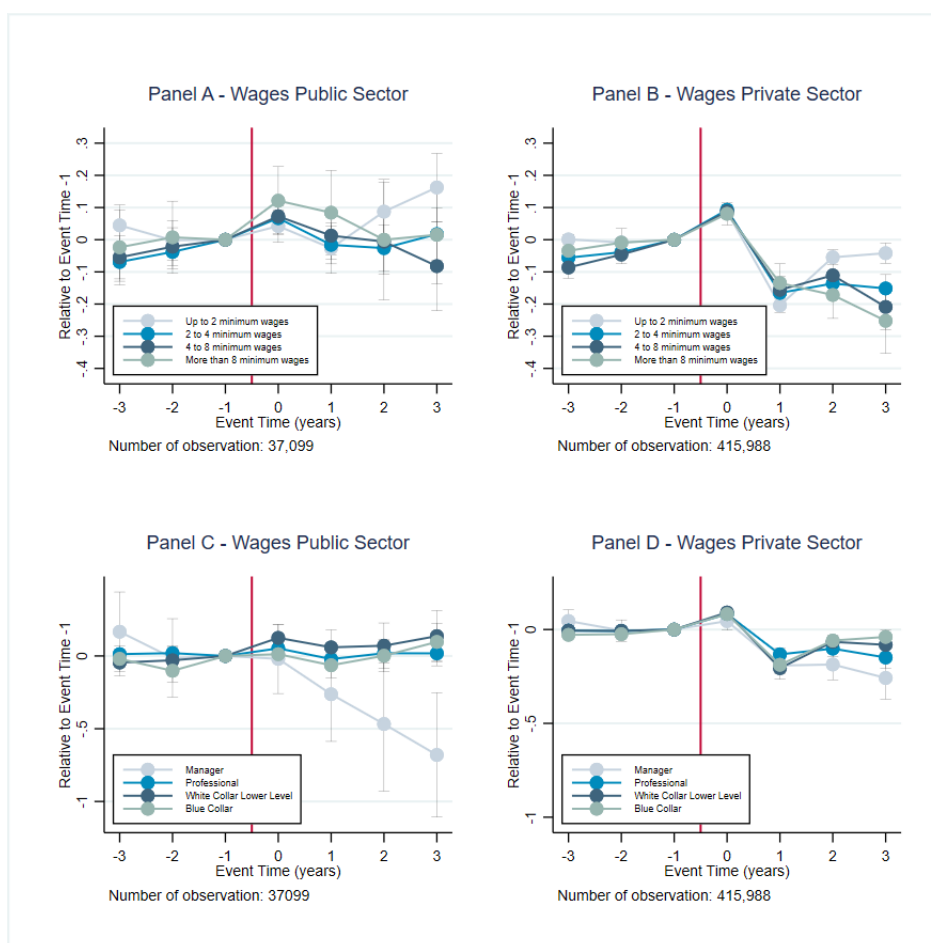
Figure 4: Heterogeneities of Children’s Impact on Employment



Notes: The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years before the childbirth. The employment variable statistics are estimated on a balanced sample with imputed observations for each CPF in years when women are out of the formal labor market, as described in the data section. The other variables are estimated on a non-balanced sample of mothers who had children between 2012 and 2018. The effects on wages, hours worked, and hourly wages are estimated conditional on employment status. The analyzed impact heterogeneities were categorized based on minimum wages and occupation type in the year of maternity leave. The shaded 95 percent confidence intervals are based on robust standard errors.

The impact of motherhood on wages is similar across all minimum wage categories in the first year after childbirth in the private sector (Figure 5). Some mothers, however, recover their salaries more quickly than others. Those earning more than 8 minimum wages experience a faster recovery compared to higher wage earners. In the public sector, impacts across different categories are quite similar across categories. Regarding occupations, impacts are very similar across different categories in the private sector. While in the public sector, managerial occupations experience the highest wage impacts.

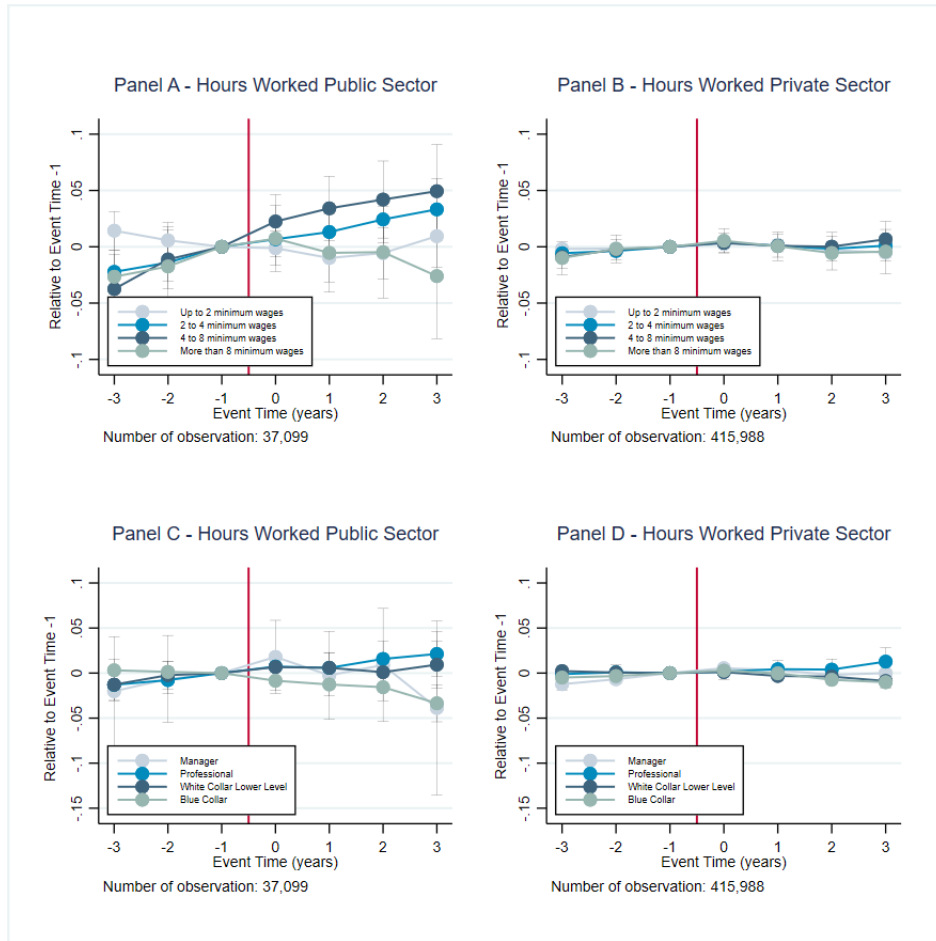
Figure 5: Heterogeneities of Children's Impact on Wage



Notes: The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years before the childbirth. The employment variable statistics are estimated on a balanced sample with imputed observations for each CPF in years when women are out of the formal labor market, as described in the data section. The other variables are estimated on a non-balanced sample of mothers who had children between 2012 and 2018. The effects on wages, hours worked, and hourly wages are estimated conditional on employment status. The analyzed impact heterogeneities were categorized based on minimum wages and occupation type in the year of maternity leave. The shaded 95 percent confidence intervals are based on robust standard errors.

Conversely, Figure 6 reinforces the main finding that motherhood does not have a significant impact on hours worked in both sectors. The impact on hours worked is very similar across minimum wage and occupation categories.

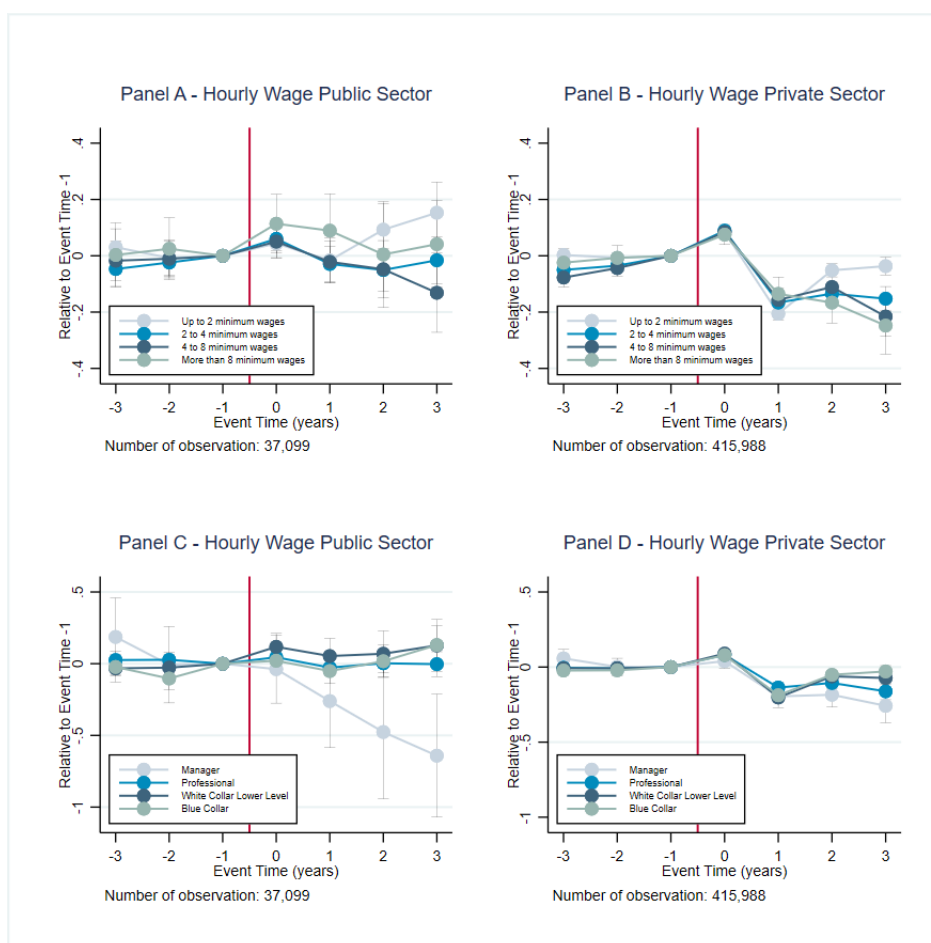
Figure 6: Heterogeneities of Children’s Impact on Hours worked



Notes: The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years before the childbirth. The employment variable statistics are estimated on a balanced sample with imputed observations for each CPF in years when women are out of the formal labor market, as described in the data section. The other variables are estimated on a non-balanced sample of mothers who had children between 2012 and 2018. The effects on wages, hours worked, and hourly wages are estimated conditional on employment status. The analyzed impact heterogeneities were categorized based on minimum wages and occupation type in the year of maternity leave. The shaded 95 percent confidence intervals are based on robust standard errors.

Figure 7 illustrates the heterogeneity of impact on hourly wages for both the public and private sectors. In the public sector, the impact of motherhood on hourly wages is minimal, and the effects are quite uniform across different categories. In contrast, the private sector experiences a stronger impact on hourly wages, with similar effects observed across various occupation and salary categories during the first years after childbirth.

Figure 7: Heterogeneities of Children's Impact on Hourly wage



Notes: The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years before the childbirth. The employment variable statistics are estimated on a balanced sample with imputed observations for each CPF in years when women are out of the formal labor market, as described in the data section. The other variables are estimated on a non-balanced sample of mothers who had children between 2012 and 2018. The effects on wages, hours worked, and hourly wages are estimated conditional on employment status. The analyzed impact heterogeneities were categorized based on minimum wages and occupation type in the year of maternity leave. The shaded 95 percent confidence intervals are based on robust standard errors.

We demonstrate that the impact of motherhood on employment is more pronounced for mothers with the lowest salaries in both the private and public sectors. Additionally, the employment impact is quite similar across all occupation categories in the public sector. However, in the private sector, women in lower-level white-collar and blue-collar occupations experience a greater child penalty. Regarding wage impacts, mothers in managerial positions experience a significant drop in wages in the public sector. In the private sector, women earning up to two minimum wages recover their salaries more quickly.

5 Final Considerations

Despite increasing female participation in the labor market and expanding opportunities for women, challenges persist in reconciling work and motherhood. Applying the event study approach to administrative data from Brazil, our study demonstrates that having children has a profound impact on women’s careers. We present three main findings:

Firstly, the arrival of a new child significantly affects women’s careers, particularly in the private sector. Mothers employed in the public sector experience a 10% decline in employment, whereas those in the private sector face nearly a 30% drop in employment and a 20% decrease in wages. These impacts are driven by substantial changes in hourly wages.

Secondly, we explore potential mechanisms underlying the decline in hourly wages. Our primary finding suggests that following childbirth, there is no significant impact on the probability of attaining a managerial position in the private sector. In the public sector, however, the likelihood of becoming a manager increases in the subsequent years. Additionally, we demonstrate that mothers in the private sector have an increased probability of changing occupation, firm, or workplace after childbirth. In contrast, no significant changes are observed in the public sector. Together, these results provide a comprehensive understanding of how motherhood influences career trajectories, highlighting its distinctly gendered nature.

Thirdly, our research identifies a common pattern but observes a different magnitude in the impact of motherhood between the private and public sectors. In both sectors, mothers in the lowest minimum wage categories experience more pronounced effects. Women in lower-skilled positions within the private sector are disproportionately affected compared to those in managerial and professional roles.

Our study emphasizes that disparities in the labor market are largely shaped by how various sectors accommodate motherhood. While working in the public sector mitigates some of the penalties associated with having children, significant impacts persist.

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